Why Don't the People Insure Late Life Consumption? A Framing Explanation of the Under-Annuitization Puzzle

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Abstract: Rational models of risk-averse consumers have difficulty explaining limited annuity demand. We posit that consumers evaluate annuity products using a narrow "investment frame" that focuses on risk and return, rather than a "consumption frame" that considers the consequences for lifelong consumption. Under an investment frame, annuities are quite unattractive, exhibiting high risk without high returns. Survey evidence supports this hypothesis: whereas 72 percent of respondents prefer a life annuity over a savings account when the choice is framed in terms of consumption, only 21 percent of respondents prefer it when the choice is framed in terms of investment features.

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According to standard economic models, a risk-averse consumer who faces uncertainty about length-of-life should place a high value on life annuities that provide guaranteed income for life. Yet numerous studies show that few consumers voluntarily annuitize their retirement savings. As public and private pension systems around the world continue the ongoing shift from traditional defined benefit plans, which typically pay benefits for life, to defined contribution structures which rarely require annuitization, retirees find themselves increasingly exposed to longevity risk – the risk of being unable to sustain their consumption should they live longer than average.

Numerous papers have attempted to resolve the puzzle of why so few individuals purchase life annuities despite the large individual welfare gains predicted by economic models (for a review of this literature, see Jeffrey R. Brown 2007). Studies have explored the role of high prices and asymmetric information, high fractions of wealth already annuitized by public pension plans, bequest motives and other forms of risk sharing within families, the option value of delayed annuitization, and incomplete annuity markets, including the absence of inflation protection, the inability to insure against medical expenditure or other consumption shocks, and the limited ability to access the equity premium while annuitizing. By combining a number of these factors, it is possible to rationalize very low demand in some specific contexts.

As a whole, however, the literature has failed to find a sufficiently general explanation of consumer aversion to annuities. Many proposed "solutions" simply create new puzzles. For example, family risk-sharing implies that annuity demand should increase upon the death of one spouse, yet we do not observe this. Nor do we observe significantly different annuitization propensities between those who self-proclaim strong bequest motives and those that do not. Several hypotheses suggest that annuitization is optimal only at more advanced ages, yet we do not observe a substantial fraction of the population annuitizing at older ages. Additionally, the

industry has created life annuities that overcome many of the product-based objections (e.g., inflation-protected annuities, annuities with payout streams linked to equity returns, policy riders that provide benefits for long-term care expenses), and yet few consumers buy these products.

Rather than attempting to rationalize the lack of annuity demand, this paper explores the idea that aversion to annuities is not a fully rational phenomenon. A large literature has documented behavioral biases in a wide range of activities that are important steps in the process of planning for retirement, including whether to participate in employer sponsored pension plans, how much to save, and how to allocate one's portfolio. To the extent that individuals exhibit biases in the wealth accumulation aspects of planning for retirement, it seems natural that similar biases might also extend to the wealth decumulation stage of retirement planning.

I. The Framing Hypothesis

This paper suggests that a psychologically richer model of consumer behavior can explain under-annuitization. Since the development of prospect theory, economists have increasingly understood the importance of framing in economic decisions (Amos Tversky and Daniel Kahneman, 1981). While loss/gain asymmetry—the differential responses when a choice is framed as a loss than when it is framed as a gain—is the most commonly discussed example, framing is a more general phenomena. Put simply, experimental findings suggest that choices are not based solely on material consequences, but instead are filtered through the particular *frame* that individuals use to interpret the choices.

To understanding our model of framing, it is useful to start with the standard, fully rational model. Suppose an individual planning for their retirement maximizes the discounted sum of each period's utility of consumption: $\sum_{t=0}^{T} \delta^t u(c_t)$ where $u(c_t)$ is concave, $\delta<1$ is the discount

factor, and T (time of death) is a stochastic variable. In this setting, annuities provide valuable insurance by transferring resources from states where resources have no value (death) to states where resources provide utility through consumption. This is most easily seen in the two-period case where the individual has probability *q* of dying. If this individual invests wealth *W* in a simple bond with a return *R*, he can only consume *W(1+R)* in the second period. If, in contrast, he buys an actuarially fair life annuity, he is able to consume *W(1+R) /(1-q)* if he lives, which, by assumption, is all he cares about. To understand why the annuity allows for higher consumption, imagine all individuals pool their wealth at time 1 and share it amongst at survivors at time 2; this generates a mortality premium.

The above model implicitly has two components: an investment component, in which the individual decides how much to invest in each asset, and a consumption component, in which she decides how to spend the money from that investment. We propose that instead of viewing the problem through the *consumption frame* (focusing on the end result of what can be spent over time), many consumers adopt an *investment frame* (focusing on the intermediate results of return and risk features when choosing assets and not considering the consequences for consumption). This assumption is closely related to the notion of choice bracketing and mental accounting (Richard H. Thaler, 1985; Daniel Read, George Loewenstein and Matthew Rabin, 1999). Consumers effectively isolate one choice (how to invest) from others (how to consume) and focus on specific features of this choice rather than viewing it as part of a broader, integrated set of choices. Specifically, suppose that individuals consider the rate of return and the variance of payouts, a natural frame for someone investigating alternative approaches investing for retirement. In the above example, a bond has return *R* and poses no risk, since it pays the same irrespective of state. On the other hand, the annuity has a return $\frac{(1+R)}{1-q}$ with probability *1-q* and

return 0 with probability *q*. If the annuity is actuarially fairly priced and individuals have rational expectations about mortality, then the annuity has expected return *R.* Yet despite having the same return, the annuity appears *riskier* than the bond. *This reversal is key to our hypothesis*: *under the consumption frame, the annuity is attractive because it serves as a form of insurance. In contrast, under the narrow investment frame, the annuity is viewed as being riskier than a bond because its return depends on a random variable T.*

Practically, this framework suggests that the unattractive feature of the annuity in the investment frame will be the potential for the investment to have a negative return. This matches the qualitative intuition that practitioners provide: people react negatively to the possibility that they could lose money. Indeed, if an individual dies immediately after annuity purchase, he could lose his entire principal. Although not necessary for our analysis, loss aversion can strengthen this fear, as noted by Wei-Yin Hu and Jason S. Scott (2007). The possibility of loss is particularly problematic since the annuity does not offer a higher expected return to offset this extra "risk." This insight is also consistent with industry market research that has found that many consumers think of annuities as a "gamble" rather than as insurance. In fact, the annuity is even more unattractive: life annuities payouts are typically less than actuarially fair due to administrative costs and adverse selection, meaning that the higher risk is bundled with a lower return. In addition, the risk of adverse selection also necessitates that most annuity contracts are essentially irreversible, resulting in illiquidity.

To summarize, we argue that when choosing how to invest their money, individuals focus too narrowly on risk and return. The annuity, when viewed in this narrow investment frame, looks risky and unattractive. In the next section we test this hypothesis.

II. Testing the Framing Hypothesis

In this paper, we provide a preliminary test of the framing hypothesis. We created descriptions of potential scenarios to be presented to potential consumers, some of which represent annuities and some of which represent competing non-annuitized products (such as a savings account.) The essence of the test is that some of the subjects are presented these products in an investment frame, which emphasized the depersonalized return on an account by using words such as "invest" and "earnings," describing periods in terms of years, mentioning the value of the initial investment ($100,000 in every case), and alluding to the account value at other points in the description. The other subjects are presented these products in a consumption frame, meaning that they are told how much each product would ultimately allow its purchaser to consume and for how long, using words such as "spend" and "payment," describing periods in terms of the purchaser's age, and never alluding to an account or its value. The key distinction is that the consumption frame shifts the frame: instead of simply considering the returns on the investment, individuals are presented with the consumption consequences of the investment. The consumption frame implicitly incorporates the results of investment decisions as well as the time path of consumption, and, in this sense, is broader. The framing hypothesis suggests that the life annuity should be attractive in the consumption frame and unattractive in the investment frame.

We collected data to test this hypothesis in a four-arm internet survey conducted in December 2007. The internet survey firm Zoomerang hosted the survey and recruited respondents over age 50 from a pre-existing panel of individuals willing to participate in surveys in return for small incentives. A total of 1342 individuals, approximately 335 per arm, completed the survey. All respondents answered seven forced-choice questions. Each question described the investment/spending decisions of two fictitious people and asked, "Who has made the better

choice?" In all arms of the survey, an introduction stated that both people receive $1,000 each month from Social Security, have "some savings" and have already set aside money for their children. The presence of savings and money for the children were intended to address respondents' potential concerns about insurance from consumption shocks and bequests. In a real-life setting, such concerns could be addressed via partial annuitization.

Two arms of the survey presented the introduction and the choices using the investment frame, and two arms used the consumption frame. The exact wording of the products and the frames is provided in Appendix A. In all four arms of the survey, the choices were described in terms of amounts and durations: the specific terms "annuity," "savings account," and "bond" were not used for labels. Several choices were compared in all arms: (1) a life annuity paying $650 each month until death (2) a traditional savings account bearing 4 percent interest (3) a consol bond paying $400 each month forever (4) a 35 year period annuity paying $500 each month and (5) a 20 year period annuity paying $650 each month. In all four arms of the survey, each respondent compared the life annuity separately to each of the other products. In addition, in the investment frame each respondent compared a principal-protected life annuity (i.e., a life annuity that guaranteed enough payments so that the nominal value of the principal would be repaid even in the event of an early death) paying $625 each month to the traditional savings account. All choices were designed to be actuarially equivalent and respondents were informed of this fact. To avoid spurious effects, the survey included several other comparisons that did not feature the life annuity, varied the order of the comparisons, and varied whether the life annuity was presented first or second within a given comparison.

To further address the role of the bequest motive in suppressing annuitization, we added an additional dimension of variation in the survey. Half of the respondents in each frame were told

that, after death, remaining earnings or payments went to charity (the weak bequest condition); the other half that they went to children (the strong bequest condition).

We note that while our survey results are based on hypothetical scenarios, these scenarios are very similar to actual financial decisions that respondents and people they know have made. This stands in sharp contrast to the frequently used (and criticized) contingent valuation situations that attempt to value the existence of things outside of normal experience. Robert B. Barsky et al. (1997) showed that data on stated preferences regarding risk tolerance and consumption path preferences were related in sensible ways to predicted behaviors. More generally, in a review of studies using stated preference data versus revealed preference data, Jordan J. Louviere, David A. Hensher and Joffre D. Swait (2002) found that estimates of parameters based on the two types of data are often quite similar. An advantage of this approach is that we can obtain stated preferences over alternatives that may not be offered in a market (and for which there are no revealed preferences) but that are constructed to directly test our hypothesis. While we do not intend these stated preference data to be conclusive, the results are useful for guiding future research, possibly including experiments using actual product choices.

III. Results

Table I reports our results. When questions were presented in the consumption frame, the majority of individuals preferred the consumption stream consistent with a life annuity to the consumption streams available from other products of comparable actuarial value. Specifically, in this frame, when individuals were told that any payments after death went to charity, 72 percent of respondents preferred the $650 per month that could be provided by a life annuity to the consumption stream from a savings account of comparable actuarial value. 77 percent

preferred the life annuity to receiving $650 per month for 20 years (age 85); 76 percent preferred the life annuity to receiving $500 per month for 35 years (age 100); and 71 percent preferred the life annuity to receiving $400 forever (the consol bond).

In contrast, when individuals faced the same choices in the investment frame, the proportions reversed, with the majority of individuals *not* choosing the life annuity. Specifically, only 21 percent of respondents preferred an account earning $650 each month for life (i.e., a life annuity) to investing $100,000 at four percent. Further, only 48 percent preferred the life annuity to an account earning $650 per month for 20 years; 40 percent preferred the life annuity to an account earning $500 per month for 35 years; and only 27 percent preferred the life annuity to an account earning a five percent interest rate from which interest but not invested money could be withdrawn. Note that in the life and period annuity cases, the respondent was explicitly told that that, at the end, the investment would be worth nothing. In every case, the difference in rates between the consumption and investment frames was statistically significant.

In order to explore the direct effect of bequest motives, as well as any interaction between bequests and framing, we also randomized the treatment of bequests in our sample. When individuals were told that remaining payments went to children, rather than to charity, the percentages of respondents preferring the life annuity in the consumption frame declined, although it remained above 50 percent in most cases. Specifically, 59 percent of respondents preferred the life annuity to a savings account; 65 percent preferred the life annuity to $650 per month to age 85; 53 percent preferred the life annuity to $500 per month to age 100; and 49 percent preferred the life annuity to $400 “forever.” Importantly, however, the percentages of respondents preferring the life annuity also fell in the investment frame so that the magnitude of the between-frame differences remained quite similar. Thus, across both a strong and a weak

framing of bequests, we find a substantially larger fraction of the population finds annuities attractive when framed in consumption, rather than investment, terms.

While the strong effect of the frame on the stated preferences for life annuities is the key finding of the survey, our research also provides insights on how the framing affects various features of the annuity product. Specifically, there are at least two distinct features of a life annuity that distinguish it from a savings account: (i) the conversion from flexible access to money (i.e., "liquidity" in the investment frame) to a fixed stream of payments, and (ii) the application of the mortality premium to the annuity payments. We are able to isolate the effect of each of these factors by comparing alternative products within each frame.

In the consumption frame, we find that the loss of flexibility did not have much impact on the respondents' evaluation of choices. Similar, albeit slightly lower, percentages of respondents preferred the life annuity to the savings account (flexible access) as preferred the life annuity to the period-certain annuity (fixed payment). In contrast, the loss of flexibility did matter in the investment frame: a smaller fraction of respondents chose the life annuity over the savings account than chose the life annuity over the period-certain annuity.

We also find that the mortality premium, which arises from pooling mortality risk, was a positive attribute in the consumption frame, with respondents consistently favoring life annuities relative to period-certain annuities. In contrast, the mortality premium was viewed negatively in the investment frame, with the majority of respondents disliking the life annuity relative to its period-certain counterpart. These attitudes are consistent with our hypothesis: a dislike of illiquidity and loss of control are salient in the investment frame, but not in the consumption frame. Similarly, a desire to insure against longevity risk is salient in the consumption frame but not the investment frame.

Our survey also indicates that principal protection is highly valued in the investment frame: in the weak bequest condition, 47 percent of respondents believe that a principal-protected life annuity earning $625 per month is a better choice than a savings account, while only 21 percent believe that an unprotected life annuity dominates; the result is more dramatic in the strong bequest arm. Again, this high valuation is consistent with our hypothesis and specifically with an aversion to the loss of wealth with a reference point at the amount of the initial investment.

IV. Conclusion

We hypothesize that framing matters for annuitization decisions: in a consumption frame, annuities are viewed as valuable insurance, whereas in an investment frame, the annuity is a risky asset because the payoff depends on an uncertain date of death. Survey evidence is consistent with our hypothesis that framing matters: the vast majority of individuals prefer an annuity over alternative products when presented in a consumption frame, whereas the majority of individuals prefer non-annuitized products when presented in an investment frame. To the extent that the investment frame is the dominant frame for consumers making financial planning decisions for retirement, this finding may help to explain why so few individuals annuitize.

This finding provokes the immediate question: if framing matters, why don't annuity providers use the consumption frame? We conjecture that the investment frame is the dominant frame in the market and in most younger customers' minds both because it is simpler, due to the focus on nearer-term and impersonal outcomes, and because little is lost by using this frame during the wealth accumulation stage of life. We further conjecture that firms tend not to "convert" retirement-age customers to the consumption frame for several reasons: resources are required to incorporate additional personalized information and thus convert consumers to a

more complex frame; a given firm may not capture the return from raising a customer's interest in particular products in the consumption frame because the converted customer can purchase from another lower-cost seller; the compensation of sales staff (e.g., through commissions) may be oriented to products most consonant with investment frame and the compensation system may involve sales people outside the direct control of a given firm; invoking the consumption frame may undermine demand for the firm's other non-life-contingent products. Exploration of these conjectures would be valuable future work.

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Table 1
Percent of Respondents Preferring Annuities to Alternative Products
Comparison of Consumption and Investment Frames

	Remaining payments left to "charity"			Remaining payments left to "children"		
Product comparison	*Consumption Frame %*	*Investment Frame %*	*p*	*Consumption Frame %*	*Investment Frame %*	*p*
Life annuity ($650 per month)						
Traditional savings account 4% interest	72	21	.000	59	12	.000
20 year period annuity $650 per month	77	48	.000	65	28	.000
35 year period annuity $500 per month	76	40	.000	53	28	.000
Consol bond $400 per month forever	71	27	.000	49	12	.000
Principal-protected life annuity ($625 per month)						
Traditional savings account 4% interest		47			50	
N	352	321		339	330	

Notes:

1. *Each question described two fictitious men's decisions for investing/spending in retirement and asked, "Who has made the better choice?" An introduction stated that both men had $1,000 each month from Social Security and "some savings" and had already set aside money for their children.*
2. *The Consumption frame used terms such as "spend" and "payment," described periods in terms of the individual's age, and never alluded to an account or its value. The Investment frame used terms such as "invest" and "earnings," described periods in terms of years, mentioned the value of the initial investment ($100,000 in every case), and alluded to the account value at other points in the survey. All decisions were described in terms of amount and duration; the terms "annuity", "savings account", and "bond" were not used to label decisions.*
3. *Standard error 2.7 percentage points.*
4. *All respondents were 50 years old or older.*
5. *Data collected via internet survey mid-December 2007*

Appendix A
Text of Survey Instrument

FRAME I: Consumption Frame with Weak Bequest

Introduction
On the following screens you will be asked seven questions. In each case, two people have made permanent decisions on how to spend a portion of their money in retirement. You are asked to judge which person has made a better choice.

In all scenarios, each person has some savings and can spend $1,000 each month from social security in addition to the portion of income mentioned in each question. They have already set aside money to leave for their children when they die. The choices are intended to be financially equivalent and based on personal preferences for spending in retirement.

Life annuity
Mr. Red: Mr. Red can spend $650 each month for as long as he lives in addition to social security. When he dies, there will be no more payments.

20-year period annuity
Mr. Orange: Mr. Orange can spend $650 each month until he is 85 years old in addition to social security. When he turns 85, he will have no additional money left to spend. However, if he dies before he is 85, he may leave remaining payments to charity.

35-year period annuity
Mr. Blue: Mr. Blue can spend $500 each month until he is 100 years old in addition to social security. When he turns 100, he will have no additional money left to spend. However, if he dies before he is 100, he may leave remaining payments to charity.

Consol bond
Mr. Green: Mr. Green can spend $400 each month for as long as he lives in addition to social security. When he dies, he may leave remaining payments, which will continue forever, to charity.

Savings account
Mr. Gray: Mr. Gray can choose an amount to spend each month in addition to social security. How long his money lasts depends on how much he spends. If he spends only $400 per month, he has money for as long as he lives. When he dies, he may leave the remainder to charity. If he spends $650 per month, he has money only until age 85. He can spend down faster or slower than each of these options.

FRAME II: Consumption Frame with Strong Bequest

Introduction

On the following screens you will be asked seven questions. In each case, two people have made permanent decisions on how to spend a portion of their money in retirement. You are asked to judge which person has made a better choice.

In all scenarios, each person has some savings and can spend $1,000 each month from social security in addition to the portion of income mentioned in each question. They have already set aside money to leave for their children when they die. The choices are intended to be financially equivalent and based on personal preferences for spending in retirement.

Life annuity
Mr. Red: Mr. Red can spend $650 each month for as long as he lives in addition to social security. When he dies, there will be no more payments.

20-year period annuity
Mr. Orange: Mr. Orange can spend $650 each month until he is 85 years old in addition to social security. When he turns 85, he will have no additional money left to spend. However, if he dies before he is 85, he may leave remaining payments to his children.

35-year period annuity
Mr. Blue: Mr. Blue can spend $500 each month until he is 100 years old in addition to social security. When he turns 100, he will have no additional money left to spend. However, if he dies before he is 100, he may leave remaining payments to his children.

Consol bond
Mr. Green: Mr. Green can spend $400 each month for as long as he lives in addition to social security. When he dies, he may leave remaining payments, which will continue forever, to his children.

Savings account
Mr. Gray: Mr. Gray can choose an amount to spend each month in addition to social security. How long his money lasts depends on how much he spends. If he spends only $400 per month, he has money for as long as he lives. When he dies, he may leave the remainder to his children. If he spends $650 per month, he has money only until age 85. He can spend down faster or slower than each of these options.

FRAME III: Investment Frame with Weak Bequest

Introduction

On the following screens you will be asked seven questions. In each case, two people have made permanent decisions on how to invest a portion of their money in retirement. You are asked to judge which person has made a better choice.

In all scenarios, each person has some savings and receives $1,000 each month in social security, in addition to the portion of savings mentioned in each question. Each person has chosen a different way to invest this portion ($100,000) of their savings. They have already set aside money to leave for their children when they die. The choices are intended to be financially equivalent and based on personal preferences for investing in retirement.

Life annuity
Mr. Red: Mr. Red invests $100,000 in an account which earns $650 each month for as long as he lives. He can only withdraw the earnings he receives, not the invested money. When he dies, the earnings will stop and his investment will be worth nothing.

20-year period annuity
Mr. Orange: Mr. Orange invests $100,000 in an account which earns $650 each month for 20 years. He can only withdraw the earnings he receives, not the invested money. After 20 years, the earnings will stop and his investment will be worth nothing. However, if he dies before then, he may leave remaining earnings to charity.

35-year period annuity
Mr. Blue: Mr. Blue invests $100,000 in an account which earns $500 each month for 35 years. He can only withdraw the earnings he receives, not the invested money. After 35 years, the earnings will stop and his investment will be worth nothing. However, if he dies before then, he may leave remaining earnings to charity.

Consol bond
Mr. Green: Mr. Green invests $100,000 in an account which earns a 5% interest rate. He can only withdraw the interest he receives, not the invested money. When he dies, he may leave the remaining earnings, which continue forever, to charity.

Savings account
Mr. Gray: Mr. Gray invests $100,000 in an account which earns a 4% interest rate. He can withdraw some or all of the invested money at any time. When he dies, he may leave any remaining money to charity.

Principal-protected life annuity
Mr. Black: Mr. Black invests $100,000 in an account which earns $625 each month for as long as he lives. He can only withdraw the earnings he receives, not the invested money. If he dies before he has received $100,000 in total payments, he may leave the difference to charity.

FRAME IV: Investment Frame with Strong Bequest

Introduction

On the following screens you will be asked seven questions. In each case, two people have made permanent decisions on how to invest a portion of their money in retirement. You are asked to judge which person has made a better choice.

In all scenarios, each person has some savings and receives $1,000 each month in social security, in addition to the portion of savings mentioned in each question. Each person has chosen a different way to invest this portion ($100,000) of their savings. They have already set aside money to leave for their children when they die. The choices are intended to be financially equivalent and based on personal preferences for investing in retirement.

Life annuity
Mr. Red: Mr. Red invests $100,000 in an account which earns $650 each month for as long as he lives. He can only withdraw the earnings he receives, not the invested money. When he dies, the earnings will stop and his investment will be worth nothing.

20-year period annuity
Mr. Orange: Mr. Orange invests $100,000 in an account which earns $650 each month for 20 years. He can only withdraw the earnings he receives, not the invested money. After 20 years, the earnings will stop and his investment will be worth nothing. However, if he dies before then, he may leave remaining earnings to his children.

35-year period annuity
Mr. Blue: Mr. Blue invests $100,000 in an account which earns $500 each month for 35 years. He can only withdraw the earnings he receives, not the invested money. After 35 years, the earnings will stop and his investment will be worth nothing. However, if he dies before then, he may leave remaining earnings to his children.

Consol bond
Mr. Green: Mr. Green invests $100,000 in an account which earns a 5% interest rate . He can only withdraw the interest he receives, not the invested money. When he dies, he may leave the remaining earnings, which continue forever, to his children.

Savings account
Mr. Gray: Mr. Gray invests $100,000 in an account which earns a 4% interest rate . He can withdraw some or all of the invested money at any time. When he dies, he may leave any remaining money to his children.

Principal-protected annuity
Mr. Black: Mr. Black invests $100,000 in an account which earns $625 each month for as long as he lives. He can only withdraw the earnings he receives, not the invested money. If he dies before he has received $100,000 in total payments, he may leave the difference to his children.