

# Who Chooses Annuities? An Experimental Investigation of the Role of Gender, Framing, and Defaults

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Research suggests that women are more risk averse and less financially literate than men, as evidenced by their choice of less risky asset investments. We contribute to the literature by focusing on the role of gender in an increasingly important financial decision facing individuals at retirement, the choice between purchasing an annuity (in this case, a fixed immediate lifetime annuity) or investing their savings on their own. By using a controlled experiment, we eliminate the role of adverse selection and unfair annuity pricing and are able to focus specifically on gender. We also explore the role of defaults and framing, and whether women react differently to these features. We find that women are more likely to choose the annuity, and this is only partly explained by differences in risk aversion and financial literacy. Furthermore, biases in a five-minute presentation of information significantly affect choices in ways that differ across men and women.

## I. Why the Annuity Decision?

We focus on the annuity decision for several reasons. First, it is a relatively complicated and increasingly important financial decision individuals must make as companies shift from defined benefit plans to defined contribution plans. While research has shown that

women prefer less risky asset allocations, we know less about how women's preferences differ from men's in their decision to annuitize or not. Second, the annuity decision is not well understood and may not be rational. The small size of the actual annuity market is inconsistent with theoretical expectations, even when rational extensions like adverse selection, preexisting annuitization, risk sharing by couples, high annuity prices, and bequest motives are added to the basic model. Jeffrey R. Brown (2007) provides a thorough summary of the past literature, defines the "annuity puzzle," and suggests that future research should focus more on behavioral explanations. Our study addresses a potential behavioral explanation and relies on a framing approach based on loss aversion.<sup>1</sup> Third, information about the annuity decision can be negatively framed to support either choice, by focusing either on the possibility of outliving resources when choosing the investment option, or the possibility of purchasing an annuity and not reaping the benefits because of dying soon after. Thus, we can study how framing might influence participants either toward *or* away from purchasing annuities, as well as look for gender-specific effects. Finally, a topic of recent debate is whether annuitization should be the default distribution option in 401(k) plans.

## II. Why Might Gender Matter?

While there is not a known psychological reason why gender should matter, it may be that gender is proxying for other factors that influence financial decisions like risk aversion and financial literacy. There is evidence that women are more risk averse than men in general (Catherine C. Eckel and Philip J. Grossman forthcoming), and this translates to investing in

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<sup>1</sup> Our experiment is not designed to test for loss aversion.

less risky assets in their retirement plans (Agnew, Pierluigi Balduzzi, and Annika Sunden 2003). Olivia S. Mitchell et al. (1999) show that as risk aversion increases, individuals are willing to forgo more wealth for actuarially fair annuities. Given the evidence that women are more risk averse than men, we hypothesize that they are more likely to choose annuities. However, if risk aversion is driving the decision to choose annuities, after controlling for it, gender differences in the annuity decision may not be significant.

Differences in financial literacy between men and women may also explain differences in their annuity decision. In most studies measuring financial literacy, women score lower than men, and it is possible that literacy is driving the decision to annuitize. In fact, Peggy D. Dwyer, James H. Gilkeson, and John A. List (2002) find that the gender differences observed in mutual fund investment decisions can be largely explained by differences in knowledge.

### III. Defaults and Framing

The importance of defaults and framing to decision making has been established in many contexts. In retirement research, the influence of defaults on financial decision making is well documented. In fact, recent changes in some 401(k) plans from voluntary enrollment to automatic enrollment were driven by the finding that people are more likely to participate when they are enrolled by default. While the role of information framing in choice, in general, is well known, its role in financial retirement decisions specifically is not.

In this paper, we adopt a framing technique that has been shown to be effective in improving preventative health behaviors. Negative framing (also known as “fear appeals”) has been effective in increasing preventive health behaviors related to colon cancer, breast cancer, sexually transmitted diseases and skin cancer (see, for example, Lauren G. Block and Punam Anand Keller 1995)

To test whether this framing technique can influence the annuity decision, we created an experiment that highlights the potential financial losses associated with either the annuity choice or the investment choice. If we are able to influence the decision based on the negative framing of information, it is possible that these effects may also exist in the marketplace.

In our experiment, we first showed our participants one of three five-minute slide shows. One slide show highlighted the negative features of the investment option and provided the annuity as the solution to avoid the drawbacks. The second slide show highlighted the negative features of the annuity option and provided the investment option as the solution to overcome the drawbacks. The third slide show, in which neither option was favored, was neutral.

### IV. Experimental Design

Risk preferences and financial literacy were collected at the beginning of each experimental session using modifications of commonly used instruments. To capture risk tolerance in the laboratory, we had participants complete the lottery choice experiment from Charles A. Holt and Susan K. Laury (2002). Following the lottery experiment, subjects completed a financial literacy survey adapted from several literacy tests used in previous studies.

Next, participants were asked to play a “Retirement Game” which began with one of the three slide shows discussed above. Then subjects were given *unbiased* instructions with specific details about the experiment. In the retirement experiment subjects were given \$60 either to purchase an annuity or to invest in a self-chosen portfolio composed of a risk-free asset and our simulated “market.”<sup>2</sup> If participants chose the annuity, they received \$16.77 for every round they survived in the game. If the investment choice was selected, then subjects had to choose how much to withdraw in the form of a check and how to allocate their remaining balance between the market and the risk-free asset. These allocations were made on a round-by-round basis, with independent die rolls for each participant determining when the subject “died.”<sup>3</sup> For participants who chose the investment, additional die rolls were used to determine their return on the investment in each round. Each round corresponded to one month

<sup>2</sup> Unfair annuity pricing and adverse selection were avoided by making the annuity price fair and making subjects aware of their identical survival probabilities over the six-period game up front.

<sup>3</sup> The instructions for the experiment were not context free, since one goal of the study was to investigate the effect of biases in information. However, we did not use the words “survive” or “die” in the instructions.

in real time, and subjects were paid using postdated checks.

The two main treatment variables in the investment experiment were whether or not there was a default choice (investment, annuity, or none) and whether or not the information provided to subjects was biased toward one of the options or no option at all. As noted above, the biased information (investment, annuity, or neutral) was given prior to the decision in the form of a five-minute marketing slide show. The default option was implemented by slight changes in the wording of the instructions and by attaching the record sheet for the default option to the instructions. Subjects had to request the other record sheet if they preferred the nondefault option. At the end of each experimental session, subjects completed an exit survey that collected information on demographic traits and real world investment decisions.

This experiment differs from the typical economics experiment in several dimensions. We deliberately introduced context into the design through the slide shows, since one focus of the study is information biases. Another unique feature of the design is that we captured individual-specific measures of risk tolerance and financial literacy in addition to documenting behavior in the main (investment) experiment. These measures are used to explain decision making in the investment experiment. Other distinguishing features of this study are the large number of participants and the wide age range of the subjects. For this study, we recruited 445 female and 400 male nonstudent subjects ranging in age from 19 to 89 from the greater Williamsburg, Virginia, area. The average age was 54 for females and 56 for males. We also recruited subjects from a wide distribution of incomes and education.

## V. The Results

Given the evidence that financial literacy and risk aversion are related to financial decision making, we begin by comparing males and females using simple *t*-tests for differences of means. Consistent with previous studies, the average score for women on a ten-point financial literacy survey is significantly lower than men (male = 7.62, female = 6.52,  $t = -8.11$ ). A separate analysis of each question finds that the percentage of women answering each

question correctly is lower for nine out of the ten questions, and the response “don’t know” was chosen more often by women than men for nine questions on the survey. We divided participants into above average (high) and below average (low) literacy groups based on the mean score of the entire sample, and more males (57 percent) fall into the high-literacy category than females (31 percent). We also find gender differences in risk aversion. We determined a range of values for each subjects’ coefficient of relative risk aversion (CRRA) using the Holt and Laury (2002) lottery choice experiment.<sup>4</sup> Comparing the midpoint of the range of the CRRA, we find that the average female is significantly more risk averse than the average male (male = 0.23, female = 0.29,  $t = 1.86$ ).

Turning to the annuity decision, we find that women choose the annuity option more frequently than men (38 percent of women versus 29 percent of men). Using our full sample of experimental results, we estimated a probit model of the decision to choose an annuity including indicator variables for the treatments. After controlling for financial literacy and risk aversion, we still find that female subjects are significantly more likely to choose the annuity than male subjects in the unbiased treatments without a default option. Given this evidence that men and women differ in risk aversion, financial literacy, and annuity choice, we split our sample to consider separately the effects of the biases and defaults on women and men.

Table 1 presents the marginal effects estimated from the probit analysis of the decision to choose an annuity. Model 1 is a basic model that controls for the default and the bias. Model 2 also includes controls for demographic characteristics. Model 3 includes the binary measure for financial literacy and the risk aversion measure. As predicted by theory, more risk-averse individuals (both male and female) are significantly more likely to choose annuities. Also, both females and males in the high

<sup>4</sup> We follow Glenn W. Harrison, John A. List, and Charles Towe (2007) in calculating the midpoint of the range of CRRA values for each subject. In model 3, we excluded from our sample 46 subjects who chose a certain payoff of \$6.00 over a certain payoff of \$11.55 in the lottery experiment, and 52 subjects who made two or more switches between the safe lottery and risky lottery, because we interpret this as evidence that subjects did not understand the experiment.

TABLE 1—PROBIT ANALYSIS OF ANNUITY CHOICE

	Model 1		Model 2		Model 3	
	Female	Male	Female	Male	Female	Male
Annuity bias	0.107* (0.056)	0.193*** (0.060)	0.077 (0.057)	0.182*** (0.069)	0.1125 (0.074)	0.210*** (0.078)
Investment bias	-0.112** (0.054)	-0.103* (0.057)	-0.114** (0.052)	-0.100 (0.071)	-0.157** (0.069)	-0.136* (0.080)
Annuity default	0.058 (0.058)	-0.066 (0.056)	0.034 (0.059)	-0.022 (0.070)	0.040 (0.076)	0.019 (0.081)
Investment default	0.021 (0.055)	-0.096* (0.053)	0.022 (0.054)	-0.091 (0.068)	-0.010 (0.068)	-0.062 (0.079)
High financial literacy					-0.131** (0.062)	-0.182*** (0.070)
Risk aversion					-0.154** (0.067)	0.209** (0.087)
Demographic controls	NO	NO	YES	YES	YES	YES
Pseudo R-squared	0.029	0.059	0.075	0.099	0.119	0.146
N	444	399	386	350	302	300

*Notes:* This table reports the marginal effects from a probit analysis using robust standard errors. The dependent variable equals one if the participant chose the annuity, and zero if not. The marginal effects are calculated holding the continuous variables (risk aversion, age, the number of people in the household) at their means and the indicator variables at zero. The marginal effects for the indicator variables are for discrete changes of the indicator variable from zero to one. The non-demographic indicator variables are the annuity bias, investment bias, annuity default, investment default, and high financial literacy variables. The demographic control indicator variables include race, marital status, levels of education, and household income ranges.

\* Significantly different from 0 at the 10 percent level.

\*\* Significantly different from 0 at the 5 percent level.

\*\*\* Significantly different from 0 at the 1 percent level.

financial literacy group are significantly less likely to choose the annuity option (-13 percent and -18 percent, respectively). The investment default option is significant and has the predicted sign in Model 1 for the male subjects. In other cases, the default is not significant and it often has the wrong sign.

Surprisingly, we find that the effect of the biases differs for men and women. Specifically, women are influenced by the investment bias, while men are influenced by both biases, and these effects are large. Notice in Model 3 that women are 16 percent *less* likely to choose an annuity if they receive the presentation biased toward investment, as opposed to the neutral presentation. Men are 14 percent *less* likely to choose an annuity after the investment bias presentation and 21 percent *more* likely to choose the annuity after the annuity bias presentation, compared to the neutral presentation.

## VI. Discussion

We find important differences in the behavior of men and women using a large sample

of nonstudent adults. Consistent with previous research, we find that women are significantly more risk averse and less financially literate than men. We also find that women are more likely to choose an annuity in our investment experiment, even after controlling for risk aversion and financial literacy.

We also find that risk averse subjects are more likely to choose the annuity. In addition, financially literate subjects are more likely to choose the investment option. The preference for the investment option may be driven by familiarity with investment vehicles proxied for by high literacy scores or by overconfidence in the ability to invest. Alternatively, less financially literate individuals may have been overwhelmed by the added complexity of the investment decision and, therefore, opted for the annuity. In most cases, the presence of a default option did not significantly affect decisions. This is inconsistent with prior research. One explanation for this lack of consistency is that our experimental default was weak. In reality, defaults allow investors to procrastinate when making their investment choices, but our

subjects were required to make an immediate choice.

One of the most striking findings from this study is that a biased five-minute slide show at the beginning of the experiment has large significant effects on choices. Further, men and women respond differently to the biases. When compared to subjects in the neutral treatment, women and men are significantly less likely to choose the annuity when presented with information negatively framing the annuity option, while *only* men are significantly more likely to choose the annuity option when presented with information negatively framing the investment option. One possible explanation for this finding is that women are more affected by biases that contradict their preconceived notions.

Overall, these results suggest that financial advisors may influence decisions, perhaps unintentionally, simply by how they present information. If the negative consequences of investments are inadvertently emphasized to convince clients to purchase annuities, our results suggest that men might be more affected than women. An important area for future research is how these biases ultimately affect financial well-being.

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