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Accumulating and spending retirement assets: A behavioral finance explanation

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Abstract

Increasing uncertainty surrounding social security benefits and public sector pension plans is pushing retirement savings into the spotlight. This study finds that education, financial discipline, and financial sophistication increase the likelihood of participating in a pension or an IRA/Keogh plan. Financial distress decreases the likelihood of setting aside additional funds in an IRA/Keogh plan. Further, the likelihood that an eligible individual will decline an offered pension plan decreases with education and financial discipline and financial sophistication. Controlling for health and marital status, the choice to annuitize retirement assets decreases with age and the desire to take risk. © 2013 Academy of Financial Services. All rights reserved.

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1. Introduction

The retirement picture in the United States has dramatically transformed over the past two decades, with defined benefit (DB) plans replaced by defined contribution (DC) plans. Even public sector plans are shifting to DC plans in response to state and local budget crises (Cooper & Walsh, 2012). According to the Government Accountability Office (2011),

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between 1990 and 2008 the number of active participants in private sector DB plans fell by 27%, from 26 to 19 million. At the same time, the number of active participants in DC plans increased by over 90%, from 35 to 67 million. The shift from DB to DC presents challenges as, increasingly, retirees themselves must determine how much to save, and subsequently how to spend down their retirement savings.

U.S. retirement assets totaled nearly $18 million in December 2011 (Investment Company Institute, 2012, pp. 106–108). But the reality is that most households are not adequately preparing for retirement. Only 66% of workers in the 2012 Retirement Confidence Survey (EBRI) reported that they and/or their spouses have saved money for retirement. Sixty percent of workers report that they and/or their spouses have less than $25,000 in total savings and investments (excluding their home and DB plans); 30% have less than $1,000.

This article looks to tenants of behavioral finance such as bounded self-control and hyperbolic discounting to explain why households are not saving enough for retirement, and considers tools that can influence saving behavior. The tools include using heuristics such as savings rules and framing alternative choices in ways that will encourage saving. Logit analysis identifies factors that are related to the likelihood of making retirement savings choices. The study also considers one alternative for liquidating retirement assets (annuities) and examines characteristics that impact the likelihood of purchasing them. The next section contains a literature review, followed by a discussion of the data and descriptive statistics. Then multivariate analyses are presented, followed by the summary and conclusions.

2. Behavioral finance theory and retirement saving and spending

2.1. Accumulating retirement assets

Understanding motivation to save is paramount in helping households make decisions that will provide them funding for the best retirement possible. The life-cycle model assumes that rational individuals are dissavers in their younger years, borrowing to meet consumption needs. As they enter later stages of their life cycles, they eventually spend less than they make, becoming savers. Finally, when they retire, they convert their savings to consumption at a rate that will exhaust savings at death. The underlying assumption is that people are well-informed and act rationally. They correctly estimate probabilities of future payoffs, and use constant discount rates to maximize the utility of consumption over their lifetimes.

The fact that households have saved little for retirement is difficult to explain using standard economic models. Behavioral finance provides insights into why actual behavior may deviate from that of the rational economic agents forming the basis of economic theory. The notions of bounded rationality (Simon, 1955) and bounded self-control (Thaler and Shefrin, 1981) provide that consumers do not want to trade consumption today for consumption in the future. Though understanding the consequences of not saving, they find it difficult to control consumption today. They have good intentions, but lack the self-control, or financial discipline, to carry them out.

Another explanation for lack of saving provided by behavioral finance involves discount rates. Rational individuals utilize constant discount rates over time, but some individuals are

hyperbolic discounters (Laibson et al., 1998). That is, they apply higher discount rates to the near term than to the future. They place a lower value on future benefits and overvalue the present.

Individuals who realize these shortcomings may employ heuristics to help them save. For example, they may use a saving rule, whereby they save a set percentage of their income or dollar amount each period. Others may use home ownership as a savings tool, which is, getting into the habit of making a consistent monthly payment and investing in an asset. Individuals who have been involved with one type of savings behavior may be more likely to save for retirement (Warneryd, 1999).

This study investigates how the tools suggested by behavioral finance theory impact households' decisions about having a pension and setting aside additional retirement savings in the form of an IRA/Keogh. Further, this study analyzes the factors that influence the decision to decline participating in a pension plan if offered one.

2.2. *Spending retirement assets*

After accumulating savings, retirees must eventually convert their assets to income to pay expenses. Biases that individuals exhibit in retirement wealth accumulation may extend to the wealth decumulation stage (Brown et al., 2008). Thus, behavioral finance theories can also be applied to how retirees spend down retirement assets. This study considers annuities, which are receiving renewed interest, as an option for retirees to convert their assets to an income stream that will last their lifetimes.

Traditionally, annuities have been the default option for DB plans and lump sum payments the default for DC plans. Thus, the shift from DB to DC retirement plans, and the subsequent shift in the default payment plans increasingly expose retirees to longevity risk, the risk that they will outlive their assets. While Social Security and DB plans provide longevity-insured incomes streams, they represent only a portion of retirement resources for retirees with substantial savings. Retirees can reduce their exposure to longevity risk by converting all or a portion of their retirement savings to annuities. Longevity annuities are receiving increased attention, as they provide for income to begin later, for example, 15 years after retirement, and so cost less than immediate annuities providing similar monthly income. Retirees who live to an old age can have guaranteed income through their final years.

Theoretical research has shown that with actuarially fair annuity prices, retirees with no bequest motives should annuitize all retirement savings (Yaari, 1965; Davidoff et al., 2005). Pooling the risk of outliving one's assets through annuities is more efficient than self-insuring by saving enough to guarantee income through the end of one's life (Government Accountability Office, 2011). Even so, very little annuitization is taking place (Scott, 2008). Many studies have tried to resolve this annuity puzzle. Explanations include desires to leave bequests, health status, marital status, illiquidity of annuities, a poorly functioning market for annuities because of adverse selection and high administrative and marketing costs, and high fractions of wealth already annuitized by public pension plans.

Concluding that the literature has failed to explain the annuity puzzle, Brown et al., (2008) look to behavioral biases for answers, and provide a framing explanation for the puzzle. In a consumption frame, annuities are viewed as insurance that reduces retirees' longevity risk.

In an investment frame, annuities are viewed as risky assets whose payoff depends upon an event (death) at an uncertain time. If death comes sooner, the payoff is lower in terms of fewer annuity payments; if death comes later, the payoff is higher with annuity payments over a longer period. They find that most individuals prefer an annuity when presented in a consumption frame, whereas most prefer nonannuitized products when presented in an investment frame.

Hurd et al. (2004) examine the decision about whether to take reduced Social Security benefits at age 62 (early) rather than delay taking the benefits; delaying application for claiming benefits is equivalent to purchasing additional Social Security annuities. The vast majority of workers claim as soon as they are eligible. The study finds weak evidence that more educated retirees delay claiming. They conjecture that individuals with high level of education better understand the decision to annuitize and its impact on future payouts.

This study examines factors that impact the probability that a household will choose to convert retirement savings to annuity payouts. Proxies for mortality risk, understanding longevity risk and the desire to leave a bequest are hypothesized to impact a household's conversion choice.

3. Survey data

All variables used in this study are derived from the 2007 Federal Reserve Board Survey of Consumer Finances (SCF; Federal Reserve Board, 2007).[1] The purpose of the SCF is to provide a comprehensive view of the financial behavior of a cross-section of U.S. households. Detailed information is gathered on the household's retirement plans and saving behavior, as well as demographic characteristics such as home ownership, age, education, income, and health. Attitudes about financial risk and leaving an inheritance are also measured.

A distinguishing factor of the SCF is its sample design.[2] To obtain more detail on the financial behavior of those households holding a disproportionate share of the wealth, the SCF combines two sampling techniques (Aizcorbe, Kennickell, & Moore, 2003). Approximately two-thirds of the respondents included in the final public dataset are randomly selected households from across the United States; the remaining one-third are wealthy households selected from a list derived from tax return data. While this sampling design prohibits the use of the sample as representative of the U.S. population, inferences can be made about the relationships among variables within households.

Descriptive statistics for the sample are provided in Table 1. Over half of the households in the sample (57%) have some type of pension plan or are receiving a pension benefit while 43% have an IRA or Keogh type account. Of the household heads offered the opportunity and are eligible to participate in a pension plan on their current job, 12% declined to participate. Over 40% of households participating in a retirement plan on a current job, and who have options about how to receive benefits, chose to receive a lifetime annuity for their benefit payout.

The median age of the head of household is 51 years, with a median household income of $70,000. Nearly 68% of households consist of couples who are married or living as

Table 1 Variable definitions and descriptive statistics

Dependent variables	Definition	Descriptive statistics
Pension	Household has a pension plan; includes a defined benefit or defined contribution plan with a current job, currently receiving a pension benefit, expects to receive a pension benefit from previous jobs, has an IRA-SEP/Simple account for self-employed or small businesses; does not take into consideration whether the household has an extra IRA or Keogh type account. n = 4,418	Sample proportion: 0.571
IRA/Keogh	Household has an IRA or Keogh type account; includes Roth accounts, regular IRAs, a rolled-over account into an IRA from a previous job; this variable is capturing those households who have "extra" retirement money set aside on top of current pension plans. n = 4,418	Sample proportion: 0.431
Decline	Household head declines the opportunity to participate in a pension plan on a current job, when eligible to participate and made the offer; excludes respondents who are not currently working for pay, are not eligible to participate, are not offered the opportunity, or are self-employed or in a partnership such as a medical practice. n = 1,760	Sample proportion: 0.124
Choose annuity	Household head chooses to receive a lifetime annuity for expected benefit payout; includes only those households who are participating in a retirement plan on a current job and have a choice as to how they can receive benefits. n = 987	Sample proportion: 0.408
Control variables	**Definition**	**Descriptive statistics**
Age	Age of household head	Mean = 52 years Median = 51 years
Income	Total gross income received by the household in 2006 from all sources, including withdrawals from IRAs and pension accounts; in $000s	Median = $70.00
Married	Household consists of a married couple or two persons living as partners	Sample proportion: 0.675
Explanatory variables	**Definition**	**Descriptive statistics**
Education level	Highest level of education earned by household head	Sample proportion:
No HS diploma	No high school diploma	0.099
HS diploma	High school diploma or GED	0.258
Some college	Attended college, but a degree not earned	0.158
College degree	Earned a college degree	0.274
Graduate degree	Earned a graduate degree	0.211
Financial discipline		Sample proportion:
Saving rule	Household has consistent plan for saving income	0.530
Homeowner	Household owns home	0.742
Financial distress	Household has used a "payday loan" in the past year, or has been 2+ months behind in loan payments in the past year, or has filed bankruptcy	0.218

Continued

Table 1 (Continued)

Explanatory variables	Definition	Descriptive statistics
Percent stock	Percent of financial assets invested in stock	Mean = 31.5% Median = 22.4%
Risk aversion	Household attitude about the amount of financial risk they are willing to take when saving or making investments	Sample proportion:
High risk	Take substantial risks expecting to earn substantial returns	0.052
More risk	Take above-average risks expecting to earn above-average returns	0.214
Avg. risk	Take average risks expecting to earn average returns	0.422
No risk	Not willing to take any risks	0.312
Estate	Household feels it is very important or important to leave an estate or inheritance to their surviving heirs $n = 987$	Sample proportion: 0.581
Health risk	Household head reports health status that is poor or fair, rather than excellent or good. $n = 987$	Sample proportion: 0.093

financially interdependent partners. Over a third of the household heads in the sample have a high school education or less; 27% have a college degree and over 20% have a graduate degree. Three quarters of the sample households own a home. Over 50% of the households report that they have a regular savings plan. Examples include setting money aside each month or spending the income of one family member, while saving all other income.

One-fifth of the households report financial distress or difficulties, measured as using a "payday loan" or getting behind two or more months in loan payments in the past year, or filing bankruptcy. The median of households' financial wealth held in stock (either directly, through mutual funds, or in retirement accounts) is 22%.

In terms of attitude toward financial risk, only five percent of the households are willing to take substantial risk to earn substantial returns. Twenty-one percent are willing to take above average risk. The most common attitude toward risk, those willing to take average risk, comprise 42% while almost a third of the sample (31%) are not willing to take any risks.

For the subsample of households who were eligible but declined an offered pension plan, nearly 60% feel that it is very important or important to leave an inheritance. Furthermore, just nine percent of these household heads report that their health status is poor or only fair.

4. Analysis

A logistic regression is used to estimate the impact of these characteristics on the household's retirement savings behavior, holding other factors constant. The model assumes that the respondent's choices are characterized by a logistic distribution, and the maximum

likelihood estimates of the regression coefficients yield an estimated probability derived from the cumulative logistic distribution function.

The odds ratio is the probability that an event occurs divided by the probability that it does not occur. In the logit model, the log of the odds is linear:

$$\log [\text{Pr Event} / (1 - \text{Pr Event})] = \alpha + \Sigma \beta_k x_k$$

The explanatory variables that are hypothesized to influence the respondent's decisions are denoted by x_k, and the regression coefficients from the model are denoted by β_k. The estimate of the odds ratio (derived from taking the exponential of the maximum likelihood estimates, β_k) indicates the impact that a unit change in x_k has on the probability of an event, holding all other factors constant. An odds ratio of 1.00 indicates equal odds, meaning the explanatory variable has no significant impact on the event probability.[3]

For the indicator variables, the odds ratio estimate denotes the marginal effect on the probability that the household will decide for (in favor of) the event when the variable is "turned on," that is, takes the value 1 relative to the value 0. For the continuous variables, the odds ratio estimate indicates the marginal impact on the probability that the household will decide for the event given a one year change in age or a $1,000 change in annual income.

The first estimated models examine factors that impact the likelihood that a household will

Table 2 Results of logistic regression on pension and IRA/Keogh

	Odds ratio estimates (pension)			Odds ratio estimates (IRA/Keogh)		
Explanatory variable	Point estimate	95% Confidence interval estimate	*p*-value	Point estimate	95% Confidence interval estimate	*p*-value
Intercept	0.12*	0.06–0.22	0.000	0.01*	0.00–0.02	0.000
Age	1.06*	1.04–1.09	0.000	1.12*	1.08–1.15	0.000
Age squared†	1.00*	1.00–1.00	0.000	1.00*	1.00–1.00	0.000
Income†	1.00*	1.00–1.00	0.000	1.00	1.00–1.00	0.583
Married	1.25*	1.08–1.45	0.003	1.45*	1.22–1.72	0.000
Education						
No diploma	0.41*	0.32–0.53	0.000	0.19*	0.13–0.27	0.000
High school	0.79*	0.66–0.95	0.012	0.37*	0.31–0.46	0.000
Some college	0.93	0.76–1.14	0.480	0.56*	0.45–0.70	0.000
Grad degree	1.02	0.84–1.23	0.874	1.40*	1.14–1.71	0.001
Homeowner	1.59*	1.34–1.90	0.000	2.06*	1.65–2.57	0.000
Saving rule	1.61*	1.41–1.84	0.000	1.47*	1.26–1.71	0.000
Percent stock	1.01*	1.01–1.01	0.000	1.02*	1.02–1.02	0.000
Financial distress	1.16	0.99–1.37	0.067	0.60*	0.49–0.74	0.000

n = 4,418.

*Odds ratio estimate differs from 1.00 at a 5% significance level.

†For both models, the odds ratio estimate for Age squared is significantly less than one, but only to the fourth decimal place, that is, a minute nonlinear effect. The odds ratio estimate for Income in the Pension model is similar, indicating a minute negative impact on the likelihood.

The *p*-value is the observed level of significance for the maximum likelihood estimates of the regression coefficients, β_k.

In both equations, the χ^2 statistics for the likelihood ratio tests in each of the five imputations are significant at less than the 1% level.

have a pension plan (left panel) or an IRA/Keogh (right panel). The results are presented in Table 2 and are interpreted as follows.

The results indicate that, as expected, the age of an individual has a significantly positive effect on the probability of having a pension. The odds ratio indicates that for each year older, the probability that a household has a pension plan increases by six percentage points. As individuals age, they become more cognizant of the need for retirement saving. The nonlinear age effect is exhibited by the odds ratio for age squared, with the likelihood of having a pension increasing at a decreasing rate. As compared with single households, couples are 25% more likely to have a pension. Because household income is held constant, this result may simply be because of the presence of another individual with an additional opportunity to participate in a pension plan.

The level of education achieved by the household head has a significant, expected impact. Compared with respondents with a college degree, those with less education are much less likely to have a pension, even when controlling for income. Those who have no high school diploma are 59% less likely, and those with just a high school diploma are 21% less likely. One possible explanation is that those with college or graduate degrees may have professional occupations that provide for a pension plan. In addition, those with more education may better understand the necessity of saving for retirement.

Homeownership has a significant positive impact on the household's decision to participate in a pension plan; homeowners are 59% more likely to have a pension than those who do not own a home. This result supports Warneryd's notion that saving through buying a home increases the likelihood of saving for other purposes such as retirement. Households who have a consistent saving rule for household income are 61% more likely to have a pension. A saving rule represents a commitment mechanism that can help individuals overcome the bounded self-control theorized by behavioral finance. Using a saving rule can help households to better save for retirement.

Several studies (Dow, 2009; Shum & Faig, 2006) have shown that household financial decisions are related to the financial sophistication of the decision-maker. The percentage of financial assets held in stock is one measure of financial sophistication. The odds ratio indicates that the higher the percentage of financial assets held in stock, the more likely the household is to have a pension. Individuals who understand the trade-off between risk and return to the extent of increasing their stock holdings to earn a higher expected return are more likely to take action in saving for retirement.[4]

Evidence of financial distress is expected to have a negative impact on the probability of participating in a pension plan. Households who live "paycheck to paycheck" or fall behind in loan payments are not as likely to have funds withheld for a pension plan. However, with household income held constant, the financial distress variable is insignificant.

The point estimate of the odds ratio for Income is 1.00 but weakly significant, indicating that a change in income has very slight negative impact on the probability that the household will have a pension. When other household characteristics are held constant, the level of income is not a driving factor in determining who will have a pension plan.[5]

The second logit model examines those factors that impact the probability that a household decides to set extra retirement money aside in the form of IRA/Keogh plans. The results reveal a significant positive relationship between the age of the household head and the

probability of an IRA/Keogh plan. The odds ratio indicates that for each year older, the probability that the household has an IRA/Keogh plan increases by 12 percentage points. As individuals age, they likely feel a greater sense of urgency to save for retirement, and thereby open and begin contributing to IRA/Keogh accounts. As with the pension model, the significant odds ratio estimate for age squared shows a minute nonlinear age effect.

The marital status of a household has a strong, significant impact on the probability of setting additional funds aside for retirement. Holding income and age constant, couples are 45% more likely to have an IRA/Keogh plan than single households. This could indicate more proactive planning that accompanies a common vision for retirement lifestyle.

The education level achieved by the head of household has a strong, significant impact on the probability of having an IRA/Keogh plan. Those with no high school diploma, or just a diploma, are 81% and 63%, respectively, less likely to have such a plan than those with a college degree. To the contrary, households whose head has a graduate degree are 40% more likely to have an IRA/Keogh. Again, those with higher education may have a better understanding of the necessity to save for retirement to maintain the accustomed lifestyle.

Homeowners are 106% more likely to have an IRA/Keogh, further supporting Warneryd's notion that the discipline of building home equity through a monthly mortgage payment increases the likelihood of saving for other purposes such as retirement. Similarly, households who have a consistent saving rule are 47% more likely to have an IRA/Keogh. When other household characteristics are held constant, the level of income is not a driving factor in determining who will have an IRA/Keogh.

As in the pension model, a financial portfolio with a larger stock component (indicating greater financial sophistication) increases the probability that the household will have an IRA/Keogh plan. This probability increases by two percent for a one percent increase in the stock portion of the portfolio.

Evidence of financial distress is also significant. Even holding income constant, households who have experienced financial difficulties are 40% less likely to have saved additional funds for retirement.

The 2012 Retirement Confidence Survey, referenced earlier, indicates that household retirement savings are woefully inadequate. In light of the need to save more, it is prudent to enroll in a pension plan whenever possible, but some workers decline to participate. The next model examines those factors that determine the probability that a household declines to participate in a pension plan for which they are eligible. Table 3 provides these logit results.

Age of head of household is negatively related to the probability that a pension plan will be declined. The odds ratio indicates that for each year older, the probability that the household declines a pension plan decreases by 14%. As individuals age and draw closer to retirement, they must be more aware of the urgency of saving for retirement. The point estimate of the odds ratio for income is 1.00, and insignificant. Thus, when other household characteristics are held constant, the level of income is not a dominant factor in determining who will decline participating in a pension plan. The marital status of the household is also insignificant.

Controlling for income, and so the wherewithal to contribute, the level of education has a significant impact on the probability of declining a pension plan. The odds ratio estimate

Table 3 Results of logistic regression on decision to decline pension plan

Explanatory variable	Odds ratio estimates		
	Point estimate	95% Confidence interval estimate	*p*-value
Intercept	13.30*	2.80–63.15	0.001
Age	0.86*	0.80–0.92	0.000
Age squared†	1.00*	1.00–1.00	0.000
Income	1.00	1.00–1.00	0.192
Married	0.89	0.63–1.26	0.513
Education			
No diploma	2.22*	1.10–4.50	0.027
High school	1.75*	1.13–2.70	0.012
Some college	1.33	0.84–2.10	0.220
Grad degree	0.79	0.46–1.35	0.386
Homeowner	0.51*	0.34–0.76	0.001
Saving rule	0.73*	0.53–1.00	0.048
Percent stock	0.98*	0.98–0.99	0.000
Financial distress	1.06	0.73–1.55	0.744

n = 1,760.

*Odds ratio estimate differs from 1.00 at a 5% significance level.

†The odds ratio estimate for Age squared is significantly greater than one, but only to the fourth decimal place, that is, a minute nonlinear effect.

The p-value is the observed level of significance for the maximum likelihood estimates of the regression coefficients, β_k.

The χ^2 statistics for the likelihood ratio tests in each of the five imputations are significant at less than the 1% level.

indicates that, compared with respondents with a college degree, those with a high school degree are 75% more likely to decline a pension plan while those with no diploma are 122% more likely to decline a pension plan. Those with more education may better understand the benefits of enrolling in a pension plan, especially when the employer matches contributions.

The impact of financial discipline is significant in this model. Homeowners are 49% less likely to decline a pension plan than those who do not own a home. Furthermore, households with some sort of savings rule are 27% less likely to decline a pension plan. Households who use tools to overcome bounds on their self-control save rather than spend (in this case, through pensions). Financial sophistication also plays a role in the likelihood of declining a pension plan. A one percentage point increase in the stock composition of the portfolio leads to a two percent decrease in the probability of declining a pension plan. Again, those who are more financially sophisticated are more aware of the benefits of contributing towards retirement savings. Contrary to expectations, financial distress does not significantly impact the likelihood that a household will decline a pension plan.

The final model estimates the impact of various factors on whether, given a choice, a household will choose an annuity benefit payout. The households examined here include only those who are currently employed or are temporarily not working (e.g., laid off, on maternity leave); retirees are excluded from the analysis. The age and health status of the household head are included to measure mortality risk. The probability that a household chooses an annuity payout significantly decreases with age. For each year older, the

Table 4 Results of logistic regression on decision to choose an annuity benefit payout

Explanatory variable	Odds ratio estimates		
	Point estimate	95% Confidence interval estimate	*p*-value
Intercept	1.79	0.90–3.57	0.099
Age	0.99*	0.97–1.00	0.023
Married	0.71	0.46–1.10	0.122
Education			
No diploma	1.81	0.75–4.39	0.187
High school	1.04	0.68–1.59	0.870
Some college	1.06	0.66–1.72	0.808
Grad degree	0.91	0.62–1.33	0.612
Risk aversion			
High risk	0.39*	0.20–0.76	0.006
More risk	0.85	0.62–1.17	0.323
No risk	1.51	0.95–2.39	0.080
Estate	1.16	0.89–1.52	0.270
Health risk	0.77	0.47–1.25	0.285

$n = 987$.

*Odds ratio estimate differs from 1.00 at a 5% significance level.

The *p*-value is the observed level of significance for the maximum likelihood estimates of the regression coefficients, β_k.

The χ^2 statistics for the likelihood ratio tests in each of the five imputations are significant at less than the 1% level.

probability of choosing an annuity payout is one percent lower. With health status constant, as individuals age their longevity risk decreases (they are less likely to outlive their assets) and so they have less incentive to purchase an annuity. As found in previous studies (Brown, 2001; Rosen & Wu, 2004), health status was expected to impact the likelihood of choosing an annuity. However, the results do not support that those in poor or fair health are less likely to choose an annuity.

Couples can substitute some of the risk reducing effects of purchasing annuities through intrafamily mortality risk-sharing. As explained by Hu and Scott (2007), ". . . a husband and wife can implicitly insure each other by forming their own mortality pool of two persons." Annuity demand should be lower for couples than for single households (Brown, 2007). However, the results do not support that marital status impacts the likelihood of choosing an annuity. When controlling for other factors, education does not have a significant impact on the selection of annuity payout. While Hurd et al. find weak evidence, we find no evidence to support the notion that education and the decision to annuitize are related.

The results for the risk aversion variable reflect that the sample of households view annuities in a consumption frame. That is, annuities are insurance that reduce risk; longevity risk, not investment risk. Compared with those who are willing to take average risk, those who are willing to take high risk are 61% less likely to choose an annuity. Interestingly, when marital status is not included in the model, those who are not willing to take any risk are 57% more likely to choose an annuity. Both marital status and the risk aversion measures are controlling for risk.

Finally, because annuities generally provide limited survivorship benefits, those desiring

to leave an estate would be less likely to choose an annuity. However, the desire to leave an estate is not significantly related to the probability of choosing an annuity payout.

5. Summary and conclusions

U.S. citizens are retiring in record numbers. The oldest baby boomers began retiring four years ago and millions are set to join them over the next 15 years. However, statistics show that Americans are not saving enough for retirement, especially in light of the tenuous position of future social security benefits and reforms of public pension plans. Traditional economic theory, which assumes rational economic agents with perfect foresight and constant discount rates, falls short in explaining why people are not saving enough. Behavioral finance theory may offer a better explanation, and suggest tools that may induce households to save more for retirement.

For example, households can use some type of heuristic, such as a rule of thumb, to impose financial discipline. This study finds that indicators of financial discipline, such as saving rules and home ownership, increase the likelihood that a household member will have a pension plan or IRA/Keogh, and decrease the likelihood that the head of household will turn down participating in a pension plan.

The power of education as a means for increasing retirement saving is compelling, and this study provides further evidence. Results of this study indicate that education is a major determinant in retirement saving decisions. Even while holding age and income constant, the more educated the head of household, the higher the probability that a household member will have a pension or IRA/Keogh. In addition, those with more education are less likely to turn down participation in a pension plan.

Public sector union officials, including those in San Diego and San Jose who have most recently seen a hit to pension plans, recognize that they must educate the public about pensions and deferred compensation to help public workers understand how much they will have to save to support themselves in retirement (Cooper and Walsh, 2012). Future San Diego employees will likely enroll in DC plans, rather than the DB plans that have been commonplace for public sector employees. More public sector employees are likely to experience this shift as state and local governments seek more flexibility in solving budget problems.

The shift from DB to DC plans in both the private and public sectors, and the resulting shift in payout from annuities to lump sums, call loudly for increased education about saving and subsequently spending down retirement assets. The danger that retirees will outlive their savings is of major concern, as life expectancy and health care costs are increasing while financial markets and home equity are declining.

While retirees can convert retirement assets to annuities, they shy away from them for many reasons, including their bad reputation for high up-front costs and annual fees as well as their poor performance as investment vehicles. Framing annuities as insurance against longevity risk, rather than as an investment, may make them a more attractive option for retirees. Survey evidence suggests that retirees holding annuities are more satisfied with their retirement (Panis, 2004).

Concern over Americans' retirement security prompted the Treasury Department to propose new regulations intended to improve access to lifetime income options (U.S. Treasury Department, 2012). The regulations make it simpler and easier for employers to offer retirees the option to split retirement benefits between a lump sum payout and an annuity. Further, the proposed reductions in regulatory barriers will open up the 401(k) and IRA market to longevity annuities by giving partial relief from minimum distribution requirements and by clarifying plan qualification rules. These new rulings will facilitate employers' ability to work with annuity providers to offer employees a broader range of choices as to how to receive and spend retirement assets. As a higher percentage of the U.S. population reaches retirement age, the number of competitive annuities offered could increase, with particular focus on longevity annuities.

Improved financial literacy is needed so that workers better understand their options for managing retirement income, and how to evaluate financial risk, for example, longevity risk, investment risk, interest rate risk. The focus of education has typically been on saving for retirement, but employers and government must broaden education while workers are in the saving plan, to include spending options that ensure that retirees have income to last a lifetime.

Notes

1 The data are available at www.federalreserve.gov/pubs/oss/oss2/2007/scf2007data.html.

2 The SCF also differs in its treatment of nonresponses. The method of multiple imputation replaces each missing value with a set of values that represent a distribution of possibilities. This method attempts to simulate the distribution of missing data and provide a more realistic measure of the variability around the unknown data than simpler methods of estimating missing values. Models are used to impute five alternative values for each missing value. The final database consists of five complete observations for each respondent, which are combined for the analysis (Rubin, 1987; Kennickell, 1991).

3 The confidence interval estimate of the odds ratio (derived from the parameter estimates and their covariance matrix) indicates whether the explanatory variable has a significant impact at the 95% level of confidence. If the value 1.00 is within the interval, then the estimated coefficient is not significantly different from zero and the explanatory variable has no statistically significant impact on the event probability.

4 The literature suggests that another measure of financial sophistication is that the household seeks investment advice from a banker, accountant, financial planner, or broker. A variable for seeking such professional advice is not significant in any of the models and does not change the results.

5 Some portfolio allocation studies include a measure of financial wealth or networth as a control variable. Adding this measure to the analysis does not change the results in any of the estimated models and the variable is insignificant.

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