

NBER WORKING PAPER SERIES

NAVIGATING COMPLEX FINANCIAL DECISIONS AT RETIREMENT:  
EVIDENCE FROM ANNUITY CHOICES IN PUBLIC SECTOR PENSIONS

Robert L. Clark  
Robert G. Hammond  
David Vanderweide

Working Paper 25129  
<http://www.nber.org/papers/w25129>

NATIONAL BUREAU OF ECONOMIC RESEARCH  
1050 Massachusetts Avenue  
Cambridge, MA 02138  
October 2018

We thank Melinda Sandler Morrill, whose contributions at an earlier stage of this project are greatly appreciated. This research is part of an on-going project that is being conducted in partnership with the North Carolina Retirement Systems Division and is being funded by the Sloan Foundation, Grant Numbers 2013-10-20 and G-2016-7054. We gratefully acknowledge the help and support of Janet Cowell, former North Carolina State Treasurer, Steven C. Toole, Director of the Retirement Systems Division, Mary Buonfiglio, Deputy Director of Supplemental Retirement Plans, and Sam Watts, Policy Director of the Retirement Systems Division; Nino Abashidze, Bryan Allard, Christelle Khalaf, Siyan Liu, Aditi Pathak, and Emma Turner for research assistance; and Jonathan Reuter and participants at the NBER Conference on Incentives and Limitations of Employment Policies on Retirement Transitions for comments and suggestions. The opinions and conclusions expressed herein are solely those of the authors and do not represent the opinions or policy of the North Carolina Retirement System, any other institution with which the authors are affiliated, or the National Bureau of Economic Research.

At least one co-author has disclosed a financial relationship of potential relevance for this research. Further information is available online at <http://www.nber.org/papers/w25129.ack>

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2018 by Robert L. Clark, Robert G. Hammond, and David Vanderweide. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

Navigating Complex Financial Decisions at Retirement: Evidence from Annuity Choices in Public Sector Pensions

Robert L. Clark, Robert G. Hammond, and David Vanderweide

NBER Working Paper No. 25129

October 2018

JEL No. G2,H55,H7

**ABSTRACT**

Choices regarding the disposition of wealth at retirement can have substantial implications for retirement income security. We analyze the factors determining annuity option choices offered by a public sector defined pension plan with no default annuity option. Using combined administrative records and survey data, we explore the role of individual and household characteristics as well as risk preferences, time preferences, and financial literacy. The evidence is consistent with predictions over which households might benefit most from each annuity option. Comparing retirees who chose different annuities, we find that these groups of retirees report very different levels of well-being in retirement.

Robert L. Clark  
Poole College of Management  
Box 7229  
North Carolina State University  
Raleigh, NC 27695  
and NBER  
robert\_clark@ncsu.edu

David Vanderweide  
Fiscal Analyst  
Fiscal Research Division  
North Carolina General Assembly  
Raleigh, NC 27601  
david.vanderweide@ncleg.net

Robert G. Hammond  
Department of Economics  
North Carolina State University  
Raleigh, NC 27695  
rghammon@ncsu.edu

# **Navigating Complex Financial Decisions at Retirement: Evidence from Annuity Choices in Public Sector Pensions**

## **I. Introduction**

At retirement, pension participants must decide the type of pension distribution that they believe will maximize their utility over the rest of their lifetime. Private sector defined benefit pension plans are regulated by the Employee Retirement Income Security Act (ERISA), which specifies how various distribution options are priced and requirements concerning the choice of annuities. In general, public sector plans are not covered by ERISA, so government agencies have greater flexibility in determining the provisions of their retirement plans. Moreover, state and local government employees often retire in their 50's because public sector defined benefit plans typically allow career retirees to begin benefits at relatively young ages. Thus, state and local employees must select the payout method that maximizes their well-being over 30 or more years of retirement. In this environment, retirees face a complex decision in choosing the most appropriate annuity option that will maximize their lifetime utility. Poor choices based on insufficient information or knowledge may result in unanticipated outcomes and cause retirees to express regret about their pension decisions later in retirement.

This paper analyzes annuity choices by pension participants using administrative records and survey data on North Carolina public sector retirees from 2009-2014. The estimation follows a nested logit regression model, which allows a flexible correlation structure for the unobserved factors affecting annuity choice. In a sample of married retirees, we find important roles for gender, race/ethnicity, own and spouse's life expectancy, and age and spouse's relative age in determining who elects each payout option. Prior research, focusing primarily on choices by retirees in private sector plans, has explored the tendency of individuals to under-annuitize

wealth.<sup>1</sup> In sharp contrast to pension distributions chosen by private sector workers, retirees in the public sector rarely select lump sum distributions because of the way they are typically priced. Public sector retirees generally have the option of selecting from a menu of lifetime annuities or a lump sum distribution. Under ERISA, private sector plans must have a default annuity option of a joint and survivor benefit with at least 50 percent of the joint benefit payable to the survivor and the pricing of annuity options must meet certain requirements.<sup>2</sup> In the public sector, there is not typically a default annuity option and often annuity options are priced so that they are present value neutral to the retirement system. Thus, it is important to understand why retirees choose an annuity and how these decisions affect retirement well-being.

This study uses the North Carolina Retirement Transitions Study-Benefit Claimants (NCRTS-BC) data, which consists of administrative records merged with survey data for state and local government retirees in North Carolina who initiated retirement benefits between 2009 and 2014. We focus on married retirees which allows us to study the role of spousal characteristics in annuity choice. This is best suited for cases when a married individual's spouse would be their beneficiary had they chosen a J&S annuity option. While we cannot directly test this assumption, we find evidence that is consistent with spouses as the vast majority

---

<sup>1</sup> For example, see Benatzi, Previtro, and Thaler 2011; Brown et al. 2008; Brown 2001; Chalmers and Reuter 2012; and Butler and Teppa 2007.

<sup>2</sup> The initial 1974 ERISA legislation required that pension plans offer at least a 50 percent J&S annuity and that it be the default distribution option in the plan; however, retirees could simply request a single life annuity when claiming benefits. The Retirement Equity Act of 1984 required a spouse to sign a notarized consent form waiving her right to the J&S before the retiree could receive a single life annuity. See Part 4, Chapter 72, Section 9 of the *Internal Revenue Manual* for further detail on current law: [https://www.irs.gov/irm/part4/irm\\_04-072-009](https://www.irs.gov/irm/part4/irm_04-072-009).

of beneficiaries for married individuals.<sup>3</sup> For these married retirees, the spousal characteristics are drawn from a retirement decision-making survey conducted in 2015 (one to six years after the claiming decision for these retirees). Finally, we study retirement well-being, including satisfaction with choices upon retirement and income security in retirement, which provides a snapshot of perceived well-being several years into retirement. Combining administrative records and responses to two surveys, our data provide a comprehensive picture of annuity choice among public sector retirees in North Carolina.

## **II. Background on North Carolina Retirement Plans and Annuity Options**

We examine the provisions of public retirement systems of North Carolina and the annuity choices of recent retirees. The retirement plan for teachers and state employees and the state-managed pension plan for local employees in North Carolina are typical of state and local pension plans across the country. Teachers and state employees in North Carolina are covered by the Teachers' and State Employees' Retirement System (TSERS), while local government workers participate in the Local Governmental Employees' Retirement System (LGERS). Almost all participants in both plans are also covered by Social Security and TSERS pension annuitants are also allowed to remain in the state health plan.<sup>4</sup>

The parameters of TSERS and LGERS are very similar. In order to qualify for normal or unreduced benefits, the employee must have satisfied one of three criteria: reached age 65 with 5 years of membership service; reached age 60 with 25 years of service; or have attained 30 years of service at any age. Early retirement with reduced benefits is available to those who have

---

<sup>3</sup> The initial survey asked respondents whom they chose as their beneficiary. Among married individuals who indicated that they chose J&S, 93.3 percent reported that their spouse/partner was their beneficiary.

<sup>4</sup> See Clark and Cowell (2017) for a review of the annuity options of 85 large state-managed public plans.

reached age 50 and completed 20 years of creditable service and those who have reached age 60 and completed 5 years of service. Thus, for many public employees in North Carolina, these plans provide a strong economic incentive to retire in their 50's.

Upon termination and achieving the age and service requirements, retirees must request from the retirement system that their benefits begin and the annuity option they desire. This is a one-time option and no benefits are paid until the benefit request has been finalized. In other words, there is no default benefit. Both plans have the same six annuity options, which include a single life annuity (called the maximum benefit), a 100 percent J&S, a 50 percent J&S, Social Security Leveling, and two additional J&S options with a pop-up provision if the retiree's beneficiary dies first. Plan actuaries set the terms of all annuity options so that they are considered present value neutral to the system.<sup>5</sup> There is also an option to take a lump sum withdrawal, but most benefit claimants with long careers find that the present value of the annuity greatly exceeds the lump sum (Clark et al. 2014).

### **III. Annuity Options in the North Carolina Retirement Plans**

We now present a more detailed discussion of the pricing of the annuity options. The benefit formula in the plan indicates the monthly retirement benefit that a retiree would receive from claiming until death. As discussed earlier, the retirement benefit is a function of years of

---

<sup>5</sup> In this context, present value neutral to the retirement system means that the discounted value of the maximum benefit from retirement to death is expected to be equivalent to the discounted value of lifetime benefits of all other options using the assumed rate of return to the plan's assets. The discounted value is calculated assuming no cost-of-living adjustments. Historically, cost-of-living adjustments have averaged close to the annual increase in CPI; in recent years, there have been few increases in benefits.

service and final average salary. This is a single life annuity that is called the maximum benefit.<sup>6</sup> Once the conditions for unreduced retirement are satisfied, the monthly benefit does not depend on age.

To determine the monthly benefit for other annuity options, the first step is to calculate the expected present value of the maximum benefit. First, define  $PV[A]$  to be the present value of a \$1 per year benefit payable in equal monthly payments for the life of an individual age  $A$ :

$$PV[A] = \sum_{a=A+1}^{120} \frac{\text{Survival}_A^a}{(1 + r_i)^{a-A}} + CtsAdj$$

where Survival is the probability of survival from age  $A$  to age  $a$ ,  $r_i$  is the assumed interest rate, and CtsAdj is the industry-standard 11/24ths adjustment for monthly payment. Then the present value of the monthly maximum benefit,  $B_{MAX}$ , can be written as:

$$PV_{MAX}[A] = B_{MAX} * 12 * PV[A]$$

This calculation is based on the mortality experience of the system and the assumed rate of return on the pension fund. Prior to 2012, the interest rate was 7.5 percent; however, the rate was changed to 7.25 percent in 2012. Thus, for individuals with the same career history, the present value of the maximum benefit decreases as age of claiming increases and there will be a small increase in present values for those claiming benefits after 2012.

Having calculated the present value of the maximum benefit, the retirement system then calculates a monthly benefit the other five annuity options using the same basic assumptions.

### ***Joint and Survivor Annuities***

---

<sup>6</sup> If the worker dies before paid benefits exceed lifetime employee contributions plus interest, a lump sum is paid to the designated survivor.

The state provides four J&S options that provide for the continuation of benefits after the death of the retired worker that are paid to the survivor until his or her death. The first option offered by the North Carolina retirement plans is a 100 percent J&S benefit, which results in the retirement benefit being the same as long as either the retiree or survivor is alive. For the present value of this annuity to be the same as that of the maximum benefit, monthly benefits must be lower. The price of this insurance for a lifetime benefit, or the magnitude of the reduction in monthly benefits, depends on the age of the retiree and the age of the survivor. To calculate the present value of the J&S benefit, first define the present value of a \$1 per year benefit payable in equal monthly payments if and only if both annuitants are living:

$$PV_{Joint}[A, S] = \left( \sum_{a=A+1, s=S+1}^{a=120, s=120} \frac{Survival_{A,S}^{a,s}}{(1 + r_i)^{a-A}} \right) + CtsAdj$$

where Survival is the joint probability of the retiree surviving from age A to age a and the spouse surviving from age S to age s. Then the present value of the monthly J&S benefit,  $B_{J\&S}$ , is:

$$PV_{J\&S}[A, S] = B_{J\&S} * 12 * [PV[A] + PctJ\&S * (PV[S] - PV_{Joint}[A, S])]$$

where PctJ&S is either 50 percent or 100 percent depending on the option chosen.

To illustrate how the price varies across retirees, we present hypothetical monthly benefits for several scenarios in Table 1. The mean married retiree in our sample claims benefits at age 60 and the retiree's spouse is on average one year older. Panel A shows the monthly benefit for a 60 year old claimant whose maximum benefit is fixed at \$2,000 per month. Panel A assumes that the retiree's spouse is 61 years old. For such a retiree, the 100 percent J&S benefit is \$1,813 per month, while the 50 percent J&S benefit is \$1,902 per month. Since the benefit after the death of the retiree is lower with the 50 percent J&S option, the benefit while the retiree is alive is greater than the 100 percent J&S. The popup J&S options increase the benefits for the



retiree if the beneficiary dies prior to the retiree. Relative to the standard J&S option without a popup provision, the monthly benefit will be lower if the popup option is selected: \$1,785 and \$1,887 per month for 100 percent popup and 50 percent popup J&S, respectively. Panels B and C show the effect of own and spouse age on the 100 percent and 50 percent J&S benefit, respectively. Moving right (up) in a given row (column) shows the benefit increase associated with an older beneficiary (younger retiree).

[Table 1]

### ***Social Security Leveling***

The final annuity option is called Social Security Leveling. Retirees selecting this option receive a higher monthly benefit prior to age 62 when an individual is first eligible to claim Social Security benefits and in return, the pension benefit is lower after age 62. The benefits before and after age 62 are calculated by the system, using the same assumptions as described before, so that the expected present value of the two Leveling benefits is the same as the present value of the maximum benefit.<sup>7</sup> To calculate the present value of the Leveling benefit, first define the present value of a \$1 per year benefit payable in equal monthly payments that begin at age C for a retiree currently age A:

$$PV[A, Def C] = \left[ \left( \sum_{a=C+1}^{120} \frac{Survival_C^a}{(1+r_i)^{a-C}} \right) + CtsAdj \right] * \frac{Survival_A^C}{(1+r_i)^{C-A}}$$

Next define F[A,C] as follows:

$$F[A, C] = PV[A, Def C] / PV[A]$$

---

<sup>7</sup> One third of all state defined benefit plans whose participants are also covered by Social Security have a Social Security leveling option. Most of these plans also use age 62 for leveling; however, some use 65 or allow the retiree to select the age for leveling (Clark et al. 2018).

Then the formula for the present value of the Leveling benefit is:

$$PV_{LEV}[A] = B_{MAX} * 12 * PV[A] + SS * F * 12 * PV[A] - SS * 12 * PV[A, Def C]$$

where SS is the monthly benefit estimate obtained from the Social Security Administration.

Returning to Table 1, the hypothetical retiree shown claimed benefits at age 60 and was eligible for a maximum benefit of \$2,000. The retiring worker reports to the retirement system that her expected Social Security benefit at age 62 is \$1,200. Using this information and the leveling factor based on the system's mortality experience and the assumed interest rate, the system would calculate the benefit prior to age 62 and the benefit from age 62 through the rest of the life of the retiree. In this example, the retiree would receive a monthly benefit of \$2,996 each month prior to age 62 and \$1,796 each month beginning at age 62. Together with a Social Security benefit of \$1,200, the post-62 total retirement income is "level" at \$2,996.

#### **IV. Theoretical Predictions Regarding Saving and Borrowing in Retirement**

We offer several predictions for various individual and household characteristics that may influence annuity choice. Individuals with higher personal discount rates place greater value on money in the early retirement years. Thus, they are expected to favor a single life annuity instead of a J&S annuity and among those requesting such a benefit, Social Security Leveling should be more appealing than the maximum benefit. Given that the retiree prefers a single life annuity, those with lower life expectancies will be more likely to choose leveling. Between the single life annuity and J&S annuity, retirees will be more likely to choose a J&S annuity if they have low life expectancy and are married to spouses with high life expectancy, holding age constant. Since the retirement system prices the annuity options based on a blended life expectancy between men and women, the leveling option is relatively more favorably priced for men with average life expectancy than for women with average life expectancy.

The work history of the spouse is expected to directly influence the annuity choice. If the spouse has been a career worker and expects to receive a pension in his or her own right, the retiree is predicted to be less likely to request a J&S benefit since the spouse expects to receive this benefit after the death of the retiree. Other employer-provided benefits earned by the spouse or the retiree or purchased by the household, such as retiree health insurance, long term care insurance, or life insurance, should also define the optimal annuity choice. Life insurance could be considered a substitute for J&S benefits, i.e. similar to the lower benefit required by J&S in that individuals pay a premium for life insurance to provide funds for the beneficiary. The predicted effect for years of service on the annuity choice is ambiguous. On the one hand, longer tenure is generally associated with higher pension benefits, which may reduce the demand for higher income immediately after retirement. However, shorter tenure might be related to retirement at younger ages with the intention to pursue a second career.

As shown in Appendix Table B3, men are much more likely to choose a J&S annuity compared to women (61 Percent compared to only 35 percent). We note that gender is highly correlated with many of the other variables that affect annuity choice and as such, gender may serve as a proxy for other characteristics. To the extent that the benefit level is correlated with household finances, we expect that those with higher benefits are more likely to have alternative sources of liquidity. Moreover, higher earners have a longer life expectancy, on average (Galama et al. 2018). As such, they may be more willing to defer some of their pension income by selecting one of the J&S options. Similarly, those without a college degree tend to have lower life expectancies, so lower educated retirees may be more likely to choose leveling due to shorter life expectancy. To the extent that race/ethnicity correlates with life expectancy, we expect that non-Hispanic blacks are more likely to choose leveling than non-Hispanic whites.

Holding constant mortality expectations, personal discount rate, and the absolute level of benefits, we find no clear prediction on the relationship between age at claiming and annuity option choice. Note that the age of the retiree and the spouse determines the reduction in benefits associated with a J&S annuity. Next, while individuals in poor health may have lower life expectancies, the prediction for the relationship between poor health and annuity choice is ambiguous (McGarry, 2014). Individuals may require additional funds for medical expenditures if they are in poor health or may want to consume more during a period of good health.

Among those who prefer a single life annuity, risk aversion could manifest itself in a preference for leveling if near-term consumption shocks are predominant in one's decision process. However, if mortality risk (i.e., dying young) is predominant, then one is likely to prefer immediate consumption and therefore choose leveling. If instead an individual is worried about longevity risk (i.e., outliving one's savings), the individual is less likely to prefer leveling so that the benefit in later years is higher. Thus, the prediction on risk preferences is ambiguous.

It is important to remember that the annuity choice is a difficult and complex decision, which will influence well-being throughout the retirement years. Knowledge concerning the annuity choices, how the benefits are calculated, and how they may change over time and in response to specific events are crucially important (Chan and Stevens, 2008). However, we have no prediction on how financial literacy might affect which annuity options is chosen.

## **V. Regression Analysis of Annuity Choice**

We now examine the annuity choices of recent retirees in North Carolina using a combination of administrative and survey data. The administrative records on individuals who first claimed pension benefits between 2009 and 2014 are from the North Carolina Retirement Transitions Study – Benefit Claimants (NCRTS-BC) data on retirees from the North Carolina

Teachers' and State Employees' Retirement System (TSERS) and Local Governmental Employees' Retirement System (LGERS). These data are merged with survey responses to a survey conducted in spring 2015 and a follow-up survey conducted in spring 2017.

The administrative records contain detailed information about each retiree including earnings, job information, years of service, creditable service, year of retirement, annuity option chosen, and benefit amount. The surveys gathered information about race/ethnicity, education level, household income and wealth, work status after claiming retirement benefits, and marital status, along with questions about their spouses' characteristics (if applicable). In addition, the surveys included questions on retiree well-being and satisfaction with retirement-related decisions.<sup>8</sup> The first set of survey responses were received in 2015, which is one to six years after the retiree had made their annuity choice. Thus, some answers (such as wealth and health) may differ from those the individual might have given at the time of the retirement decision.<sup>9</sup>

Table 2 presents summary statistics from the administrative records (Column (1)), the first survey respondents (Column (2)), and the first survey respondents who reported being married or living with partner (Column (3), where we refer to both groups simply as married). The survey was sent to 27,434 individuals from the population in Column (1). Our estimation sample includes 5,515 useable responses, which represents a survey response rate of roughly 20 percent.<sup>10</sup> Comparing Columns (1) and (2), our survey sample is reasonably representative of

---

<sup>8</sup> Appendices B and C provide detail on the data and survey instrument.

<sup>9</sup> See Clark, Hammond, and Vanderweide (2018) for additional details on the pattern of annuity choice over time. The proportion of retirees choosing J&S increases over time, with a small but noticeable jump in 2012. This is consistent with the annuity pricing changes in 2012 discussed earlier.

<sup>10</sup> The survey is part of a larger project and covers all benefit claimants from 2009 to 2014. Our overall response rate on the survey was 22 percent. For more detail on the larger project, please see our website: <https://sites.google.com/site/publicsectorretirement/>.

the population of interest. Survey respondents have higher final average salary and maximum initial benefit amounts, and they were more likely to have more than 30 years of service at retirement.

[Table 2]

From Column (2) to (3), we restrict the sample to survey respondents who are married. Our focus is individuals who consider both a single life and J&S annuity; for married individuals considering a J&S annuity, their spouse represents a focal beneficiary. While unmarried individuals do choose J&S, their rates are much lower.<sup>11</sup> Further, the survey data provide information on spousal characteristics for married individuals and this information allows us to reconstruct the annuity benefit associated with each annuity option, assuming the spouse would have been the beneficiary. Comparing Columns (2) and (3), the restriction to married respondents changes the sample in relatively minor ways. There are a larger proportion of males in Column (3) and, consistent with the arguments above, a larger proportion of men choose J&S.

The first column in Table 3 reproduces the last column of Table 2, while Columns (2)-(4) of Table 3 split the married respondent sample among the three annuity options. For all married survey respondents in Column (1), the average retiree is around 60 years of age upon retirement. Around 48 percent of all retirees are teachers, 19 percent are local government employees, and 18 percent are state government employees. In general, the public sector tends to be majority female and the North Carolina data are consistent with this observation, as 66.8 percent of the married respondents are women. 40.2 percent of married respondents retired with 30 or more years of service, while the average final salary is \$62,754.32 and the initial benefit check had the retiree chosen the Maximum Benefit annuity option is \$2,433.50 on average.

---

<sup>11</sup> 5.8 percent of unmarried individuals in our sample chose one of the J&S annuity options.

[Table 3]

Comparing Columns (2)-(4), the characteristics of those choosing the three annuity options are quite different along several dimensions. Those choosing leveling tended to be younger at retirement (which is intuitive because leveling is only possible for those retiring under 62), had lower salaries, and had more years of service. Those choosing J&S tended to have higher salaries and were eligible for more from the retirement system in the form of higher benefits had they chosen the maximum benefit. A meaningfully higher proportion of men chose a J&S annuity relative to women. These are univariate differences along correlated dimensions, so now we conduct a regression analysis to explore *ceteris paribus* associations.

Our main regression analysis is estimated using data from married respondents to the first survey, as shown in Column (1), Table 3. As mentioned above, we include individuals who reported that they are married or living with partner and simply say married. The survey of retirees provides us with the opportunity to examine the annuity choice process utilizing personal information that is not available in the administrative records. Tables 4 and 5 present regression estimates from a nested logit regression model (McFadden, 1981).<sup>12</sup> A nested logit model is a generalized multinomial logit model with less restrictive assumptions regarding the independence of the error terms affecting choice among each annuity option. Choice is nested and the error terms for options in the same nest can be correlated. In our setting, there are two nests: the single life nest includes the Maximum Benefit and Social Security Leveling, while the J&S nest includes the four J&S options (two 100 percent and two 50 percent J&S options).

---

<sup>12</sup> In addition to the covariates shown in the table, the regression also includes an indicator for having multiple benefit accounts and controls for five agency categories and for the year of benefit claiming.

Our nested logit regression analysis in Table 4 shows estimates at the “top level” of the nesting structure, thus the coefficients reflect the effects of observable characteristics on the choice of J&S, with single life as the baseline. An alternative is a multinomial logit regression model; we show nested logit results because specification tests favor our nested logit regression model over this alternative.<sup>13</sup> Clark et al. (2018) provide an analysis of the choice of leveling, among individuals who chose a single life annuity. Table 4 displays regression results and marginal effects. Column (1) includes the baseline covariates, while Column (2) adds spousal characteristics. The results are similar in both columns, so we focus on Column (2).

[Table 4]

The first covariate is the only alternative-specific covariate in the model (i.e., varies across individuals and annuity options), which ensures identification of the nested logit model. In our setting, this is the annuity factor, defined as the ratio of the net present value of the annuity option relative to the net present value of the maximum benefit.<sup>14</sup> The factor coefficient is not our focus, and its positive coefficient simply says that a higher present value is preferred. We simply control for the annuity factor to ask how observable characteristics affect annuity choice.

Men are more likely to choose J&S, with a large effect size of 14.3 percentage points. This is consistent with the fact that men have shorter life expectancies, on average, which implies that the survivor benefit is valued more by men than women. We explore gender more in the next table. Non-Hispanic black retirees choose J&S at a 10.4 percentage point lower rate.

---

<sup>13</sup> Results from multinomial logit regression models are presented in Appendix Table B4.

<sup>14</sup> The present value calculation uses survival probabilities from the retirement system and discount factors equal to the 20-Year Treasury Constant Maturity Rate at the beginning of the claiming year.



Later age at claiming lowers the propensity to choose J&S, an effect of around 0.5 percentage point for five years older at claiming. We account for spousal age by constructing two age difference variables, the number of years the retiree is older if the difference is positive and separately the number of years younger if negative. Larger age gaps among spouses are associated with less choice of J&S, with 1.5 percentage points per year of difference if positive and 0.6 percentage points per year of difference if negative. The negative effect of age difference for retirees who are younger than their spouse might reflect the fact that the survivor benefit is less valuable to a retiree who is much younger. As shown in Table 1, younger spouses are associated with a lower J&S benefit, relative to maximum benefit, which probably explains the effect of positive age difference.

Next, reporting being in good health is associated with a 10.3 percentage point lower rate of choosing J&S; reported spousal good health also lowers J&S choice, but neither the level effect nor the interaction with spousal health is statistically significant. A retiree's perception of their life expectancy and his or her perception of their spouse's life expectancy both have the expected effect (while the interaction is not significant). Expecting a long life is associated with 6.7 percentage point lower rate of J&S choice, while expecting one's spouse to live a long life is associated with 8.7 percentage point higher rate of J&S choice. The survey also asked retirees whether they and/or their spouse had life insurance (LI) and long-term care insurance (LTCI) as well as whether their spouse had access to a pension from their current or previous employer (either currently receiving pension benefits or eligible to receive in the future).

While life insurance is not associated with J&S annuity choice, having purchased long-term care insurance has a strong effect. Retirees with long-term care insurance are 7.0 percentage points less likely to have chosen J&S, which suggests that these two products are

substitutes. There is an effect of spousal long-term care insurance, but it interacts with the covariate for both retiree and spouse having long-term care insurance. Spousal pension also affects J&S choice: retirees whose spouse has their own pension are 2.6 percentage points less likely to choose J&S. Years of service has a monotonic effect, such that those retiring with less service are less likely to choose J&S. Each \$1,000 additional in a retiree's initial benefit amount is associated with 5.4 percentage points higher rate of J&S choice.

Finally, the measures of financial literacy and preferences toward risk and time are elicited from the survey.<sup>15</sup> High levels of objective financial literacy (as measured by answering both questions correctly) are associated with a choice of J&S at a rate that is 5.4 percentage points higher relative to a single life annuity. Time preferences affect J&S annuity choice as expected. Those who are measured as impatient on the lottery frame only and on lottery and benefit frames have 3.4 and 3.7 percentage points lower rates of J&S choice respectively. Risk preferences reveal one statistically significant association, where those who are measured as being risk averse on the pension frame chose J&S at a rate that is 12.7 percentage points lower. However, the risk results on the lottery prize frame and from retirees who answered consistently across both frames are opposite signed relative to the pension results. This suggests that the framing of our pension question, rather than risk preferences per se, may be at work here.

Next, we explicitly examine gender by presenting results for men and women separately. Table 5 estimates the baseline specification of Table 4 separately by gender. The results in Table 5 are similar to the aggregate results. Several coefficients are more precisely estimated for

---

<sup>15</sup> The wording of these questions is included in Appendix C. We have two questions respectively for eliciting risk and time preferences: one question asks respondents to choose between pension benefits and one asks respondents to choose between lottery prizes.

women, which may be driven by our larger female sample; notably, the negative effect of long life expectancy is driven entirely by women. Our main goal in separate gender estimation is to decompose the difference in J&S choice into observable differences among men and women.

[Table 5]

In our sample of married public sector workers, 61.3 percent of men and 34.7 percent of women choose a J&S annuity, a 26.6 percentage point difference. (See Appendix Table B3.) Is this difference explained by observable characteristics that differ by gender? From Table 4, the predicted probability of choosing J&S (holding all covariates at their sample means) is 53.6 percent for men and 39.0 percent for women, a 14.5 percentage point difference. If the women in our sample had observable characteristics that took the same values as our men, then the predicted probability of choosing J&S would be 41.4 percent for women. Relative to the predicted probability reported above of 53.6 percent for men, the difference is 12.2 percentage points. In total, we can explain more than half of the gender difference in J&S choice by observable characteristics. The remaining gender difference represents the residual gender effect.

We place our public sector workers in context using private sector workers in the Health and Retirement Study (HRS) 2014 wave. Note that the sample of public sector workers in the HRS is very small, which emphasizes the importance of new data such as ours for this segment of the workforce. Restricting to married private sector workers in the HRS, 75.8 percent of men and 49.4 percent of women choose a J&S annuity.<sup>16</sup> Thus, both males and females in our sample

---

<sup>16</sup> Johnson et al. (2005) examine earlier HRS waves and also report substantial gender differences in the choice of J&S. They find that 72 percent of men and 31 percent of women choose J&S. The lower rate they find for women may be driven by their earlier data or by our sample restrictions.

choose J&S annuities at rates that are more than 10 percentage points lower than private sector workers in the HRS.<sup>17</sup> Overall, 43.6 percent of our sample chooses a J&S annuity, while 66.9 percent of married private sector workers in the HRS choose J&S, where the overall gap between J&S choice in our sample and J&S choice in the HRS is wider due to the larger proportion of women among our public sector workers.

In total, we find that retirees choose among annuity options in ways that are consistent with predictions over which individuals might benefit from each annuity option. J&S is more likely to be chosen by individuals for whom survivor motives are more salient (e.g., those with lower life expectancies such as males, those with low subjective life expectancy, and those whose spouse does not have alternative sources of retirement incomes such as a pension or long-term care insurance). Leveling is more likely to be chosen by individuals whose near-term retirement income needs are more salient (e.g., those with low subjective life expectancy and those whose time preferences are consistent with impatience). To study retirement outcomes for individuals who chose different annuities, we now analyze self-reported retirement well-being.

## **VI. Well-being in Retirement**

Is the choice of annuity an important determinant of well-being in retirement? Our surveys of retirees provide information on several measures of well-being in retirement, which we group into two sets of measures. The information measures are retirees' satisfaction with their retirement choices and the information available upon annuity choice. The income security measures are retirees' satisfaction with their standard of living, belief that they saved enough,

---

<sup>17</sup> Myers et al. (1987) and Kotlikoff and Smith (1983) study J&S choice in the pre-ERISA years. They find that J&S choice rates were lower before the ERISA default of a 50 percent J&S annuity. Holden and Nicholson (1998) and Aura (2005) study the post-ERISA period and find higher rates of J&S choice.

and confidence in not outliving their savings. Each measure takes a positive value when the individual “agrees” or “strongly agrees” with the statements.<sup>18</sup>

Table 6 presents means along each dimension of information and income security, shown separately using responses to the first survey in 2015 and from the follow-up survey in 2017 (S2015 and S2017, respectively). The sample in this, and the subsequent tables, is married individuals who claimed benefits between 2009 and 2014 who responded to both surveys.<sup>19</sup> First, we focus on the initial responses in 2015 and then turn to the follow-up responses in 2017. Among all married individuals in the first survey, we observe high rates of agreement with having made the best decisions regarding annuity choice and having had enough information upon retirement (both rates are over 90 percent). For income security, 82.6 percent of respondents are satisfied with their standard of living in retirement, while only 62.3 percent of respondents believe they saved enough and 69.5 percent are confident in not outliving their savings. Overall, we interpret these figures as being consistent with high rates of well-being in retirement but with magnitudes that vary with the framing of the question.

[Table 6]

Individuals report lower levels of satisfaction with information and income security, on average, two years after the original survey. Table 7 presents additional information on changes between the two surveys, but it is clear that the means are lower in 2017 along every dimension. Comparing responses across individuals who chose different annuity options, J&S annuitants are

---

<sup>18</sup> The wording of these questions is included in Appendix C. Results are similar using only “strongly agree” as the well-being measure.

<sup>19</sup> Appendix Table B5 presents a comparison between the estimation sample in Tables 6-8 (those who responded to both the initial and the follow-up surveys) and estimation sample in Tables 4-5 (those who responded to the initial survey).

similar to maximum benefit annuitants with the exception of satisfaction with annuity choice, where J&S is associated with 2.9 percentage points higher satisfaction. Relative to J&S or maximum benefit, leveling is associated with less satisfaction in terms of information and income security. Those who chose leveling are particularly unlikely to report belief in having saved enough and unlikely to report having confidence in not outliving their savings.

Table 7 reports the proportion of individuals who increased or decreased along each dimension from the original survey to the follow-up survey. The statistical test results shown in Panel A are from tests of whether changes are equally likely to be increases and decreases. For each cell, decreases are statistically significantly more likely than increases. Thus, perceived retirement well-being decreases for these individuals. Panel B compares measures across annuity options, where the statistical test results are from tests of whether the proportion of individuals reporting less satisfaction is different across annuity options.

[Table 7]

Relative to maximum benefit, individuals who chose J&S are similar with the exception of belief in having saved enough, where J&S is associated with a larger decrease in satisfaction (5.0 percentage points). Relative to maximum benefit, for individuals who chose leveling, the decrease between the two surveys is statistically significantly larger for leveling in terms of having made the best annuity choice decision, satisfaction with standard of living, and confidence in not outliving their savings. Overall, we find small differences among maximum and J&S annuitants, but large differences between leveling annuitants and others. Those choosing leveling are less satisfied and more likely to report lower satisfaction over time. This

result should not be surprising since many of those that selected leveling will have reached age 62 and would have had their pension benefit reduced by the specified formula.<sup>20</sup>

Finally, Table 8 presents a regression analysis of these five measures using the responses to the follow-up survey in 2017, which is three to eight years after the claiming decision for these retirees. Using the follow-up survey responses allows us to measure retirement well-being several years into retirement. Each column presents the results from a linear probability model. J&S is similar to maximum benefit on some measures, but J&S is associated with less satisfaction with their standard of living in retirement (6.7 percentage points) and less belief in having saved enough (6.8 percentage points). Consistent with the comparison of means, leveling is generally associated with less satisfaction than maximum benefit: 4.8 percentage points less satisfied with annuity choice decision, 12.6 percentage points less satisfied with having saved enough, and 12.6 percentage points less confident about not outliving their savings. In total, leveling is associated with less perceived well-being in retirement, with large effect sizes.

[Table 8]

The other covariates in Table 8 provide additional insights regarding the characteristics associated with well-being in retirement. Males are much more confident in not outliving their savings than females, but they do not believe they saved enough at higher rates and are not more satisfied with their standard of retirement living. Non-Hispanic black retirees report less satisfaction along all dimensions, with large effect sizes. Individuals with at least a BA degree report more satisfaction, as do those who claimed at older ages. Interestingly, those with higher

---

<sup>20</sup> The retirement system reports that they receive calls from many retirees who selected leveling who seem surprised that their monthly pension benefit has been reduced. Perhaps due to this reaction, a bill was introduced in the 2018 legislative session to eliminate this option (HB 1055). The bill has not become law during the 2018 session of the North Carolina General Assembly.

initial benefit checks report more satisfaction with their well-being in terms of income security, but they are no more likely to report satisfaction in terms of information/decision quality.

The results in Table 8 do not provide causal interpretations because these covariates are correlated with a host of unobserved factors that limit precise interpretations. However, controlling for these observed factors, we find that individuals who chose different annuities upon retirement report different levels of satisfaction in retirement. J&S annuitants are somewhat less satisfied than maximum benefit annuitants in terms of income security (standard of living and saved enough). Leveling annuitants are less satisfied than maximum benefit annuitants in all five measures, with statistically significant differences for three measures.

## **VII. Conclusions**

Using combined administrative records and survey data, we analyze how individuals choose among annuity options at retirement. Several findings are particularly relevant to policymakers. First, only 44 percent of North Carolina public sector retirees select a J&S annuity. This is much lower than the rate of 67 percent that we document among private sector workers in the Health and Retirement Study (HRS). Some portion of the difference between our finding and those from the HRS may be due to differences among the private sector workers in the HRS and our public sector workers. However, we conjecture that there is an important role played by ERISA regulations for a J&S default annuity, which does not cover the plans we study.

Second, as has been found previously, males are much more likely than females to choose a J&S annuity. Our regression analysis controls for a large set of individual and household characteristics and holding these constant, the results suggest that men value survivor benefits more than women. Men are also more likely to choose J&S when their spouse does not have access to a pension of their own, while a spouse's pension plays a less important role for women



in the choice of annuity. We decompose the gap between men and women in the choice of a J&S annuity; observable characteristics explain more than half of the gender difference, but a sizeable gap remains. Annuity choice appears to be a household decision that involves bargaining between household members in ways that are consistent with predictions over which households might benefit most from each annuity option.

Our final analysis exploits the panel nature of our survey data to track self-reported well-being several years into retirement. Retirees who made different annuity choices report very different levels of well-being in retirement and changes in well-being also differ markedly. The Social Security Leveling annuity option (which provides a level retirement income before and after age 62) is associated with substantially less retirement income security, relative to the Maximum Benefit or a J&S annuity. J&S annuitants are relatively similar in their self-reported well-being with respect to those who chose the Maximum Benefit, but there is some evidence that the Maximum Benefit is associated with slightly higher levels of retirement income security. In total, the annuity an individual chooses matters a lot for their outcomes in retirement.

## REFERENCES

- Aura, Saku. 2005. "Does the balance of power within a family matter? The case of the retirement equity act," *Journal of Public Economics*, 89: 1699-1717.
- Benartzi, Shlomo, Alessandro Previtero, and Richard Thaler. 2011. "Annuitization puzzles," *Journal of Economic Perspectives*, 25(4): 143-164.
- Brown, Jeffrey. 2001. "Private pensions, mortality risk, and the decision to annuitize," *Journal of Public Economics*, 82(1): 29 - 62.
- Brown, Jeffrey R., J.R. Kling, S. Mullainathan, and M.V. Wrobel. 2008. "Why Don't People Insure Late-Life Consumption? A Framing Explanation of the Under-Annuitization Puzzle," *American Economic Review: Papers & Proceedings*, 98:2, 304-309.
- Brown, Jeffrey and James Poterba. 2000 "Joint life annuities and annuity demand by married couples," *Journal of Risk and Insurance*, December: 527-553
- Bütler, M., and Teppa, F. 2007. "The choice between an annuity and a lump sum: Results from Swiss pension funds." *Journal of Public Economics*, 91(10), 1944-1966.
- Chalmers, J., and Reuter, J. 2012. "How do retirees value life annuities? Evidence from public employees," *The Review of Financial Studies*, 25(8): 2601-2634.
- Chan, Sewin and Ann Huff Stevens. 2008. "What you don't know can't help you: Pension knowledge and retirement decision-making," *The Review of Economics and Statistics*, 90(2): 253-266.
- Clark, Robert and Janet Cowell. 2017. "Annuity Options in Public Pension Plans," in *Financial Decision Making and Retirement Security in an Aging World*, Olivia Mitchell, Brett Hammond, and Stephen Utkus (eds.), Oxford, UK: Oxford University Press, pp. 130-152.
- Clark, R. L., Hammond, R. G., Morrill, M. S., & Vanderweide, D. 2018. "Annuity Options in Public Pension Plans: The Curious Case of Social Security Leveling." *Journal of Retirement*, 6(1): 33-44.
- Clark, R. L., Hammond, R. G., & Vanderweide, D. 2018. "Navigating Complex Financial Decisions at Retirement: Evidence from Annuity Choices in Public Sector Pensions."

- NBER Conference on Incentives and Limitations of Employment Policies on Retirement Transitions. [http://www.nber.org/conf\\_papers/f114053/f114053.pdf](http://www.nber.org/conf_papers/f114053/f114053.pdf)
- Clark, Robert, Morrill, M. S., & Vanderweide, D. 2014. "Defined Benefit Pension Plan Distribution Decisions by Public Sector Employees," *Journal of Public Economics*, 116: 73-88.
- Galama, T. J., Lleras-Muney, A., & van Kippersluis, H. (2018). The Effect of Education on Health and Mortality: A Review of Experimental and Quasi-Experimental Evidence (No. w24225). *National Bureau of Economic Research*.
- Holden, K. and Nicholson, S., 1998. "Selection of a joint-and-survivor pension." Institute for Research on Poverty Discussion Paper No. 1175-98.
- Johnson, Richard, Cori Uccello, and Joshua Goldwyn. 2005. "Who Foregoes Survivor Protection in Employer-Sponsored Annuities," *The Gerontologist*, 45(1): 26-35.
- Kotlikoff, Laurence, and Smith, David. 1983. *Pensions in the American Economy*. Chicago: University of Chicago Press.
- McFadden, Daniel. 1981. Econometric Models of Probabilistic Choice. In *Structural Analysis of Discrete Data with Econometric Applications*, ed. C. F. Manski and D. L. McFadden, 198-272. Cambridge, MA: MIT Press.
- McGarry, Kathleen. 2014. "Health and retirement: Do changes in health affect retirement expectations?" *Journal of Human Resources*, 39(3): 624-648.
- Myers, Daniels, Richard Burkhauser, and Karen Holden. 1987. "The Transition from wife to widow: the importance of survivor benefits to widows," *Journal of Risk and Insurance*, December: 752-759.
- Wisconsin Legislative Council. 2016. "2015 Comparative Study of Major Public Employee Retirement Systems," [http://docs.legis.wisconsin.gov/misc/lc/comparative\\_retirement\\_study/2015\\_retirement.pdf](http://docs.legis.wisconsin.gov/misc/lc/comparative_retirement_study/2015_retirement.pdf)

**Table 1. Monthly Benefits of Retirees****Panel A: Benefit overview of an age 60 benefit claimant**

Age of spouse	Max	SS Leveling (before 62)	SS Leveling (after 62)	J&S 100%	J&S 100% popup	J&S 50%	J&S 50% popup
61	\$2,000	\$2,996	\$1,796	\$1,813	\$1,785	\$1,902	\$1,887

**Panel B: J&S 100% option benefit**

Age of spouse \ Age of benefit claimant	56	61	66
55	\$1,849	\$1,884	\$1,915
60	\$1,764	\$1,813	\$1,860
65	\$1,646	\$1,709	\$1,774

**Panel C: J&S 50% option benefit**

Age of spouse \ Age of benefit claimant	56	61	66
55	\$1,922	\$1,940	\$1,957
60	\$1,875	\$1,902	\$1,927
65	\$1,806	\$1,843	\$1,880

Note: The example is for a retiree with a maximum single life benefit of \$2,000 per month, and a Social Security benefit of \$1,200 at age 60. The mean age at claiming is 60 and the mean spouse's age at claiming is 61 in the sample of retirees who responded to S2015.

**Table 2. Means of Individuals Claiming Retirement Benefits between 2009 and 2014**

	All Retirees	S2015 Respondents	S2015 Married
	(1)	(2)	(3)
Age at Claiming	60.7	59.9	59.7
Age at Termination	60.7	59.8	59.7
Early Retirement	36.1%	32.9%	33.2%
TSERS	79.1%	80.7%	80.6%
Community College	4.3%	5.4%	5.5%
Local Government	20.9%	19.3%	19.4%
Primary Government (and	19.8%	18.2%	18.4%
Public Schools	46.9%	47.0%	47.5%
University	8.1%	10.0%	9.2%
Male	34.2%	28.6%	33.2%
Years of Service	22.9	24.8	24.8
Years of Service 5-19	35.1%	27.6%	27.2%
Years of Service 20-24	15.7%	13.2%	13.1%
Years of Service 25-29	19.2%	19.4%	19.6%
Years of Service 30+	30.1%	39.8%	40.2%
Final Average Salary	\$51,447.37	\$61,765.97	\$62,754.32
Maximum Initial Benefit	\$1,876.21	\$2,386.90	\$2,433.50
Annuity Type:			
Max	56.0%	54.1%	45.2%
SS Leveling	12.0%	13.0%	11.2%
J&S	32.0%	32.9%	43.6%
100%	10.5%	9.5%	12.8%
50%	3.7%	3.1%	3.8%
100% Popup	11.0%	11.9%	16.1%
50% Popup	6.9%	8.4%	10.8%
Has any other account	7.2%	2.0%	2.0%
Has both TSERS/LGERS	0.13%	0.02%	0.03%
<i>N</i>	72,350	5,515	3,952

Notes: Only primary TSERS and LGERS accounts are included in the sample, as described in Appendix A. The second last row indicates the percent of the sample that has both a TSERS and LGERS account in the data.

**Table 3. Means of Married S2015 Respondents Claiming Retirement Benefits between 2009 and 2014**

	All Retirees	Selecting Max	Selecting SS Leveling	Selecting J&S
	(1)	(2)	(4)	(3)
Age at Claiming	59.7	60.3	54.8	60.3
Age at Termination	59.7	60.3	54.7	60.3
Early Retirement	33.2%	38.7%	38.3%	26.1%
TSERS	80.6%	84.0%	82.2%	76.8%
Community College	5.5%	5.3%	4.5%	6.0%
Local Government	19.4%	16.0%	17.8%	23.2%
Primary Government	18.4%	14.3%	21.8%	21.8%
Public Schools	47.5%	56.0%	50.0%	38.2%
University	9.2%	8.4%	5.9%	10.8%
Male	33.2%	22.5%	24.1%	46.7%
Years of Service	24.8	23.1	28.0	25.8
Years of Service 5-19	27.2%	33.9%	7.9%	25.1%
Years of Service 20-24	13.1%	14.2%	12.8%	12.0%
Years of Service 25-29	19.6%	19.3%	23.9%	18.8%
Years of Service 30+	40.2%	32.6%	55.4%	44.2%
Final Average Salary	\$62,754.32	\$58,421.26	\$57,886.60	\$68,503.51
Maximum Initial Benefit	\$2,433.50	\$2,119.25	\$2,409.20	\$2,765.70
Has any other account	2.0%	1.1%	2.0%	2.9%
Has both TSERS/LGERS	0.03%	0.00%	0.00%	0.06%
<i>N</i>	3,952	1,786	444	1,722

Notes: Only primary TSERS and LGERS accounts are included in the sample, as described in Appendix A. The second last row indicates the percent of the sample that has both a TSERS and LGERS account in the data.

**Table 4. Nested Logit Regression Results: Determinants of J&S Annuity Choice**

Factor	Financial Characteristics (1)		Spouse Characteristics (2)	
	B/SE	Mfx	B/SE	Mfx
	2.441 (0.520)***		2.996 (0.650)***	
Male	0.645 (0.087)***	0.145	0.643 (0.094)***	0.143
Non-Hispanic Black	-0.539 (0.128)***	-0.112	-0.508 (0.130)***	-0.104
Other Race/Ethnicity	0.128 (0.211)	0.028	0.060 (0.214)	0.013
Age at Claiming	-0.007 (0.004)	-0.001	-0.004 (0.004)	-0.001
BA Degree or More	-0.149 (0.087)*	-0.032	-0.108 (0.109)	-0.023
Has Good Health	-0.337 (0.132)**	-0.073	-0.482 (0.201)**	-0.103
Life Exp 80+	-0.161 (0.077)**	-0.035	-0.321 (0.148)**	-0.067
Has LI	0.019 (0.086)	0.004	-0.051 (0.140)	-0.011
Has LTCI	-0.010 (0.092)	-0.002	-0.339 (0.184)*	-0.070
Years of service 5-19	-0.169 (0.151)	-0.036	-0.161 (0.153)	-0.034
Years of service 20-24	-0.146 (0.138)	-0.031	-0.131 (0.139)	-0.028
Years of service 25-29	-0.099 (0.105)	-0.021	-0.077 (0.106)	-0.016
Maximum Benefit Amount (1K)	0.242 (0.039)***	0.052	0.254 (0.039)***	0.054
Financial Knowledge: Compounding Only	0.113 (0.175)	0.024	0.111 (0.177)	0.024
Financial Knowledge: Inflation Only	0.006 (0.156)	0.001	0.009 (0.158)	0.002
Financial Knowledge: Both	0.237 (0.124)*	0.051	0.256 (0.125)**	0.054
Impatient: Benefit Frame Only	-0.157 (0.102)	-0.033	-0.157 (0.102)	-0.033
Impatient: Lottery Frame Only	-0.159 (0.091)*	-0.034	-0.159 (0.092)*	-0.034
Impatient Both Frames	-0.184 (0.098)*	-0.039	-0.177 (0.099)*	-0.037
Risk Averse: Pension Frame Only	-0.693 (0.233)***	-0.140	-0.635 (0.235)***	-0.127
	0.077	0.017	0.112	0.024

Risk Averse: Prize Frame	(0.149)		(0.150)	
Risk Averse Both Frames	-0.023	-0.005	-0.006	-0.001
	(0.134)		(0.135)	
Own Age-Spouse Age (if positive)			-0.071	-0.015
			(0.015)***	
Own Age-Spouse Age (if negative)			-0.028	-0.006
			(0.012)**	
Spouse Has BA Degree or More			-0.199	-0.042
			(0.148)	
Own BA Degree*Spouse BA Degree			0.019	-0.038
			(0.171)	
Spouse Has Good Health			-0.297	-0.064
			(0.251)	
Own Health Good*Spouse's Health Good			0.389	0.019
			(0.274)	
Spouse Life Exp 80+			0.405	0.087
			(0.170)**	
Own Life Exp 80+*Spouse's Life Exp 80+			-0.145	0.054
			(0.218)	
Spouse Has LI			-0.002	-0.000
			(0.183)	
Has LI*Spouse Has LI			0.089	0.018
			(0.217)	
Spouse Has LTCI			-0.358	-0.074
			(0.235)	
Has LTCI*Spouse Has LTCI			0.758	0.083
			(0.310)**	
Spouse Has Pension			-0.124	-0.026
			(0.071)*	
<i>N</i>	3,952		3,952	

---

Notes: Data are from administrative records on pension benefit claimants merged with survey responses. Coefficients are estimates from a nested logit model with standard errors in parentheses. All specifications include agency type and year of claiming fixed effects and a dummy variable for Hispanic ethnicity (mean 0.005). \* p<0.1; \*\* p<0.05; \*\*\* p<0.01



**Table 5. Nested Logit Regression Results: Determinants of J&S Annuity Choice by Gender**

Factor	Male		Female	
	B/SE	Mfx	B/SE	Mfx
Factor	-0.721 (0.902)		0.185 (1.018)	
Non-Hispanic Black	-0.581 (0.227)**	-0.128	-0.499 (0.158)***	-0.098
Other Race/Ethnicity	0.395 (0.404)	0.081	0.070 (0.259)	0.015
Age at Claiming	0.010 (0.007)	0.002	0.059 (0.012)***	0.012
BA Degree or More	-0.182 (0.147)	-0.038	-0.109 (0.113)	-0.023
Has Good Health	-0.183 (0.206)	-0.038	-0.219 (0.179)	-0.047
Life Exp 80+	0.003 (0.132)	0.001	-0.271 (0.095)***	-0.057
Has LI	0.024 (0.158)	0.005	0.127 (0.108)	0.026
Has LTCI	0.101 (0.165)	0.021	-0.101 (0.115)	-0.021
Years of service 5-19	0.008 (0.267)	0.002	-0.525 (0.194)***	-0.106
Years of service 20-24	-0.105 (0.242)	-0.022	-0.251 (0.172)	-0.051
Years of service 25-29	-0.055 (0.198)	-0.012	-0.239 (0.127)*	-0.049
Maximum Benefit Amount (1K)	0.280 (0.061)***	0.060	0.205 (0.053)***	0.043
Financial Knowledge: Compounding Only	0.111 (0.368)	0.023	0.245 (0.204)	0.052
Financial Knowledge: Inflation Only	0.276 (0.307)	0.057	-0.070 (0.189)	-0.015
Financial Knowledge: Both	0.135 (0.252)	0.029	0.322 (0.146)**	0.066
Impatient: Benefit Frame Only	-0.148 (0.170)	-0.032	-0.112 (0.130)	-0.023
Impatient: Lottery Frame Only	-0.204 (0.169)	-0.044	-0.105 (0.110)	-0.022
Impatient Both Frames	-0.167 (0.170)	-0.036	-0.102 (0.123)	-0.021
Risk Averse: Pension Frame Only	-0.511 (0.375)	-0.112	-0.685 (0.307)**	-0.129
Risk Averse: Prize Frame Only	0.371 (0.259)	0.077	0.076 (0.186)	0.016
Risk Averse Both Frames	0.161 (0.231)	0.034	0.005 (0.168)	0.001
<i>N</i>	1,313		2,639	

Notes: Regression models are the same as that in Table 4, column (1). See the notes to Table 4.

**Table 6. Retirement Income Well-being**

	<b>Best decisions</b>	<b>Enough info</b>	<b>Satisfied</b>	<b>Saved enough</b>	<b>Confident</b>
<b>Panel A: Means</b>					
Full sample					
S2015 Agree	90.7%	90.9%	82.6%	62.3%	69.5%
S2017 Agree	82.1%	79.7%	74.0%	37.2%	37.2%
Max					
S2015 Agree	90.2%	89.8%	81.4%	61.1%	69.9%
S2017 Agree	81.5%	79.5%	76.4%	40.5%	38.5%
J&S					
S2015 Agree	91.8%	92.7%	84.5%	66.6%	71.1%
S2017 Agree	84.5%	80.9%	73.5%	38.0%	40.5%
SS Leveling					
S2015 Agree	88.3%	88.3%	79.9%	50.4%	61.7%
S2017 Agree	75.4%	76.1%	66.3%	20.8%	19.3%
<b>Panel B: Comparisons</b>					
J&S - Max (S2017 Agree)	2.9%*	1.4%	-2.9%	-2.5%	2.0%
SS Leveling - Max (S2017 Agree)	-6.2%**	-3.4%	-10.1%***	-19.7%***	-19.2%***
SS Leveling - J&S (S2017 Agree)	-9.1%***	-4.8%*	-7.2%**	-17.2%***	-21.2%***

Note: Data are from two surveys of individuals who initiated retirement benefits from 2009-2014 in 2015 and 2017. The sample is restricted to married individuals. "Agree" refers to selecting "Strongly Agree" or "Agree" to the specified statement in 2015 or 2017 surveys. Stars in Panel B indicate that the proportion of takers of an annuity option agreeing with the specified statement is statistically significantly different from the proportion of takers of another annuity option agreeing with the specified statement.

**Table 7. Retirement Income Well-being in S2015 and S2017**

	<b>Best decisions</b>	<b>Enough info</b>	<b>Satisfied</b>	<b>Saved enough</b>	<b>Confident</b>
<b>Panel A: Changes between S2015 and S2017</b>					
Full sample					
Increased in S2017	6.7%	6.1%	8.0%	4.8%	6.2%
Decreased in S2017	15.2% ***	17.3% ***	16.6% ***	29.9% ***	38.6% ***
Max					
Increased in S2017	6.9%	7.2%	10.2%	6.5%	6.6%
Decreased in S2017	15.6% ***	17.6% ***	15.2% ***	27.1% ***	38.1% ***
J&S					
Increased in S2017	6.1%	4.7%	6.0%	3.6%	6.5%
Decreased in S2017	13.4% ***	16.4% ***	16.9% ***	32.2% ***	37.0% ***
SS Leveling					
Increased in S2017	8.0%	7.6%	7.2%	2.3%	3.8%
Decreased in S2017	20.8% ***	19.7% ***	20.8% ***	31.8% ***	46.2% ***
<b>Panel B: Comparisons</b>					
J&S - Max (Decreased)	-2.2%	-1.2%	1.7%	5.0% **	-1.0%
SS Leveling - Max (Decreased)	5.2% **	2.1%	5.6% **	4.7%	8.1% **
SS Leveling – J&S (Decreased)	7.4% ***	3.3%	3.9%	-0.3%	9.2% ***

Note: Data are from two surveys of individuals who initiated retirement benefits from 2009-2014 in 2015 and 2017. The sample is restricted to married individuals. An “increase” refers to agreeing with the specified statement in 2017 survey but not 2015. A “decrease” refers to agreeing with the specified statement in 2015 survey but not 2017. Stars in Panel A indicate that the proportion of individuals whose well-being decreased between surveys is statistically significantly different from the proportion of individuals whose well-being increased between surveys, among those with a well-being change. Stars in Panel B indicate that the proportion of takers of an annuity option with a well-being decrease between surveys is statistically significantly different from the proportion of takers of another annuity option with a well-being decrease.

**Table 8. Retirement Income Well-being Regression Results**

	<b>Best decisions</b>	<b>Enough info</b>	<b>Satisfied</b>	<b>Saved enough</b>	<b>Confident</b>
J&S	0.013 (0.018)	-0.007 (0.019)	-0.067 (0.020)***	-0.068 (0.022)***	-0.035 (0.022)
SS Leveling	-0.048 (0.028)*	-0.021 (0.030)	-0.040 (0.032)	-0.126 (0.035)***	-0.126 (0.035)***
Male	-0.021 (0.018)	-0.003 (0.019)	0.032 (0.021)	0.028 (0.023)	0.138 (0.023)***
Non-Hispanic Black	-0.054 (0.029)*	-0.056 (0.031)*	-0.097 (0.033)***	-0.172 (0.036)***	-0.145 (0.036)***
Hispanic/Latino	-0.137 (0.120)	-0.109 (0.127)	-0.076 (0.136)	-0.244 (0.149)	-0.233 (0.148)
Other Race/Ethnicity	0.020 (0.057)	0.070 (0.060)	0.066 (0.064)	-0.096 (0.071)	-0.047 (0.070)
BA Degree or More	0.057 (0.019)***	0.052 (0.020)**	0.124 (0.022)***	0.107 (0.024)***	0.115 (0.024)***
Age at Claiming	0.002 (0.002)	0.005 (0.003)*	0.012 (0.003)***	0.008 (0.003)**	0.006 (0.003)*
Early Retirement	-0.002 (0.027)	0.007 (0.028)	-0.041 (0.030)	0.018 (0.033)	-0.002 (0.033)
Years of Service 5-19	-0.074 (0.043)*	-0.079 (0.045)*	-0.057 (0.048)	0.058 (0.053)	0.101 (0.052)*
Years of Service 20-24	-0.086 (0.040)**	-0.060 (0.042)	0.012 (0.045)	0.034 (0.049)	0.115 (0.049)**
Years of Service 25-29	-0.055 (0.026)**	-0.025 (0.028)	-0.027 (0.030)	0.018 (0.033)	0.027 (0.032)
Maximum Benefit Amount (1K)	-0.000 (0.007)	0.005 (0.008)	0.019 (0.008)**	0.041 (0.009)***	0.038 (0.009)***
R-squared	0.03	0.02	0.07	0.08	0.09
N	2,303	2,304	2,310	2,300	2,301
Mean Dependent Variable	0.824	0.800	0.740	0.373	0.373

Notes: Data are from a survey of individuals who initiated retirement benefits from 2009-2014. Administrative records as of spring 2015 and survey responses are as of spring 2017. The sample is restricted to married individuals. Dependent variables are indicated in the column headings. Coefficients are estimates from a linear probability model with standard errors in parentheses. All specifications include agency type and year of claiming fixed effects. Details are provided in the appendix. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## **Appendix A: Sample construction and restrictions**

### **1. Administrative Records**

The retirement system maintains records for several retirement plans including firefighters, judicial classes, and the legislature. We construct our data using administrative records on active retirement benefit accounts that were initiated between January 1, 2009 and December 31, 2014. We only consider retirement accounts from the TSERS or LGERS retirement systems. We exclude any accounts that are suspended. We do not include ancillary accounts from other systems but do retain an indicator if the individual has other benefit accounts, which might include the transfer benefit option or another retirement system such as the legislature or firefighters.<sup>21</sup> We also exclude any accounts that were closed for any reason, including disability, withdrawal, or transfer of benefits. We exclude firefighters and law enforcement officers that are within TSERS and LGERS, since the eligibility rules are different for those plans.

We confirm that the remaining 80,241 benefit records are unique accounts – individuals may only receive one benefit from TSERS and one benefit from LGERS. We make further exclusions as listed in Appendix Table B1 below. These include: recorded years of service is less than 5 years, termination of employment before 2008, days between termination and claiming greater than one year, and missing gender code. We end up with 72,350 unique benefit accounts representing 72,254 individuals with one account and 96 individuals with both a TSERS and LGERS account.

We sent a survey to 27,434 of the eligible benefit claimants. Our final sample for analysis includes 5,515 respondents for a response rate of 20%.

Appendix Table B2 presents a comparison between our sample and data from the American Community Survey (ACS). For the ACS data, we used the 2012-2016 5-year Public Use Microdata Samples (PUMS). We include individuals aged 50 or older. We consider those

---

<sup>21</sup> While we focus solely on those accounts in TSERS and LGERS, individuals may also have accounts with these other systems. Where relevant, we include an indicator variable for the individual having an additional membership in another retirement plan. About 1 percent of our sample has both an active TSERS and LGERS retirement benefit. For those individuals we keep both records and treat them as separate observations but retain an indicator variable.

who were state or local government employees and worked full time (14+ weeks and 30+ hours per week worked). The sample is then restricted to those that did not work last week, that last worked within the past 12 months, and that are currently either unemployed or not in the labor force. This approximates recent retirees. Our ACS data will exclude individuals that claimed benefits from a public sector retirement system but immediately took another job.

## **2. Key Policy Details**

Here we outline some key policies that were in place during the 2009-2014 time period.

### **Return to work:**

Our data will include some individuals that have “retired” but are still working within the system according to the rules below.

- Pension benefits can be received while working at any other job not covered by that pension. This includes a TSERS employee working under LGERS and vice versa.
- Pension benefits can be received while working for a job at the prior employer as long as the position is not eligible for pension benefits (typically a part-time position).
- Pension benefits will be suspended if an individual works in a job that is covered by the same pension. After 3 years of service, the earned benefits can be combined into one account. If 3 years of service are not reached, the new account is not eligible for pension benefits and must be withdrawn as a lump sum.

### **Multiple benefit accounts:**

We retain individuals that have multiple benefit accounts and include TSERS and LGERS accounts separately in the data. The rules on maintaining multiple benefit accounts are below.

- Each retirement benefit account can be paid separately and there are no restrictions on coordinating annuity type or timing. Individuals with multiple accounts have the option to consolidate them by transferring service from one account to another. The average final compensation (AFC) used is that from the receiving account, while the years of service is the sum of all accounts. We

cannot track in the data whether the benefit account is the sum of multiple benefits earned under different retirement systems.

- An individual may have multiple membership accounts due to:
  - Long break in work
  - Return to work
  - Work with a different retirement system (first TSERS, then LGERS etc.)

### **Years of Service:**

In our data, we only observe creditable service, which is a combination of tenure and optional purchased service.

- Creditable service: service calculation used for determining benefit level
  - Membership service
  - Purchased service: withdrawn service, military service, out-of-state, temporary, educational leave, workers' compensation, community service, parental leave, extended illness leave, etc. Also, unused sick leave and vacation time.
- Contributory service: service calculation used for determining eligibility

Using date of hire and date of termination, which are measured with some error, we estimate that most individuals have about 6-8 months of purchased service on top of membership service.

## Appendix Table B1. Sample Construction

<b>Restriction</b>	<b>Count of Observations</b>	<b>Sample Size</b>
All eligible benefit accounts		80,241
Reported service credit < 5 years	368	79,873
Terminated prior to 2008	5,043	74,830
Days between termination and benefit claiming $\geq$ 366	2,454	72,376
Missing gender code	26	72,350
<b>Full Administrative Records</b>		<b>72,350</b>
<b>Table 2, Column (1)</b>		
Remove combinations of age and YOS that are not consistent with eligibility	299	72,051
Validated Email Address and Sent S2015 Survey Sample Responses		27,434
<b>Completed Survey Response</b>		<b>5,515</b>
<b>Table 2, Column (2)</b>		
Validated Email Address and Sent S2017 Survey Sample Responses		5,485
<b>Completed Survey Response</b>		<b>3,230</b>

Note: The 2015 survey response rate was 20% for the sample used in this paper. The 2017 survey response rate was 58.9% for the sample used in this paper.



## Appendix Table B2. Data Representativeness

Variables	ACS United States	ACS North Carolina	Survey Respondents (Response Rate 20%)
	(1)	(2)	(3)
Number of Observations	11,733	444	3,952
Age at Survey			62.9
Age at Claiming			59.7
Age	61.5	61.0	
Male	39.8%	33.3%	33.2%
Non-Hispanic Black	7.1%	12.2%	9.2%
Hispanic/Latino	5.9%	1.6%	0.5%
Other Race/Ethnicity	4.3%	2.7%	2.8%
BA or above	49.2%	54.7%	69.1%

Notes: ACS data include married individuals ages 50 or above who were working full time (14+ weeks and 30+ hours per week worked) at a state or local government employer last year but are currently either unemployed or not in the labor force. Data from our survey include married individuals that claimed retirement benefits in North Carolina. Survey respondents are disproportionately higher educated than the population average.

### Appendix Table B3. Annuity Choice by Gender

	Male	Female
	(1)	(2)
Annuity Type:		
Max	30.5%	52.5%
SS Leveling	8.1%	12.8%
J&S	61.3%	34.7%
100%	26.1%	6.2%
50%	5.6%	2.9%
100% Popup	20.0%	14.2%
50% Popup	9.6%	11.4%
<i>N</i>	1,313	2,639

Notes: Only primary TSERS and LGERS accounts are included in the sample, as described in Appendix A.

**Appendix Table B4. Multinomial Logit Regression Results: Determinants of J&S Annuity Choice**

	Baseline (1)	Spouse Characteristics (2)	Financial Characteristics (3)
Male	0.845 (0.077)***	0.831 (0.084)***	0.818 (0.085)***
Non-Hispanic Black	-0.618 (0.125)***	-0.588 (0.126)***	-0.541 (0.129)***
Other Race/Ethnicity	0.061 (0.207)	-0.033 (0.211)	-0.036 (0.214)
Age at Claiming	-0.005 (0.004)	-0.001 (0.004)	0.000 (0.004)
BA Degree or More	-0.139 (0.085)	-0.101 (0.107)	-0.128 (0.108)
Has Good Health	-0.409 (0.128)***	-0.588 (0.197)***	-0.597 (0.200)***
Life Exp 80+	-0.146 (0.076)*	-0.343 (0.147)**	-0.341 (0.148)**
Has LI	-0.045 (0.084)	-0.112 (0.138)	-0.089 (0.139)
Has LTCI	0.007 (0.091)	-0.363 (0.182)**	-0.362 (0.183)**
Years of service 5-19	0.073 (0.143)	0.082 (0.146)	0.057 (0.147)
Years of service 20-24	0.014 (0.133)	0.035 (0.135)	0.027 (0.136)
Years of service 25-29	-0.059 (0.103)	-0.036 (0.104)	-0.035 (0.105)
Maximum Benefit Amount	0.242 (0.038)***	0.253 (0.039)***	0.248 (0.039)***
Own Age-Spouse Age (if positive)		-0.050 (0.014)***	-0.050 (0.014)***
Own Age-Spouse Age (if negative)		-0.037 (0.012)***	-0.036 (0.012)***
Spouse Has BA Degree or More		-0.221 (0.147)	-0.217 (0.148)
Own BA Degree*Spouse BA Degree		0.050 (0.170)	0.027 (0.171)
Spouse Has Good Health		-0.455 (0.246)*	-0.437 (0.248)*
Own Health Good*Spouse's Health Good		0.504 (0.270)*	0.500 (0.272)*
Spouse Life Exp 80+		0.397 (0.169)**	0.379 (0.170)**
Own Life Exp 80+*Spouse's Life Exp 80+		-0.095 (0.216)	-0.091 (0.218)

Spouse Has LI	-0.032 (0.180)	-0.052 (0.182)
Has LI*Spouse Has LI	0.118 (0.214)	0.128 (0.216)
Spouse Has LTCI	-0.352 (0.231)	-0.339 (0.232)
Has LTCI*Spouse Has LTCI	0.806 (0.305)***	0.778 (0.307)**
Spouse Has Pension	-0.121 (0.070)*	-0.134 (0.071)*
Financial Knowledge: Compounding Only		0.057 (0.176)
Financial Knowledge: Inflation Only		-0.038 (0.157)
Financial Knowledge: Both		0.201 (0.124)
Impatient: Benefit Frame Only		-0.162 (0.102)
Impatient: Lottery Frame Only		-0.172 (0.091)*
Impatient: Both Frames		-0.209 (0.098)**
Risk Averse: Pension Frame Only		-0.666 (0.234)***
Risk Averse: Prize Frame Only		0.062 (0.149)
Risk Averse: Both Frames		-0.041 (0.134)
<i>N</i>	3,952	3,952

Notes: Data are from administrative records on pension benefit claimants merged with survey responses. Coefficients are estimates from a multinomial logit model with standard errors in parentheses. All specifications include agency type and year of claiming fixed effects and a dummy variable for Hispanic ethnicity (mean 0.005). \* p<0.1; \*\* p<0.05; \*\*\* p<0.01

**Appendix Table B5. Data Representativeness of S2017 Responses**

	S2015 Married (1)	S2015 Married (Not in S2017) (2)	S2015 Married (in S2017) (3)
Age at Claiming	59.7	59.8	59.6
Age at Termination	59.7	59.7	59.6
Early Retirement	33.2%	32.7%	33.5%
TSERS	80.6%	80.9%	80.5%
Community College	5.5%	5.1%	5.8%
Local Government	19.4%	19.1%	19.5%
Primary Government (and	18.4%	17.4%	19.2%
Public Schools	47.5%	50.2%	45.7%
University	9.2%	8.2%	9.8%
Male	33.2%	31.9%	34.1%
Years of Service	24.8	24.7	25.0
Years of Service 5-19	27.2%	27.5%	26.9%
Years of Service 20-24	13.1%	13.0%	13.1%
Years of Service 25-29	19.6%	18.3%	20.5%
Years of Service 30+	40.2%	41.2%	39.5%
Final Average Salary	\$62,754.32	\$61,282.60	\$63,799.36
Maximum Initial Benefit	\$2,433.50	\$2,364.28	\$2,482.66
Annuity Type:			
Max	45.2%	46.4%	44.3%
SS Leveling	11.2%	11.0%	11.4%
J&S	43.6%	42.6%	44.3%
100%	12.8%	12.3%	13.2%
50%	3.8%	3.5%	4.0%
100% Popup	16.1%	16.6%	15.8%
50% Popup	10.8%	10.2%	11.3%
Has any other account	2.0%	1.9%	2.1%
Has both TSERS/LGERS	0.03%	0.00%	0.04%
<i>N</i>	3,952	1,641	2,311

Notes: Only primary TSERS and LGERS accounts are included in the sample, as described in Appendix A. The second last row indicates the percent of the sample that has both a TSERS and LGERS account in the data.

## Appendix C: Definition of Key Survey Variables

### Risk and Time Preferences

#### **Impatient: Lottery Frame**

Suppose that you won a prize that is worth \$1000 if you take it today. Alternatively, you could wait one year to claim the prize and be guaranteed to receive \$1200. Would you claim the \$1000 dollars today, or would you wait one year for the \$1200?

- Claim \$1000 today**
- Wait one year and claim \$1200
- Not sure

#### **Impatient: Benefit Frame**

Imagine you are 65 years old, and you (and your spouse/partner) are receiving \$1000 per month in Social Security benefits. Suppose you were given the choice to reduce that benefit by half, to \$500 per month. This one-half benefit reduction would continue for as long as you (and your spouse/partner) live. In return, you would be given a one-time, lump-sum payment of \$80,500. Would you take the \$1000 monthly benefit for life, or the reduced monthly benefit combined with the lump sum payment?

- Take the \$1000 monthly benefit
- Take the reduced benefit and the lump sum**
- Not sure

#### **Risk Adverse: Pension Frame**

Suppose that you are about to retire and have two choices for your pension benefit. Pension A gives you an income equal to your pre-retirement income. Pension B has a 50% chance of providing a benefit worth double your pre-retirement income and a 50% chance of providing a benefit worth 20% less than your pre-retirement income. Which pension benefit would you choose?

- Pension A**
- Pension B
- Not sure

### **Risk Adverse: Prize Frame**

Suppose that you are offered a choice between two prizes. If you choose Prize A, you are guaranteed to receive \$1000. Alternatively, if you choose prize B, you will have a 50-50 chance of receiving \$2200 and a 50-50 chance of receiving \$0. Which prize would you choose -- Prize A or Prize B?

- Prize A**
- Prize B
- Not sure

### **Financial Knowledge**

#### **Financial Knowledge: Compounding**

**If you have \$100 in your savings account, and the annual interest rate is 2%, how much money will you have in your account after five years?**

- More than \$102**
- \$102
- Less than \$102
- Do not Know

#### **Financial Knowledge: Inflation**

**If the current interest rate on your savings account is 1% per year, and the inflation rate is 2% per year, how much do you think you will be able to buy with your money a year from now?**

- A larger amount than you can buy now
- Exactly the same amount as you can buy now
- A smaller amount than you can buy now**
- Do not know

#### **Self-Reported Financial Knowledge:**

**On a scale from 1 to 7 (where 1 means very low, and 7 means very high), how would you rate your financial knowledge?**

### **Well-Being Outcomes:**

The five retiree well-being outcomes in Table 6-8 of the text are derived from the following questions. The outcome is binary with a 1 for “agree” or “strongly agree” and 0 otherwise. Results are similar when the outcome is alternatively “strongly agree” only.

**Please indicate whether you agree or disagree with the following statements regarding your retirement [Strong Disagree; Disagree; Neither Agree nor Disagree; Agree; Strongly Agree; Not Applicable/ Don’t know]:**

“Best decisions”: I made the best possible decisions concerning the payment option for my TSERS/LGERS pension benefit.

“Enough info”: I had enough information to make the best possible decisions regarding my retirement.

“Satisfied”: I am satisfied with the standard of living I have had since I first started receiving a pension check.

“Saved enough”: I saved enough for retirement while working.

“Confident”: I am confident that I will not outlive my savings.