**Navigating Complex Financial Decisions at Retirement:**

**Evidence from Annuity Choices in Public Sector Pensions**

**Supplemental Appendix**

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**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.[[1]](#footnote-2) 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 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**

|  |  |  |
| --- | --- | --- |
| **Restriction** | **Count of Observations** | **Sample Size** |
| 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 >= 366 | 2,454 | 72,376 |
| Missing gender code | 26 | 72,350 |
| **Full Administrative Records****Table 2, Column (1)** |  | **72,350** |
|  |  |  |
| Remove combinations of age and YOS that are not consistent with eligibility | 299 | 72,051 |
| Validated Email Address and Sent S2015 |  | 27,434 |
| Survey Sample Responses |  | 5,515 |
| **Completed Survey Response****Table 2, Column (2)** |  | **5,515** |
|  |  |  |
| Validated Email Address and Sent S2017 |  | 5,485 |
| Survey Sample Responses |  | 3,230 |
| **Completed Survey Response** |  | **3,230** |
|  |  |  |

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 disproportionally 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% |
| *N* | 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** | **Spouse Characteristics** | **Financial Characteristics** |
|  | **(1)** | **(2)** | **(3)** |
| Male | 0.845 | 0.831 | 0.818 |
|  | (0.077)\*\*\* | (0.084)\*\*\* | (0.085)\*\*\* |
| Non-Hispanic Black | -0.618 | -0.588 | -0.541 |
|  | (0.125)\*\*\* | (0.126)\*\*\* | (0.129)\*\*\* |
| Other Race/Ethnicity | 0.061 | -0.033 | -0.036 |
|  | (0.207) | (0.211) | (0.214) |
| Age at Claiming | -0.005 | -0.001 | 0.000 |
|  | (0.004) | (0.004) | (0.004) |
| BA Degree or More | -0.139 | -0.101 | -0.128 |
|  | (0.085) | (0.107) | (0.108) |
| Has Good Health | -0.409 | -0.588 | -0.597 |
|  | (0.128)\*\*\* | (0.197)\*\*\* | (0.200)\*\*\* |
| Life Exp 80+ | -0.146 | -0.343 | -0.341 |
|  | (0.076)\* | (0.147)\*\* | (0.148)\*\* |
| Has LI | -0.045 | -0.112 | -0.089 |
|  | (0.084) | (0.138) | (0.139) |
| Has LTCI | 0.007 | -0.363 | -0.362 |
|  | (0.091) | (0.182)\*\* | (0.183)\*\* |
| Years of service 5-19 | 0.073 | 0.082 | 0.057 |
|  | (0.143) | (0.146) | (0.147) |
| Years of service 20-24 | 0.014 | 0.035 | 0.027 |
|  | (0.133) | (0.135) | (0.136) |
| Years of service 25-29 | -0.059 | -0.036 | -0.035 |
|  | (0.103) | (0.104) | (0.105) |
| Maximum Benefit Amount (1K) | 0.242 | 0.253 | 0.248 |
|  | (0.038)\*\*\* | (0.039)\*\*\* | (0.039)\*\*\* |
| Own Age-Spouse Age (if positive) |  | -0.050 | -0.050 |
|  | (0.014)\*\*\* | (0.014)\*\*\* |
| Own Age-Spouse Age (if negative) |  | -0.037 | -0.036 |
|  | (0.012)\*\*\* | (0.012)\*\*\* |
| Spouse Has BA Degree or More |  | -0.221 | -0.217 |
|  |  | (0.147) | (0.148) |
| Own BA Degree\*Spouse BA Degree |  | 0.050 | 0.027 |
|  | (0.170) | (0.171) |
| Spouse Has Good Health |  | -0.455 | -0.437 |
|  | (0.246)\* | (0.248)\* |
| Own Health Good\*Spouse's Health Good |  | 0.504 | 0.500 |
|  | (0.270)\* | (0.272)\* |
| Spouse Life Exp 80+ |  | 0.397 | 0.379 |
|  |  | (0.169)\*\* | (0.170)\*\* |
| Own Life Exp 80+\*Spouse's Life Exp 80+ |  | -0.095 | -0.091 |
|  | (0.216) | (0.218) |
| Spouse Has LI |  | -0.032 | -0.052 |
|  |  | (0.180) | (0.182) |
| Has LI\*Spouse Has LI |  | 0.118 | 0.128 |
|  |  | (0.214) | (0.216) |
| Spouse Has LTCI |  | -0.352 | -0.339 |
|  |  | (0.231) | (0.232) |
| Has LTCI\*Spouse Has LTCI |  | 0.806 | 0.778 |
|  |  | (0.305)\*\*\* | (0.307)\*\* |
| Spouse Has Pension |  | -0.121 | -0.134 |
|  |  | (0.070)\* | (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) |
| *N* | 3,952 | 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** | **S2015 Married (Not in S2017)** | **S2015 Married (in S2017)** |
|  | **(1)** | **(2)** | **(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 Proprietary Unit) | 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 Amount | $2,433.50 | $2,364.28 | $2,482.66 |
|  |  |  |  |
| Financial literacy and preferences regarding time and risk: |  |
| Financial Knowledge: Compounding Only | 6.5% | 7.6% | 5.8% |
| Financial Knowledge: Inflation Only | 10.4% | 10.6% | 10.2% |
| Financial Knowledge: Both | 71.5% | 67.7% | 74.2% |
| Impatient: Benefit Frame Only | 17.6% | 17.5% | 17.7% |
| Impatient: Lottery Frame Only | 25.9% | 27.0% | 25.1% |
| Impatient Both Frames | 20.8% | 20.8% | 20.9% |
| Risk Averse: Pension Frame Only | 3.5% | 3.0% | 3.8% |
| Risk Averse: Prize Frame Only | 17.5% | 17.3% | 17.7% |
| Risk Averse Both Frames | 70.0% | 68.4% | 71.1% |
|  |  |  |  |
| 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% |
| *N* | 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.

1. 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. [↑](#footnote-ref-2)