Social Security and Retirement Timing: Evidence from a National Sample of Teachers

Melinda Sandler Morrill and John Westall
Department of Economics
North Carolina State University

Preliminary Draft: Please do not cite or circulate without the authors' permission

August 6, 2018

Abstract

How important is Social Security income in workers' retirement timing? About 40 percent of public school teachers are not covered by Social Security. This provides an opportunity to analyze the causal impact of Social Security on retirement timing by comparing covered and non-covered teachers. Using individual-level data from the American Community Survey, we find strong evidence of higher rates of retirement among covered teachers at key Social Security eligibility ages. This pattern is most pronounced at the early Social Security eligibility age for single female teachers and just after the full eligibility age for married teachers. This illustrates the importance of Social Security in retirement timing. In addition, these estimates suggest that, should the federal government mandate full inclusion in Social Security for all public sector workers, newly covered teachers and other public sector workers would retire at younger ages putting further strain on public pension plan finances.

1 Introduction

Roughly 40 percent of teachers are not currently covered by Social Security (Kan and Aldeman, 2014). These teachers are more vulnerable to changes in primary pension plans and may not receive adequate protection from inflation. Originally, the Social Security Act of 1935 only covered private sector workers. Concerns about the constitutionality of the federal government collecting taxes from state and local governments prevented the inclusion of state and local government employees. Section 218 of the Social Security Act passed in 1950 allowed states to decide whether to bring their employees into Social Security. Subsequent changes to the Act mandated Social Security coverage for any state or local government employees not included in another pension system (Gale et al., 2015). In total approximately 25% of public employees are not covered by Social Security of which most are public safety officers and teachers (GAO-05-786T, 2005).

Prior work on the role of Social Security in retirement has estimated elasticities with respect to benefit levels (e.g. Coile and Gruber, 2007; Coile, 2015; Liebman et al., 2009). This study instead measures the impact of Social Security coverage on the extensive margin. We estimate the individual-level probability of retiring within the past year leveraging pension plan level variation in Social Security inclusion. We find strong evidence that teachers respond to Social Security incentives through higher retirement rates at key eligibility ages. Social Security inclusion increases the probability of retiring at age 62, the earliest non-disability Social Security eligibility age, by about 23 percent. The normal retirement age (NRA) is increasing for cohorts within our sample from age 65 to age 66 and Medicare eligibility is age 65 for nearly all workers.[1] Social Security inclusion is associated with about a 20 percent higher probability of retirement for 66 year old teachers. These averages mask important heterogeneity by marital status. For non-married, female

[1]For the full chart of cohorts see: https://www.ssa.gov/oact/progdata/nra.html. The oldest birth cohort in our data is 1940 (age 70 in 2010), while the youngest cohort reaching age 65 is born in 1952. The former has NRA of 65 and 6 months, while the latter has NRA of age 66.

teachers, Social Security inclusion is associated with over a 73 percent higher probability of retiring at age 62 and 46 percent higher probability at age 65. The results for single men are generally similar but imply an even larger effect. For female, married teachers, at age 67 Social Security coverage is associated with about a 36 percent higher probability of retiring. Similarly, for married men, the estimates suggest a 39 percent higher retirement probability at age 66 due to Social Security inclusion. Thus, Social Security coverage leads to higher rates of retirement at early eligibility ages for single people and at the full eligibility ages for married men and women. We confirm these findings by illustrating that the teacher labor force participation rate, which is defined as the age $\times$ state $\times$ year $\times$ gender cell probability that an individual with at least a bachelor's degree is currently working as a teacher, follows a similar pattern.

With the Social Security system facing potential future solvency issues, policymakers have considered mandating the coverage of all public sector workers to increase the Social Security tax base (GAO-HEHS-98-196, 1998; GAO-03-710T, 2003; GAO-05-786T, 2005; Munnell, 2000, 2005; Nuschler et al., 2011) and changing rules that determine the level of spousal and survivor benefits for those not covered by Social Security (Diamond and Orszag, 2003; Haltzel, 2004; Kilgour, 2009; Gustman et al., 2013). Because public sector pensions generally have full retirement ages that are significantly younger than those of Social Security and private sector pension plans, past research into the impact of Social Security on retirement timing may not be extendable to teachers. Gale, Holmes, and John (2015) provide a comprehensive analysis of the issues associated with a potential federal mandate to include all state and local government employers in Social Security. Teachers with short tenures are likely better off when covered by Social Security, but it is less clear whether long tenure teachers would benefit.[2]

For workers who are excluded from Social Security, two programs are used to adjust

[2]This argument is in contrast with enhancements to public sector pensions, which typically will benefit long tenure teachers at the cost of short tenure teachers (e.g. Koedel et al., 2014).

benefits. The Windfall Elimination Program (WEP) reduces one's own Social Security benefits earned under covered employment to account for the period of non-covered employment. The Government Pension Offset (GPO) program reduces the spousal benefit that individuals with non-covered employment history can receive. These programs impact the joint retirement decisions of households and apply to a substantial proportion of teachers (Diamond and Orszag, 2003; Haltzel, 2004; Kilgour, 2009; Gustman et al., 2013). When considering the implications of extending Social Security coverage to public sector workers, it is important to not only consider the impacts on Social Security solvency, but also how structural changes in public sector workers' retirement incentives will change their labor supply decisions.

2 Background and Literature

Teachers were among the first public sector workers to be covered under employer-provided pensions.[3] Almost all teacher pension plans are some form of a defined benefit (DB) plan.[4] DB plans have their own unique rules regarding such parameters as pension benefit formulas, ages at which benefits can be received, years of service required to claim benefits, years of service until employees are vested, levels of inflation adjustment, and eligibility for Social Security benefits, among others. Koedel and Podgursky (2016) provide a comprehensive overview of teacher pensions and their role in the teacher labor market.

The incentives generated by pension parameters are generally grouped into two categories: "pull" incentives that attract and retain new employees and "push" incentives that promote retirement of employees when they reach a certain age (Lazear, 1986). Pull incentives come primarily through rules governing when employees become vested in the pension

[3]For an in-depth discussion of the history and structure of teacher pensions across states see Clark and Craig (2011).

[4]Alaska is the only state to provide a pure defined-contributions (DC) plan to teachers, but that plan only applies to those hired after 2006.

system and the steep backloading of pension wealth that characterizes DB plans during an employee's mid-career. Push incentives occur primarily in DB plans where retirement wealth accruals increase as one approaches the full retirement age and then decline sharply soon after. One can then model these incentives as an "option-value" of work where for an additional year of work pensions levels increase but at a cost of foregone pension receipt within that year (Stock and Wise, 1990). This framework models employees who continue to work another year as buying an option on the value of that additional year of employment. Individuals retire when the utility from an additional year of income and retirement wealth accruals is exceeded by the disutility of work and the opportunity cost of an additional year of foregone retirement benefits. Costrell and Podgursky (2009) illustrate the sharp patterns of pension wealth accruals for six teacher pension plans. On the other hand, Clark and McDermed (1986) show that earnings rise after pension eligibility ages, supporting the notion that compensation is more of a spot market than a Lazear-type lifetime contract. Krueger and Meyer (2002) provide a summary of the research on how various social insurance programs affect labor supply.

Coile and Gruber (2007) adapted the forward looking, option-value framework to the modeling of Social Security wealth accrual patterns. Similar to the models of employer-provided pension wealth, one must forgo Social Security income to qualify for a higher benefit the following year. Coile and Gruber (2007) compute the option value of work using employment history and pension parameter data from the Health and Retirement Survey and find that Social Security incentives are a significant determinant of retirement decisions and have an impact similar to private pension incentives. Liebman et al. (2009) uses the HRS in conjunction with discontinuities in Social Security rules and conclude that individuals are responsive to marginal changes in Social Security benefits. Mastrobuoni (2011) also use the HRS and finds that retirement timing responds to both perceived and actual changes in Social Security incentives. Fetter and Lockwood (2016) show that an additional program, the Old Age Assistance Program (OAA), which is means tested,

reduced the labor force participation rate among men in their late 60's and early 70's. No paper to our knowledge specifically examines the impact of Social Security inclusion on teachers' retirement decisions. Rather than relying on structural estimates of variation in the intensity of Social Security wealth changes, this study instead utilizes variation on the extensive margin: having any Social Security wealth or not.

This paper also contributes to the large literature on how teachers' retirement decisions are influenced by pension wealth. Asch et al. (2005) explore retirement timing among federal workers in the Civil Service Retirement System (CSRS). These federal workers are not covered by Social Security. Using administrative records, Asch et al. (2005) estimate retirement hazards over 7 years as a function of forward-looking measures of pension wealth incentives. They find workers are responsive to financial incentives for retirement with no evidence of "excess retirements at key Social Security eligibility ages 62 and 65. Ni and Podgursky (2016) estimate a structural model of teacher retirement and illustrate an important role for pension wealth in retirement timing.

Recent work on retirement timing has investigated the role of pension modifications and enhancements on encouraging delayed retirement. Teachers responsiveness to changes in financial incentive is typically small. Koedel and Xiang (2017) leverage variation in how a pension enhancement in St. Louis affected pension wealth for teachers differentially by years until retirement eligibility. Similarly, Brown (2013) exploits a change for California teachers and finds a significant but small elasticity of lifetime labor supply with respect to the return to work. Fitzpatrick (2015) finds that teachers willingness-to-pay for retirement benefits is small relative to the cost of providing them. Furgeson et al. (2006) estimate that Pennsylvania public school teachers responded to early retirement incentives with women having a higher elasticity than men.

The Government Pension Offset (GPO) and Windfall Elimination Provision (WEP) are Social Security programs intended to reduce the benefits received by individuals who haven't contributed to the Social Security system or are receiving a substantial public sector

pension. The GPO impacts the spousal or survivor benefits of individuals not covered by Social Security, but who earn a pension from government employment. Social Security benefits affected by the GPO are reduced by 66% of the benefits earned from a federal, state, or local government pension. The WEP reduces the Social Security benefits of individuals who worked part of there career in a job not included in Social Security and part in employment covered by Social Security. The WEP only applies if the individual worked long enough in the Social Security system to qualify for benefits and also receives a pension from their non-Social Security employment (Diamond and Orszag, 2003). Both programs are designed to ensure individuals who do not contribute to the Social Security system via Federal Insurance Contributions Act (FICA) taxes do not receive unfair compensation from Social Security benefits. These programs have somewhat complicated rules, and often individuals are not aware that their benefits will be reduced until the point of claiming. Because the programs are unpopular, Congress has debated repealing them. Most recently, the H.R.1205 - Social Security Fairness Act of 2017 proposed repeal.[5] Gustman et al. (2014) estimate that about 3.5 percent of households in the HRS are affected by either the WEP or the GPO. We provide evidence below that the GPO does affect the retirement timing of widows and widowers who are not covered by Social Security through their teacher pension plan. The GPO effectively reduces the incentive to wait until age 60 and then claim benefits, so those not covered are significantly more likely to retire between 55-59 than those covered.

[5]More information can be found at: https://www.congress.gov/bill/115th-congress/house-bill/1205, [accessed July 2018]

3 Data and Methods

3.1 Pension Plan Data

All state and local government employers, including the District of Columbia, have Section 218 agreements with the Social Security Administration. These agreements stipulate the Social Security coverage of state and local government employees. There can be significant confusion about which state and local government employees are covered by Social Security, even within the Social Security Administration (GAO-10-938, 2010). Our teacher pension plan data come from the Center for Retirement Research, Public Pensions Database (PPD).[6]

Table 1 lists the Social Security coverage status of teachers in each state and the District of Columbia. There are 12 states plus the District of Columbia where teachers are not covered by Social Security and 35 states where teachers are covered. The remaining 3 states, Georgia, Missouri, and Rhode Island, allow local school districts to enter into Section 218 agreements with the Social Security Administration. Because teachers in those states cannot reliably be classified as covered or not, they are excluded from our sample.

3.2 Teacher Employment Data

Data on the retirements are from the American Community Survey (ACS) from 2010 to 2016.[7] The ACS allows for the estimation of a large sample of teachers representative at the state level. Unlike administrative datasets, the ACS data include detailed demographics, marital status and household structure, and socioeconomic characteristics. Furthermore, because employer is easily identifiable for most teachers, we can merge on detailed information about pension coverage with reasonable accuracy. Longitudinal data, such as the

[6]Data are available at: http://publicplansdata.org/public-plans-database/, [accessed July 2018].

[7]Steven Ruggles, Katie Genadek, Ronald Goeken, Josiah Grover, and Matthew Sobek. Integrated Public Use Microdata Series: Version 7.0 American Community Survey. Minneapolis: University of Minnesota, 2017

HRS, provides a better indication of teaching history and teacher retirement. However, the ACS has a substantially larger sample size and allows for a more precise estimation of differences by public employer.

We identify teachers following the definition of Harris and Adams (2007), which includes: kindergarten teachers, primary and secondary school teachers, special education teachers, and other teachers not otherwise classified. We exclude all post-secondary teachers. We classify as a teacher any individual who reported their most recent occupation as one of the above teachers who was also working in the last year. We further restrict to those who report working for a state or local government employer.[8]The ACS contains limited information on work history necessitating an approximation of retirement. Retired teachers are defined as individuals whose most recent reported occupation was a teacher and who worked last year, but are currently not in the labor force. The data appendix provides details on the questionnaire wording and our definition of terms.

For comparison, we construct a group of "other workers" consisting of individuals with bachelor's degrees working in similar occupations but excluding healthcare, education, or social workers. The following occupation categories are included: management, business, science, and arts occupations; business operations specialists; financial specialists;

[8]Results are similar without making this restriction, although because private school teachers are also included the magnitudes are diminished. We include individuals regardless of self-reported hours of work. We benchmark the implied population from ACS weights against data from the National Center for Education Statistics (NCES, Data available at: https://nces.ed.gov/programs/digest/d16/tables/dt16_105.40.asp?current=yes, [accessed August 2018]).For this exercise, we do not make an age restriction in the ACS in order to match better with the NCES. We also further restrict our ACS population to only include public primary and secondary school teachers, as in the NCES. In the NCES, the population statistics for public primary and secondary school teachers range from 3,099,000 in 2010 to 3,152,000 in 2016 (2016 is projected). The implied one year population size for primary and secondary school teachers in the ACS is 3,164,176. If we were to restrict to only those reporting working 30 or more hours per week, the implied population size would be 2,826,564. In results not shown, when making this more stringent restriction on hours of work, we find a similar age pattern but with implied magnitudes that are about twice the size. Thus, failure to restrict for hours of work biases our results towards zero.

computer and mathematical occupations; architecture and engineering occupations; life, physical, and social science occupations; community and social services occupations; legal occupations; arts, design, entertainment, sports, and media occupations; sales and related occupations; and office and administrative support occupations. Note that these workers may have some work history of teaching. However, the impact of teachers' Social Security inclusion in the state of residence should be small or zero, on average, for these workers in "other" occupations.

3.3 Accuracy of Retirement Classification

Because the ACS does not contain a precise measure of retirement, there is some noise in our constructed measure. We define an individual as retired if she worked within the last year but was not working at the time of the survey. This definition of retirement will not capture individuals who retire from teaching and immediately start working elsewhere without a break in service. Note that in the window of time observed in the ACS, an individual must not be currently working but may later return to work. Most teacher pension plans require a break in service before returning to a covered or non-covered employment within that same plan. Thus, our measure of retirement should capture most job separations.

Failure to observe retirements will bias our estimates of the impact of Social Security inclusion if there is any correlation between the coverage of teachers by Social Security and moving into other work directly after leaving teaching. For example, the number of "unobserved" retirements would be lower in non-covered states if individuals must work after retirement to supplement income. Similarly, Haider and Loughran (2008) find that the Social Security Earnings Test reduces labor supply in retirement, although they do not consider specifically the timing of return to paid employment. When a retirement is "missed" by our measure, the denominator (i.e., the population of teachers) will also be lowered as that person is not identified as a teacher by our definition. As a robustness check, we confirm our main findings using a parallel analysis of teacher labor force participation

rates in Section 4.3. Labor force participation rates will not be biased by individuals transitioning directly from teaching to another position. Here, we provide evidence that the fraction of retirements that we miss with our definition is similar by Social Security coverage status.

As evidence that there is not differential measurement error in our definition of retirement by Social Security inclusion, we conduct a study of "observed" versus "unobserved" exits. We begin by calculating the weighted total number of teachers age 25 to 75 by age, first for the years 2011-2016 then for 2010-2015. Teachers are defined as individuals whose most recent primary occupation is teaching and who reported working in the last year. This includes individuals who are currently teachers or who are unemployed or not in the labor force. We then calculate the "loss" of teachers from age $a-1$ in year $t-1$ to a in t, which we term unobserved exits.

$$\widehat{\text{Unobserved Exits}}_{a,t} = \text{Teachers}_{a-1,t-1} - \text{Teachers}_{a,t} \tag{1}$$

Note that unobserved exits could theoretically be negative if there are new entrants to teaching. This measure of unobserved exits will include teachers who move directly into another occupation after retiring as well as sampling errors. To make our estimate of unobserved exits comparable by age group, we scale it by the sum of observed exits from teaching and our estimate of unobserved exits. This produces a fraction of exits that are "missed" by our measure of retirement.

$$\text{Percent of Exits Missed}_{a,t} = \frac{\widehat{\text{Unobserved Exits}}_{a,t}}{\widehat{\text{Unobserved Exits}}_{a,t} + \text{Observed Exits}_{a,t}} \tag{2}$$

For younger ages, we anticipate a large number of missed exits due to job switching without a period of non-employment. However, as individuals age, we expect that departures will be more likely to lead to a termination of employment, at least for some period of time. Note that even if a teacher returns to work at a later age, we will observe the exit if she spends a period of not working first. Figure 1 presents graphically the measured

"missed" exits by age at time t. For younger ages, the data are noisier and indicate not only unobserved exits but also new entrants (i.e., negative values). However, by age 56, where we begin our analysis, nearly all missing teachers are captured by our definition of retirement. The dark line represents states where teachers are covered by Social Security, while the lighter line includes teachers not part of Social Security. Importantly, we observe that the age-specific loss rates are nearly identical between the two groups of states from age 55 through age 70. We do not observe any systematic difference in missing teachers between to the two groups of states at any age. We interpret these findings as strong evidence that our measure of retirement is a good approximation and that Social Security inclusion is not correlated with better quality measures of retirement.

4 Methods and Results

4.1 Means and Descriptive Statistics

Table 2 contains descriptive statistics for our sample of teachers by Social Security inclusion. Our sample is 60,890 teachers ages 55-70. Column (1) is the full sample. Column (2) includes teachers who are not covered by Social Security, as listed in Table 1. About 40 percent of teachers in our sample are not covered by Social Security. Column (3) includes teachers who are covered by Social Security. Column (4) provides the difference between Columns (3) and (2). To calculate the difference in means we conduct two-sided t-tests with the null hypothesis that Column (3) − Column (2) = 0.

The first row of Table 2 provides the average probability of retiring. As described in more detail above, this variable is defined as an individual reporting teaching at some point in the prior year but no longer teaching at the time of the survey. Teachers ages 55-70 who are covered by Social Security are 1.0 percentage points (about 7 percent of the mean of the not-covered sample) more likely to retire than their peers who are not covered by Social Security. Thus, Social Security coverage is associated with a statistically

significantly higher rate of retirement, on average. Given this, it is not surprising to see that among 55-70 year olds who were working within the past year, the population of teachers covered by Social Security is slightly younger. Importantly, teachers in states covered by Social Security are 4.3 percentage points more likely to have an advanced degree. If Social Security inclusion is viewed as an amenity, states where teachers are included may have a more positively selected sample of teachers. States where teachers are included in Social Security have more non-Hispanic African American teachers, while there are fewer Hispanic teachers. This is primarily driven by the fact that California and Texas are two large states not included in Social Security. The probability of being married is very slightly higher in states covered by Social Security, while the probability of being never married or divorced is lower. Below, we show that the main findings are insensitive to controlling for these demographic characteristics.

Social Security coverage is not the only aspect of retirement income that differs by state. To capture some of the variation in plan characteristics, we define an indicator variable for theoretically being eligible for full retirement at the individual's age. For each pension plan in the data, we calculate the age at which a teacher who began working in the pension system at age 24 and had no breaks in service would be eligible for a full and unreduced pension. For this exercise, we utilize plan-specific retirement eligibility rules from the Urban Institute's State and Local Employee Pension Plan Database (SLEPP).[9] We define the theoretical eligibility indicator as whether the individual is younger or older than that earliest full retirement eligibility age within their pension plan. Note that measure is just a theoretical construct as each individual's eligibility will be a function of age at hire and any prior service that might be used to purchase service. Among teachers who worked within the past year, those covered by Social Security are more likely to be "eligible" for a full retirement benefit, by this definition. This is consistent with teachers who are covered

[9]For more information on the Urban Institute's Public Pension Project, see: https://www.urban.org/policy-centers/cross-center-initiatives/program-retirement-policy/projects/public-pension-project [accessed May 2018].

by Social Security being more influenced by Social Security eligibility than by pension plan parameters.

4.2 Age-Specific Retirement Rates

Figure 2 shows the retirement patterns of teachers separately by Social Security inclusion. This is contrasted with workers in "other occupations," most of whom will be covered by Social Security. See Section 3.2 and the data appendix for details on which occupations are included here. Note that some workers in this latter group will have had prior experience as a teacher, so we anticipate that the difference in retirement patterns in this other category of workers will be smaller but not necessarily zero.

First, as shown in Figure 2, teachers are more likely than their private sector counterparts to retire between age 50 and 70 with the gap growing at about age 57 and increasing through the 60's. Second, we do observe a slightly higher rate of retirement after age 66 for other workers in states with Social Security coverage for teachers. This difference is much smaller than for those actively working as teachers and is likely due to prior public sector work among these "other" workers. Most importantly, we observe a striking difference in retirement rates between teachers covered by Social Security and those not covered. There is a jump at age 62, which coincides with the earliest age of eligibility to claim Social Security. The differences continue throughout the 60's with those covered by Social Security having a higher probability of retirement at each age except age 63.

In these raw means, we observe that retirement rates between ages 62 and 67 are higher for those teachers who are covered by Social Security. We model this more formally by estimating versions of the following regression equation:

$$Retired_{ist} = \alpha + \beta_{ss} SSInc_s + \sum_{a=60}^{69} \gamma_a \mathbf{1}(Age_{ist} = a) + \sum_{a=60}^{69} \beta_a \mathbf{1}(Age_{ist} = a) \times SSIncl_s + X_{ist}\delta + P_s\psi + \tau_t + \epsilon_{ist}$$

where i, s, and t index individuals, states, and years respectively. Age_{ist} is the age of individual i in state s in year t. $SSIncl_s$ equals 1 if an individual is in a state where

teachers are covered by Social Security. X_{ist} is a vector of individual characteristics. P_s is a vector of state pension plan parameters. Standard errors are clustered at the state level. β_a are the parameters of interest. We first estimate a baseline model with individual controls for sex, marital status, and education level. Then, we incorporate two basic pension parameters into the model. Below, we presents estimates for subgroups by gender and marital status.

Table 3 presents estimated coefficients from a logit model. Column (1) includes only the age indicators, interactions between age and Social Security inclusion, and year fixed effects. These estimates parallel Figure 2. Column (2) presents estimates that control for demographic characteristics: educational attainment, race/ethnicity, gender, and marital status. Column (3) adds the pension plan variable described in Section 4.2 above. Recall this variable is a constructed measure of whether the teacher would qualify for a full and unreduced retirement benefit if she had begun working at age 24 without any break in service. The coefficients are estimated by a Logit model with robust standard errors clustered by state of residence. For the key Social Security inclusion variables, average marginal effects are reported in brackets.

In Table 3, the omitted age group is ages 55-59. Across all three specifications, for the omitted group there is no statistically significant difference in retirement by Social Security inclusion. For the group of teachers not covered by Social Security, we observe that retirement rates increase monotonically in age except at age 69. Most importantly, we do not observe sharp jumps at any age except age 65, when most teachers would become eligible for Medicare. Note that most teachers with sufficient tenure will be covered by some form of retiree health insurance (see, e.g., Clark and Morrill, 2010). But, Medicare is likely still an important component of health insurance support for many teachers.

The interaction terms between Social Security inclusion and age reveal a statistically significant difference in the retirement patterns of teachers. At the key Social Security eligibility ages of 62 and 66, the estimated coefficients indicate that Social Security coverage

is associated with higher retirement rates. The average marginal effects are presented in brackets. Considering the preferred model in Column (3), at age 62 Social Security inclusion increases the probability of retirement by 4.3 percentage points. Social Security inclusion is also associated with an increased the probability of retirement of 5.7 percentage points for 66 year olds. Figure 2 illustrates that the mean retirement rates for teachers not included in Social Security. Appendix Table A1 provides the numerical values presented in this figure. The age-specific retirement rate for individuals age 62 who are not covered by Social Security is 19.1 percent. Thus, Social Security coverage is associated with about a 22.5 percent higher risk of retirement at age 62. Similarly, 66 year old teachers who are not covered by Social Security have a 27.8 percent probability of retiring. Thus, the marginal effects suggest a 20 percent higher risk of retirement at age 66. These results indicate a clear impact of Social Security inclusion on the timing of retirement.[10]

The bottom half of Table 3 presents the estimated coefficients for the other covariates in the model. We observe that retirement rates are mostly flat except for a statistically significant drop in 2015 and 2016.[11] Individuals with an advanced degree are less likely to retire, while non-Hispanic whites are more likely to retire than the other racial/ethnic groups. We include interaction terms between gender and marital status. Women are more likely to retire, on average, than men. Men who were never married are more likely to retire, while women who were never married or who are currently divorced are less likely. Recent changes in marital status are not significantly related to retirement probabilities. We explore subgroups by marital status in more detail below. The constructed measure of "theoretical eligibility" for full retirement benefits strongly predicts retirement. Its inclusion in Column (3) increases the precision of the estimates and the magnitude of the estimated coefficients on the interaction terms.

[10] In results not shown, we confirm that these estimates are robust to dropping Texas or California, both large states where teachers are not covered.

[11] Future work will explore the impact of local macroeconomic conditions on retirement timing.

4.3 Labor Force Participation Rates

So far, we have considered individual's transitions from working to not working. This "flow" measure will capture all workers who retire from teaching and do not immediately begin a new job. The measure will not detect individuals who move directly from teaching to a new job without a period time spent not working. An alternative measure is a "stock" of who is actively working as a teacher. For this exercise, we collapse the data into age × state × year × gender cells. We define the teacher labor force participation rate as the fraction of individuals in each cell who are actively working as a teacher. There are several complicating factors when modeling labor force participation. Most importantly for teachers, over the summer months a teacher may not be actively working but may still have a job as a teacher. The ACS is collected year-round, but the public use version does not indicate the survey month. We include in the numerator individuals that are currently employed or unemployed and report their current or most recent occupation to be teacher. Individuals who report being out of the labor force are excluded from the numerator. The denominator is all individuals in that age × state × year × gender cell who have at least a bachelor's degree. For age groups where the flow to stock ratio is small, it will be more difficult to detect a statistically significant change in the outflow from teaching. Still, we anticipate that the sign and approximate magnitude of the change will be similar to that from the preferred age-specific retirement rates analysis above.

To begin, we illustrate the teacher labor force participation rate for ages 25 through 70. Means are presented for each age individually with population weights used in the calculation of the mean.[12] Figure 3 illustrates that the teacher labor force is actually higher in states covered by Social Security for ages 25 through about age 55. For that age range, about 10 percent of individuals in states where teachers are covered by Social Security are working as teachers, compared to closer to 9 percent in non-covered states. This could be due to a labor supply effect indicating that Social Security is a benefit valued

[12] Appendix Table A2 presents the statistics on teacher labor force participation for 55 - 70 year olds.

by potential teachers. It might also reflect a relationship between the demand for teachers and Social Security inclusion. This pattern switches starting at about age 55. Interestingly, from about age 55 through age 63, the teacher labor force participation rates are much more similar between the two groups of states. Starting at age 63, states where teachers are covered by Social Security now have lower teacher labor force participation rates. This is consistent with the increased retirements observed above.

We estimate a regression of the fraction of the population who are teachers within a age $\times$ state $\times$ year $\times$ gender cell. The teacher labor force participation rate is equal to the total number of employed and unemployed teachers divided by the total number of individuals with a bachelor's degree. The rate is calculated by collapsing the data into age $\times$ state $\times$ year $\times$ gender cells employing sample weights. The main regressions are estimated using analytic weights accounting for the population size of each cell. Table 4 presents results that weight each cell by the denominator (i.e., total number of individuals with a bachelor's degree). Appendix Table A3 shows parallel results instead weighting each cell equally. The results are similar but less precisely estimated.

Table 4 presents estimates from an OLS regression with the columns paralleling the specifications in Table 3. Column (1) is the parsimonious model, while Column (2) includes individual demographics and Column (3) adds the pension plan parameter proxy. The data are collapsed to the age $\times$ state $\times$ year $\times$ gender cell for the dependent variable and all covariates. The first row indicates that the teacher labor force participation rate does not significantly differ by Social Security inclusion for the omitted age group, ages 55-59. This is consistent with the labor force participation rate figure above. Similar to the retirement rate regressions presented above, the teacher labor force participation rates drop as individuals age. The estimated coefficients on age suggest a smooth decline in the probability of being a teacher by age with only a slightly larger decline at age 65.

To see the difference in participation in the teacher labor force by Social Security coverage, Table 4 includes interaction terms with age and Social Security inclusion. Confirming

the results above, Social Security is associated with lower teacher labor force participation rates starting at age 64. Considering the most saturated model, shown in Table 4, Column (3), for individuals age 67, Social Security inclusion is associated with a 0.4 percentage point lower teacher labor force participation rate. The average labor force participation rate for non-covered teachers age 67 is 2.0 percent, shown in Appendix Table A2. This implies an approximately 20 percent lower teacher labor force participation rate among 67 year olds associated with Social Security coverage. Although not always statistically significant, the magnitudes are quite similar to that found analyzing retirement rates above. Social Security coverage is associated with a diminished probability of being a teacher between ages 64 and 67. To put this number into perspective, Fetter and Lockwood (2016) find that the Old Age Assistance Program (OAA) reduced the labor force participation rate of men in their late 60's by 8.5 percentage points[13]

The second half of Table 4 presents the estimated coefficients for the other covariates in the regression model. Interestingly, the time pattern here shows a drop in teacher labor force participation over the sample, the opposite of the findings for age-specific retirement rates. Not surprisingly, married women are about 7 percentage points more likely to be teachers than men. There are not significant differences in teacher labor force participation rates by racial group. When considering single people separately by gender, we see that for both men and women, being never married or separated is associated with a lower probability of working as a teacher. Male widowers are more likely to be a teacher than married men, but the relationship is reversed for female widows. Having recently been widowed is associated with a 6 percentage point higher probability of being a teacher. Our approximation for eligibility for full retirement is not significantly related to teacher labor force participation rates.

[13] Appendix Table A3 presents estimates that weight each age by state by year by gender cell equally to approximate the level of the policy. The estimated effects are similar but not statistically significant.

4.4 Single Women

Unmarried women represent 22 percent of the sample of teachers. Over half of these women are divorced, with the remaining split between never married or widowed.[14] Table 5 presents results for all unmarried women in Column (1) and for each subgroup in the remaining columns. The specification matches the preferred specification in Table 3, Column (3), except that the gender by marital status interactions are dropped.

In the first row of Table 5, Column (1), again there is no difference in retirement rates, on average, by Social Security inclusion for single women ages 55-59. Although not statistically significant, there is a large negative coefficient on Social Security inclusion for female teachers ages 55-59 who are widows. The Government Pension Offset (GPO) provision reduces spousal and widow benefits by two-thirds of the government pension. Widows covered by Social Security must be age 60 to collect survivor benefits. Widows can collect survivor benefits starting at age 60 and may switch to collect under their own benefit as early as age 62, if that is a higher benefit. Thus, a teacher who is widowed and is covered by Social Security through her teaching position has an incentive to work until age 60 and then retire under survivor benefits at age 60 or own benefits at age 62. The patterns in Table 5, Column (4), are consistent with this predicted behavior and illustrate large increases in retirement probability for widows covered by Social Security at ages 60 and 62. Widows who are not covered by Social Security can also receive survivor benefits starting at age 60, but these will be reduced by the GPO.

Looking across the columns of Table 5, there is still mostly positive age gradient in the probability of retirement for divorced and never married women. Recall that many teachers will have access to retiree health insurance in retirement (see, e.g., Clark and Morrill 2010). Interestingly, the age 65 "Medicare" effect observed for the full sample is not as clear for single women.

The overall pattern of differences by age and Social Security inclusion is similar to the

[14] Note that this table excludes women whose marital status is "separated."

full sample with some notable exceptions. The implied marginal effects are substantially larger, but not always statistically significant. The marginal effects for single women, shown in Column (1), indicate that Social Security coverage is associated with a 9.6 percentage point higher probability of retiring among 62 year old teachers and a 9.0 percentage point higher probability of retiring among 65 year olds. Not presented in the tables, the mean retirement rate for non-covered, single women, age 62, is 13.2 percent and for age 65 is 19.6 percent. Thus, the marginal effects imply about a 73 percent increase at age 62 and about a 46 percent increase at age 65 in the probability of retiring due to Social Security coverage. As noted above, in Table 5, Column (4), widows have a different pattern whereby Social Security inclusion is associated with higher retirement rates at ages 60 and 62, the key ages for widow benefits, and not at older ages.

The bottom half of Table 5 presents the estimated coefficients for the other covariates in the model. The changes over time in retirement rates are more monotonic than for the full sample of teachers and indicate falling retirement rates over time. Being Hispanic is associated with a significantly lower retirement rate among single female teachers, as is being divorced. Recent marital status changes are not related to retirement rates. Eligibility for full retirement benefits again predicts retirement except for widows.

4.5 Single Men

Table 6 presents parallel results for single men. It should be noted that single men represent less than five percent of the sample, so the estimates should be interpreted with some caution. Overall, the patterns are similar to single women. At age 62, the marginal effect of Social Security coverage for single male teachers is 13.3 percentage points. The non-covered sample mean at age 62 (not shown) is 12.9 percent. Thus, the marginal effect on the interaction term at age 62 implies an effect size of Social Security coverage that is over 100 percent. The pattern for divorced men looks quite different. The estimated effects of Social Security coverage are large and negative at ages 60, 65, and 67. There

are only 201 male widowers in the sample. Still, a large and significant negative estimated coefficient on ages 55-59 suggests there may be an economically meaningful difference by Social Security inclusion in how widowers time retirement around spousal benefit rules due to the GPO. Overall the estimates for single men are roughly consistent with those for single women. Social Security inclusion is associated with higher retirement rates at the early Social Security eligibility age.

4.6 Married Individuals

There are several reasons to expect retirement patterns for married individuals to be less sensitive to Social Security inclusion. First, own Social Security income may be a smaller portion of total household income and, thus, may be less important in timing retirement. Second, couples may consider other non-financial factors in timing their retirement, such as joint leisure. If so, we expect to see a smaller impact of financial incentives on retirement. One benefit of the ACS is that we can observe characteristics of the spouse. We add indicator for spouse's age to our preferred model above.

Retirement coordination is well established in the data: married couples tend to retire at the same time (Blau, 1998; Gustman and Steinmeier, 2000; Coile, 2004). This result is often explained by the joint budget set faced by couples and leisure complementarities between spouses. This intuition runs counter to recent empirical evidence which suggests that the returns to additional years of work later in life are greater for married women than for married men (Maestas, 2017). Henriques (2018) uses Social Security records to estimate whether men and women claim Social Security benefits in a way that maximizes benefit levels. Her analysis shows that, despite the increase in women's labor force participation and wages, wives are still dependent on their husbands' Social Security benefits. Further, she finds that husbands respond to their own incentives but do not claim in a way that maximizes dependent benefits.

Table 7 presents estimated coefficients first for married women in Column (1) and then

for married men in Column (2). The first row shows again that Social Security coverage is not related to retirement probability for individuals ages 55-59. The age dummies again show a smooth and rising probability of retirement among married people who are not covered by Social Security with a notable jump at age 65. Interestingly, for married women, Social Security coverage is only associated with a higher probability of retirement at age 67. The marginal effect here indicates that Social Security coverage is associated with an 11.5 percentage point higher probability of retirement for married women age 67. Not shown in the table, the average retirement rate for married female teachers not covered by Social Security who are age 67 is 31.7 percent. Thus, Social Security coverage is associated with about a 36 percent higher probability of retirement among 67 year old married female teachers, but not at other ages. Married male teachers age 66 also have a statistically significantly higher probability of retiring if covered by Social Security. Here the marginal effect of 8.8 percent again represents about 39 percent of the non-covered mean of 22.3 percent. For married male teachers there are also statistically significant differences by Social Security coverage at ages 64, 69, and 70. Although the estimates are also positive at ages 62 and 67, neither are statistically significant. The fact that we do not see similar jumps at the early Social Security claiming ages for married men or women suggests that factors impacting the joint retirement decisions of couples might outweigh the effects of Social Security incentives.

The second half of Table 7 presents the remaining covariates in the regression model. The time gradient illustrates no changes in married women's probability of retirement over time and a large and statistically significantly lower retirement rate for married men in 2013 only. We include spouse's age in categories with the reference group being 55-59 years old. For women, there is a large positive estimated coefficient on having a spouse who is age 60 or 64, holding all else equal, and a large negative coefficient for having a spouse older than age 69. For married men, having a wife younger than age 55 is associated with a significantly lower probability of retirement, as is having a spouse who is age 66

or 70. There is also evidence of a desire for joint leisure as having a spouse who is not in the labor force is associated with a large and statistically significantly higher probability of retirement for both men and women.

5 Discussion and Conclusion

The evidence presented here supports the hypothesis that Social Security increases retirement rates at key eligibility ages. These results are supported by an alternative analysis of the participation in the teacher labor force. On average, teachers covered by Social Security have about a 23 percent higher probability of retirement at age 62 and a 20 percent higher rate at age 66. These results mask interesting heterogeneity by major demographic group. Single female teachers, who are nearly a quarter of all teachers, have large and statistically significant differences by Social Security inclusion in retirement rates only at ages 62 and 65. For single female teachers, the marginal effects imply about a 73 percent higher retirement rate at age 62 and a 46 percent higher retirement rate at age 65 associated with Social Security coverage. Married female teachers, who represent about half of all teachers, have about a 32 percent higher probability of retiring at age 67 associated with Social Security coverage, but not at other ages. Married male teachers, representing about 18 percent of the sample, also have about a 39 percent higher retirement probability at age 66 associated with Social Security inclusion. Married male teachers also have significantly higher retirement probabilities due to Social Security coverage at ages 64, 69, and 70. Thus, although the main results show a sizable impact at all key Social Security eligibility ages, the strongest effects are seen for single women and men at the earlier retirement age and for married women and men at the full retirement age.

In the American Community Survey (ACS) data, we can only observe a retirement if an individual moves from working as a teacher to not working. If the teacher terminates employment and begins a new career without a break, our method will not capture that retirement. Our estimates will be inaccurate if this type of measurement error is correlated

with Social Security coverage. For example, if the Social Security Earnings Test influences retirement transition type (e.g., Haider and Loughran, 2008), our estimates might be biased. We therefore confirm our main estimates by instead analyzing participation in the teacher labor force. This measure is not sensitive to retirement transition type. Using this measure, we find that Social Security coverage is associated with lower participation in the teacher labor force at ages 64 and 67.

In our analysis of participation in the teacher labor force, we observe higher participation rates in teaching for individuals younger than age 50 in states included in Social Security. This is consistent with either higher labor supply due to this additional benefit or higher labor demand. Our results of the impact of Social Security coverage on retirement timing may be in part due to sorting of teachers. While it is possible that teachers self-select into Social Security coverage because they know they plan to retire earlier, we believe it is more likely that teachers have a sense that Social Security is a valuable benefit. It is possible that Social Security is associated with higher retirement rates because Social Security provides adequate income to support teachers in retirement. On the other hand, it may also be the case that a teacher is "pushed" out of teaching at an earlier age due to the perceived incentive to retire at a key Social Security eligibility age.

Graphically, we illustrated that the observed patterns of retirement do not hold for similar private-sector workers. Future work will compare teachers to these other workers in a difference-in-differences model. In addition, future work will compare teachers to other state and local government workers.

Many public employees are not currently covered by SS. Public pension plans are in crisis due to lower investment returns, historic underfunding, and rising life expectancies. One option a plan sponsor might consider is transitioning to a DC plan plus Social Security. This leads to several key questions. Which public employees would benefit and which may not? What are the labor supply impacts of pension reforms? What are the implications on costs for Social Security?

The results in this paper indicate that Social Security coverage is associated with increased retirement rates between ages 62 and 67. The income support that Social Security provides likely allows individuals to retire at these ages. This study cannot address whether individual teacher welfare is enhanced by retiring earlier versus later. Engelhardt et al. (2018) show that the introduction of early Social Security claiming led to a decline in retirement income and a subsequent rise in old age poverty for male-headed households. Snyder and Evans (2006) leverage variation in retirement income induced by the notch and find that the larger benefit group experienced higher mortality rates. One potential mechanism for this is that the lower benefit group engaged with post-retirement work, which may have yielded a health benefit to those workers. In addition, we cannot provide evidence on whether these earlier departures are helpful or harmful to the education system as a whole. Fitzpatrick and Lovenheim (2014) estimate that when a teacher early retirement incentive is introduced, student test scores do not drop as a result of the induced retirements.

In this study, we cannot distinguish between whether Social Security allows individuals to retire when desired or whether workers are being pulled out of the labor force. Coile and Levine (2007) show that Social Security can help alleviate the income loss associated with a weak labor market. They find that when a labor market downturn occurs, individuals eligible for Social Security are more likely to retire. The evidence presented here strongly suggests that Social Security influences retirement timing. Should a teacher pension plan opt to join Social Security in the future, these newly covered teachers would increase their retirement rates in their 60's. These earlier retirements would, in turn, put further strain on the public sector pensions.

References

Asch, B., S. J. Haider, and J. Zissimopoulos (2005, February). Financial incentives and retirement: Evidence from federal civil service workers. *Journal of Public Economics 89*(2), 427–440.

Blau, D. M. (1998, July). Labor Force Dynamics of Older Married Couples. *Journal of Labor Economics 16*(3), 595–629.

Brown, K. M. (2013, February). The link between pensions and retirement timing: Lessons from California teachers. *Journal of Public Economics 98*, 1–14.

Clark, R. L. and L. A. Craig (2011, January). Determinants of the generosity of pension plans for public school teachers, 1982-2006. *Journal of Pension Economics & Finance; Cambridge 10*(1), 99–118.

Clark, R. L. and A. A. McDermed (1986). Earnings and Pension Compensation: The Effect of Eligibility. *The Quarterly Journal of Economics 101*(2), 341–361.

Clark, R. L. and M. S. Morrill (2010, January). *Retiree Health Plans in the Public Sector: Is There a Funding Crisis?* Edward Elgar Publishing.

Coile, C. (2004). Retirement Incentives and Couples' Retirement Decisions. *Topics in Economic Analysis & Policy 4*(1).

Coile, C. and J. Gruber (2007, April). Future Social Security Entitlements and the Retirement Decision. *The Review of Economics and Statistics 89*(2), 234–246.

Coile, C. C. (2015, September). Economic Determinants of Workers Retirement Decisions. *Journal of Economic Surveys 29*(4), 830–853.

Coile, C. C. and P. B. Levine (2007, November). Labor market shocks and retirement: Do government programs matter? *Journal of Public Economics 91*(10), 1902–1919.

Costrell, R. M. and M. Podgursky (2009, April). Peaks, Cliffs, and Valleys: The Peculiar Incentives in Teacher Retirement Systems and Their Consequences for School Staffing. *Education Finance and Policy 4*(2), 175–211.

Diamond, P. A. and P. R. Orszag (2003). Reforming the GPO and WEP In Social Security. pp. 3.

Engelhardt, G. V., J. Gruber, and A. Kumar (2018, May). Early Social Security Claiming and Old-Age Poverty: Evidence from the Introduction of the Social Security Early Eligibility Age. Working Paper 24609, National Bureau of Economic Research.

Fetter, D. K. and L. M. Lockwood (2016, March). Government Old-Age Support and Labor Supply: Evidence from the Old Age Assistance Program. Working Paper 22132, National Bureau of Economic Research.

Fitzpatrick, M. D. (2015). How Much Are Public School Teachers Willing to Pay for Their Retirement Benefits? *American Economic Journal: Economic Policy 7*(4), 165–188.

Fitzpatrick, M. D. and M. F. Lovenheim (2014, August). Early Retirement Incentives and Student Achievement. *American Economic Journal: Economic Policy 6*(3), 120–154.

Furgeson, J., R. P. Strauss, and W. B. Vogt (2006, July). The Effects of Defined Benefit Pension Incentives and Working Conditions on Teacher Retirement Decisions. *Education Finance and Policy 1*(3), 316–348.

Gale, W. G., S. E. Holmes, and D. John (2015). Social Security coverage for state and local government workers: A reconsideration. *Brookings Institution. June*.

GAO-03-710T (2003). Social Security: Issues Relating to Noncoverage of Public Employees.

GAO-05-786T (2005). Social Security: Coverage of Public Employees and Implications for Reform, Statement of Barbara D. Bovbjerg, Director, Education, Workforce, and Income Security. Testimony. Technical report.

GAO-10-938 (2010). Management Oversight Needed to Ensure Accurate Treatment of State and Local Government Employees. Technical report.

GAO-HEHS-98-196 (1998). Social Security: Implications of Extending Mandatory Coverage to State and Local Employees. Technical report.

Gustman, A. L. and T. L. Steinmeier (2000, July). Retirement in DualCareer Families: A Structural Model. *Journal of Labor Economics 18*(3), 503–545.

Gustman, A. L., T. L. Steinmeier, and N. Tabatabai (2013, December). The Social Security Windfall Elimination and Government Pension Offset Provisions for Public Employees in the Health and Retirement Study. Working Paper 19724, National Bureau of Economic Research.

Gustman, A. L., T. L. Steinmeier, and N. Tabatabai (2014). The Social Security Windfall Elimination and Government Pension Offset Provisions for Public Employees in the Health and Retirement Study. *Social Security Bulletin 74*, 55.

Haider, S. J. and D. S. Loughran (2008, January). The Effect of the Social Security Earnings Test on Male Labor Supply New Evidence from Survey and Administrative Data. *Journal of Human Resources 43*(1), 57–87.

Haltzel, L. (2004). Social Security: The Government Pension Offset (GPO). pp. 18.

Harris, D. N. and S. J. Adams (2007, June). Understanding the level and causes of teacher turnover: A comparison with other professions. *Economics of Education Review 26*(3), 325–337.

Henriques, A. M. (2018, March). How Does Social Security Claiming Respond to Incentives? Considering Husbands' and Wives' Benefits Separately. *Journal of Human Resources 53*(2), 382–413.

Kan, L. and C. Aldeman (2014). *Uncovered: Social Security, Retirement Uncertainty, and 1 Million Teachers*. Bellwether Education Partners.

Kilgour, J. G. (2009, September). Social Security and the Public Sector: The Windfall Elimination Provision and the Government Pension Offset. *Compensation & Benefits Review 41*(5), 34–42.

Koedel, C., S. Ni, and M. Podgursky (2014, February). Who Benefits from Pension Enhancements? *Education Finance and Policy 9*(2), 165–192.

Koedel, C. and M. Podgursky (2016, January). Chapter 6 - Teacher Pensions. In E. A. Hanushek, S. Machin, and L. Woessmann (Eds.), *Handbook of the Economics of Education*, Volume 5, pp. 281–303. Elsevier.

Koedel, C. and P. B. Xiang (2017, March). Pension Enhancements and the Retention of Public Employees. *ILR Review 70*(2), 519–551.

Krueger, A. B. and B. D. Meyer (2002, January). Chapter 33 Labor supply effects of social insurance. In *Handbook of Public Economics*, Volume 4, pp. 2327–2392. Elsevier.

Lazear, E. P. (1986, January). Chapter 5 Retirement from the labor force. In *Handbook of Labor Economics*, Volume 1, pp. 305–355. Elsevier.

Liebman, J. B., E. F. P. Luttmer, and D. G. Seif (2009, December). Labor supply responses to marginal Social Security benefits: Evidence from discontinuities. *Journal of Public Economics 93*(11), 1208–1223.

Maestas, N. (2017, April). The Return to Work and Women's Employment Decisions. *NBER Working Paper. http://www.nber.org/papers/w24429*.

Mastrobuoni, G. (2011, August). The role of information for retirement behavior: Evidence based on the stepwise introduction of the Social Security Statement. *Journal of Public Economics 95*(7), 913–925.

Munnell, A. H. (2000). The Impact of Mandatory Social Security Coverage of State and Local Workers: A Multi-State Review. pp. 92.

Munnell, A. H. (2005). Mandatory Social Security Cover- Age of State and Local Workers: A Perennial Hot Button. pp. 9.

Ni, S. and M. Podgursky (2016, February). How Teachers Respond to Pension System Incentives: New Estimates and Policy Applications. *Journal of Labor Economics 34*(4), 1075–1104.

Nuschler, D., A. M. Shelton, and J. J. Topoleski (2011). Social Security: Mandatory Coverage of New State and Local Government Employees. *Social Security*, 22.

Snyder, S. E. and W. N. Evans (2006, August). The Effect of Income on Mortality: Evidence from the Social Security Notch. *The Review of Economics and Statistics 88*(3), 482–495.

Stock, J. H. and D. A. Wise (1990). Pensions, the Option Value of Work, and Retirement. *Econometrica 58*(5), 1151–1180.

Figure 1: Estimates of Missed Teachers by Age

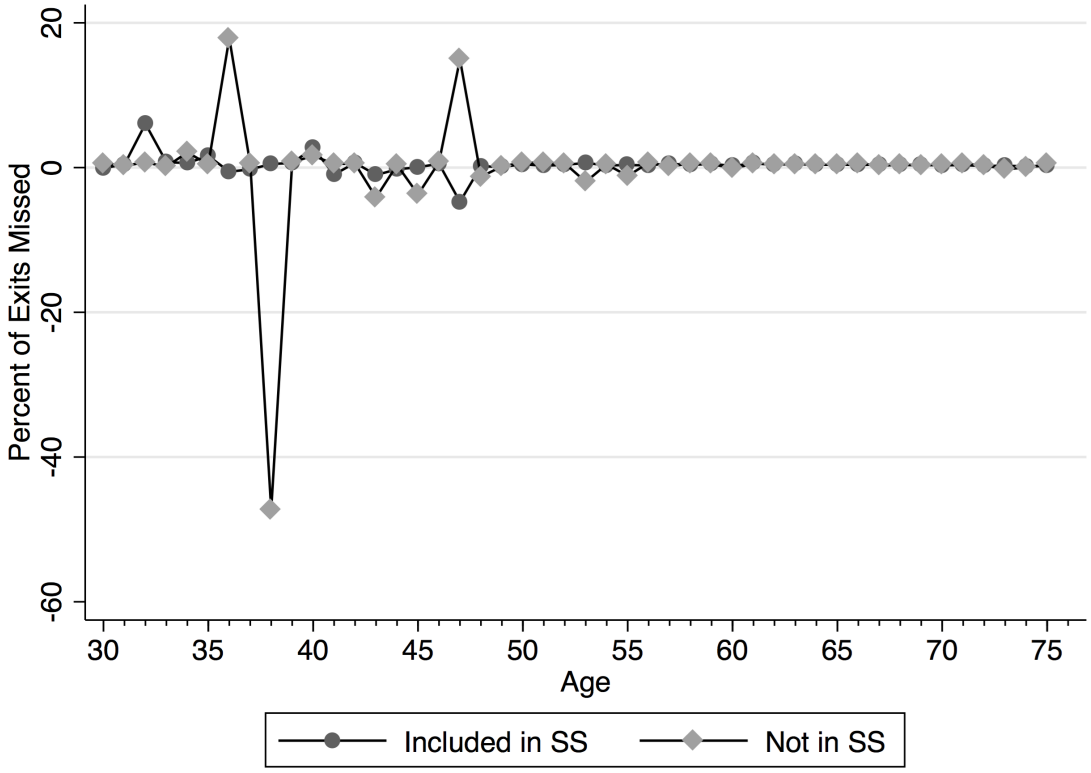

Figure 2: Age-Specific Retirement Rates for Teachers and Other Workers

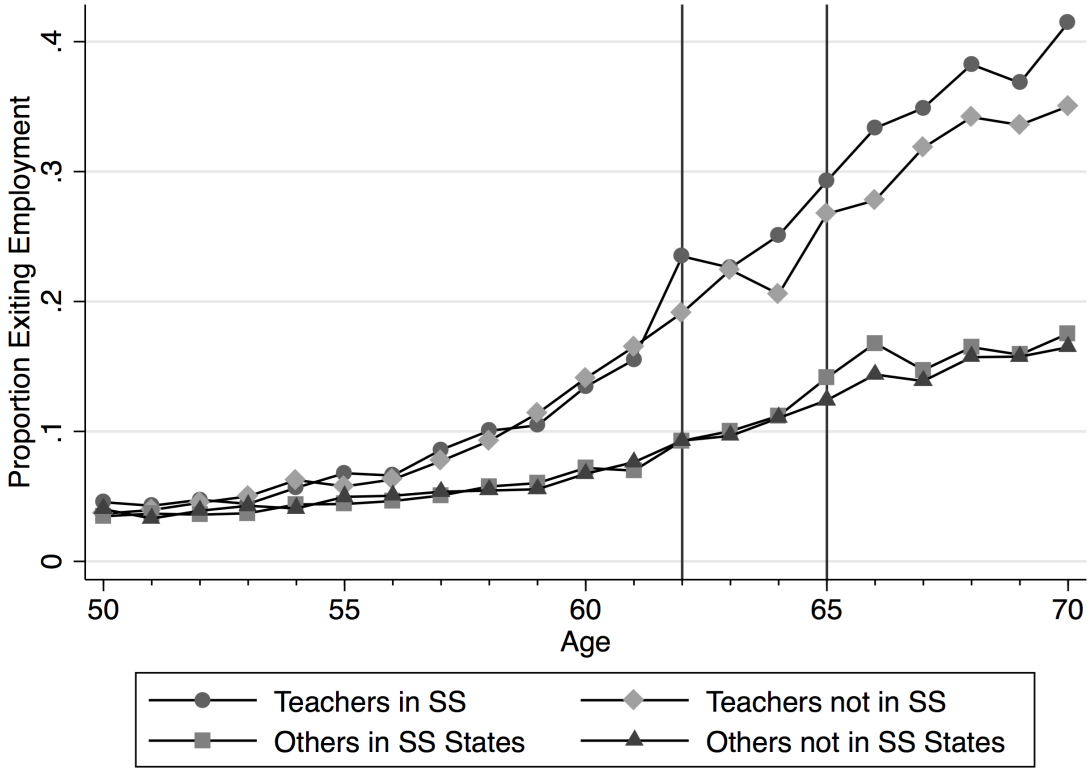

Figure 3: Teacher Labor Force Participation Rates

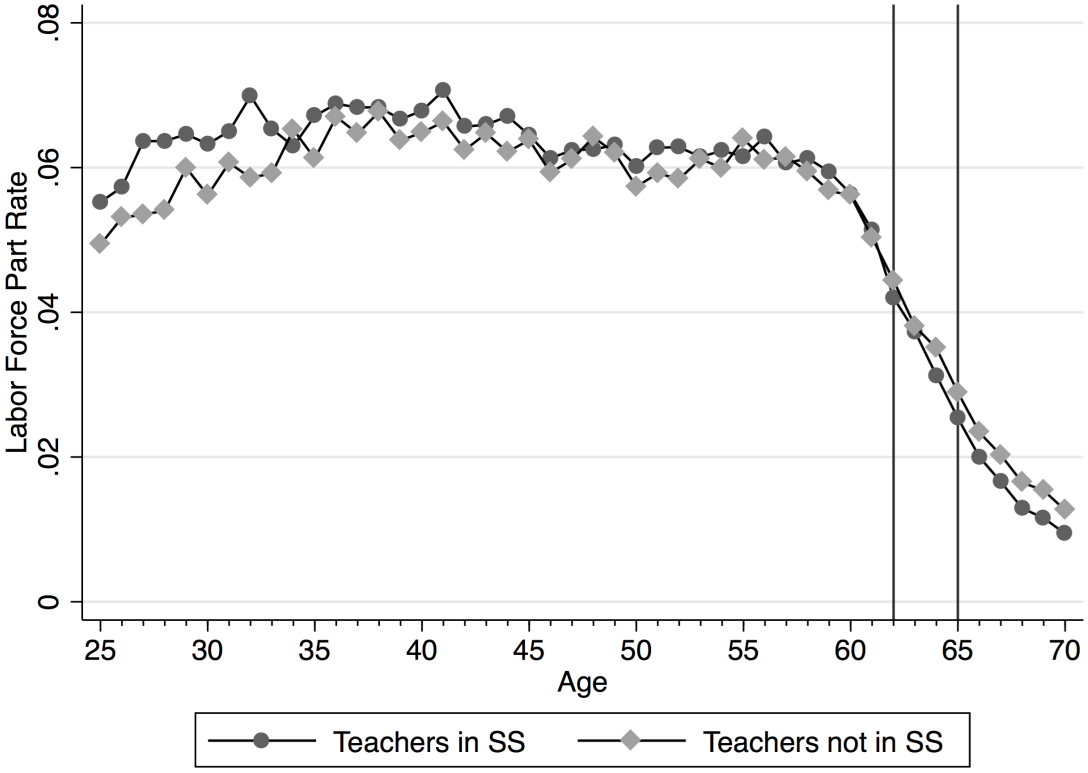

Table 1: Teachers' Social Security Coverage by State

State	Are Teachers Included in Social Security?
Alabama	Yes
Alaska	No
Arizona	Yes
Arkansas	Yes
California	No
Colorado	No
Connecticut	No
Delaware	Yes
District of Columbia	No
Florida	Yes
Georgia†	Partial Inclusion
Hawaii	Yes
Idaho	Yes
Illinois	No
Indiana	Yes
Iowa	Yes
Kansas	Yes
Kentucky	No
Louisiana	No
Maine	No
Maryland	Yes
Massachusetts	No
Michigan	Yes
Minnesota	Yes
Mississippi	Yes
Missouri†	Partial Inclusion
Montana	Yes
Nebraska	Yes
Nevada	No
New Hampshire	Yes
New Jersey	Yes
New Mexico	Yes
New York	Yes
North Carolina	Yes
North Dakota	Yes
Ohio	No
Oklahoma	Yes
Oregon	Yes
Pennsylvania	Yes
Rhode Island†	Partial Inclusion
South Carolina	Yes
South Dakota	Yes
Tennessee	Yes
Texas	No
Utah	Yes
Vermont	Yes
Virginia	Yes
Washington	Yes
West Virginia	Yes
Wisconsin	Yes
Wyoming	Yes

† States where only some teachers are covered are excluded.

Notes: Pension plan data is derived from the the Center for Retirement Research at Boston College's Public Plan Database. See Section 3.1 for details.

Table 2: Summary Statistics

	(1) All	(2) Not included in SS	(3) Included in SS	(4) Difference:(3)-(2)
Retired	0.1586	0.1525	0.1625	0.0100***
	(0.3653)	(0.3595)	(0.3689)	(0.0035)
Age	60.2244	60.2763	60.1909	-0.0853**
	(3.8329)	(3.8935)	(3.7929)	(0.0383)
Advanced Degree	0.6121	0.5858	0.6291	0.0433***
	(0.4873)	(0.4926)	(0.4830)	(0.0049)
White	0.8711	0.8711	0.8712	0.0001
	(0.3350)	(0.3351)	(0.3350)	(0.0036)
African American	0.0872	0.0795	0.0922	0.0127***
	(0.2822)	(0.2705)	(0.2893)	(0.0031)
Other Race	0.0416	0.0494	0.0366	-0.0129***
	(0.1997)	(0.2168)	(0.1877)	(0.0022)
Hispanic Origin	0.0527	0.0786	0.0360	-0.0425***
	(0.2235)	(0.2691)	(0.1864)	(0.0026)
Married	0.7026	0.6897	0.7109	0.0212***
	(0.4571)	(0.4626)	(0.4533)	(0.0047)
Separated	0.0123	0.0121	0.0125	0.0003
	(0.1103)	(0.1094)	(0.1109)	(0.0013)
Never Married	0.0695	0.0737	0.0667	-0.0070***
	(0.2542)	(0.2614)	(0.2495)	(0.0027)
Divorced	0.1691	0.1794	0.1624	-0.0170***
	(0.3749)	(0.3837)	(0.3689)	(0.0039)
Widowed	0.0465	0.0450	0.0475	0.0025
	(0.2105)	(0.2072)	(0.2126)	(0.0021)
Divorced in Past Year	0.0053	0.0059	0.0049	-0.0009
	(0.0726)	(0.0764)	(0.0700)	(0.0008)
Widowed in Past Year	0.0054	0.0056	0.0052	-0.0004
	(0.0732)	(0.0748)	(0.0722)	(0.0008)
Eligible for Full Retirement	0.8238	0.7926	0.8439	0.0514***
	(0.3810)	(0.4055)	(0.3629)	(0.0039)
Observations	60890	23531	37359	60890

Sample of all teachers. Means weighted at the person level with SD in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Teacher retirement data are derived from the 2010-2016 American Community Surveys, see text for details. Means weighted at the person level with standard deviations in brackets and standard errors in parentheses.

Table 3: Logit Regression Coefficient Estimates

	(1) Baseline		(2) + Demographics		(3) + Pension Characteristics	
Included in SS	0.0614	(0.1108)	0.0492	(0.1081)	-0.0067	(0.0891)
	[0.0046]		[0.0037]		[-0.0005]	
60 Years Old	0.6312***	(0.0935)	0.6337***	(0.0930)	0.5043***	(0.1252)
61 Years Old	0.8206***	(0.0661)	0.8244***	(0.0659)	0.6948***	(0.0661)
62 Years Old	1.0042***	(0.0982)	1.0170***	(0.0976)	0.8874***	(0.0625)
63 Years Old	1.2064***	(0.1500)	1.2218***	(0.1508)	1.0920***	(0.1082)
64 Years Old	1.1000***	(0.1135)	1.1282***	(0.1166)	0.9986***	(0.0677)
65 Years Old	1.4411***	(0.0957)	1.4658***	(0.0958)	1.3361***	(0.1017)
66 Years Old	1.5016***	(0.1016)	1.5202***	(0.1017)	1.3904***	(0.0927)
67 Years Old	1.6987***	(0.1495)	1.7258***	(0.1527)	1.5962***	(0.1292)
68 Years Old	1.8097***	(0.1583)	1.8295***	(0.1505)	1.6996***	(0.1120)
69 Years Old	1.7724***	(0.0564)	1.8170***	(0.0585)	1.6871***	(0.0874)
70 Years Old	1.8358***	(0.1948)	1.8866***	(0.1915)	1.7563***	(0.1522)
Included in SS and 60 Years Old	-0.1162	(0.1114)	-0.1057	(0.1122)	-0.0076	(0.1377)
	[-0.0065]		[-0.0067]		[-0.0017]	
Included in SS and 61 Years Old	-0.1375	(0.0843)	-0.1310	(0.0846)	-0.0311	(0.0866)
	[-0.0102]		[-0.0110]		[-0.0050]	
Included in SS and 62 Years Old	0.1949	(0.1222)	0.1968	(0.1224)	0.2666***	(0.0918)
	[0.0428]		[0.0409]		[0.0432]	
Included in SS and 63 Years Old	-0.0510	(0.1641)	-0.0483	(0.1657)	0.0224	(0.1315)
	[0.0018]		[0.0001]		[0.0027]	
Included in SS and 64 Years Old	0.1918	(0.1328)	0.1814	(0.1371)	0.2551**	(0.1023)
	[0.0445]		[0.0403]		[0.0434]	
Included in SS and 65 Years Old	0.0675	(0.1146)	0.0730	(0.1135)	0.1292	(0.1183)
	[0.0260]		[0.0244]		[0.0245]	
Included in SS and 66 Years Old	0.2039	(0.1300)	0.2205*	(0.1320)	0.2769**	(0.1172)
	[0.0561]		[0.0567]		[0.0568]	
Included in SS and 67 Years Old	0.0716	(0.1581)	0.0868	(0.1622)	0.1430	(0.1416)
	[0.0295]		[0.0300]		[0.0301]	
Included in SS and 68 Years Old	0.1025	(0.1783)	0.1254	(0.1769)	0.1819	(0.1369)
	[0.0378]		[0.0400]		[0.0401]	
Included in SS and 69 Years Old	0.0862	(0.1210)	0.0748	(0.1231)	0.1313	(0.1255)
	[0.0336]		[0.0280]		[0.0282]	
Included in SS and 70 Years Old	0.2217	(0.2106)	0.2188	(0.2117)	0.2756	(0.1700)
	[0.0666]		[0.0627]		[0.0629]	
Observations	60890		60890		60890	

Table continues on next page.

Table 3: Continued...

	(1) Baseline		(2) + Demographics		(3) + Pension Characteristics	
2011	0.0004	(0.0520)	-0.0039	(0.0517)	-0.0033	(0.0516)
2012	0.0441	(0.0625)	0.0410	(0.0628)	0.0437	(0.0624)
2013	-0.0500	(0.0738)	-0.0530	(0.0729)	-0.0513	(0.0726)
2014	-0.0922	(0.0830)	-0.0949	(0.0830)	-0.0939	(0.0825)
2015	-0.1374*	(0.0785)	-0.1411*	(0.0762)	-0.1398*	(0.0763)
2016	-0.1753**	(0.0778)	-0.1764**	(0.0778)	-0.1736**	(0.0772)
Advanced Degree	–		-0.1221***	(0.0363)	-0.1246***	(0.0364)
African American	–		-0.1817***	(0.0683)	-0.1886***	(0.0673)
Other Race	–		-0.3048***	(0.0781)	-0.2985***	(0.0783)
Hispanic Origin	–		-0.2749***	(0.0750)	-0.2710***	(0.0724)
Never Married	–		0.3008**	(0.1175)	0.3051**	(0.1193)
Female	–		0.1748***	(0.0440)	0.1719***	(0.0441)
Never Married and Female	–		-0.2943**	(0.1466)	-0.2914**	(0.1483)
Separated	–		-0.3319	(0.2840)	-0.3257	(0.2827)
Separated and Female	–		-0.0750	(0.3620)	-0.0821	(0.3625)
Divorced	–		-0.0868	(0.0944)	-0.0863	(0.0939)
Divorced and Female	–		-0.2230*	(0.1164)	-0.2218*	(0.1162)
Widowed	–		0.1287	(0.2463)	0.1243	(0.2454)
Widowed and Female	–		-0.2172	(0.2548)	-0.2104	(0.2550)
Divorced in Past Year	–		0.1372	(0.2469)	0.1314	(0.2444)
Widowed in Past Year	–		-0.0839	(0.1484)	-0.0855	(0.1481)
Eligible for Full Retirement*	–		–		0.3238***	(0.0626)
Observations	60890		60890		60890	

Standard errors clustered at the state level in parentheses. Marginal effects in brackets.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Participation in the Teacher Labor Force

	(1) Baseline		(2) + Demographics		(3) + Pension Characteristics	
Included in SS	0.0008	(0.0036)	-0.0001	(0.0031)	-0.0005	(0.0030)
60 Years Old	-0.0044**	(0.0017)	-0.0035*	(0.0018)	-0.0051**	(0.0021)
61 Years Old	-0.0102***	(0.0017)	-0.0094***	(0.0019)	-0.0110***	(0.0023)
62 Years Old	-0.0162***	(0.0020)	-0.0140***	(0.0021)	-0.0155***	(0.0025)
63 Years Old	-0.0225***	(0.0017)	-0.0206***	(0.0018)	-0.0221***	(0.0022)
64 Years Old	-0.0253***	(0.0010)	-0.0232***	(0.0015)	-0.0247***	(0.0021)
65 Years Old	-0.0312***	(0.0032)	-0.0279***	(0.0030)	-0.0294***	(0.0029)
66 Years Old	-0.0366***	(0.0017)	-0.0326***	(0.0022)	-0.0341***	(0.0020)
67 Years Old	-0.0396***	(0.0019)	-0.0349***	(0.0024)	-0.0364***	(0.0025)
68 Years Old	-0.0434***	(0.0017)	-0.0388***	(0.0024)	-0.0403***	(0.0027)
69 Years Old	-0.0445***	(0.0029)	-0.0386***	(0.0033)	-0.0401***	(0.0032)
70 Years Old	-0.0473***	(0.0016)	-0.0396***	(0.0028)	-0.0411***	(0.0027)
Included in SS and 60 Years Old	-0.0006	(0.0023)	-0.0002	(0.0024)	0.0010	(0.0024)
Included in SS and 61 Years Old	0.0002	(0.0022)	0.0003	(0.0022)	0.0014	(0.0024)
Included in SS and 62 Years Old	-0.0031	(0.0026)	-0.0037	(0.0026)	-0.0029	(0.0027)
Included in SS and 63 Years Old	-0.0015	(0.0021)	-0.0007	(0.0021)	0.0001	(0.0023)
Included in SS and 64 Years Old	-0.0045**	(0.0020)	-0.0043**	(0.0020)	-0.0035	(0.0023)
Included in SS and 65 Years Old	-0.0043	(0.0036)	-0.0043	(0.0032)	-0.0037	(0.0029)
Included in SS and 66 Years Old	-0.0042*	(0.0024)	-0.0040	(0.0024)	-0.0033	(0.0022)
Included in SS and 67 Years Old	-0.0045	(0.0028)	-0.0048*	(0.0026)	-0.0042*	(0.0025)
Included in SS and 68 Years Old	-0.0044	(0.0026)	-0.0041	(0.0026)	-0.0035	(0.0026)
Included in SS and 69 Years Old	-0.0045	(0.0034)	-0.0051	(0.0033)	-0.0045	(0.0031)
Included in SS and 70 Years Old	-0.0041*	(0.0024)	-0.0051**	(0.0025)	-0.0045*	(0.0025)
Observations	8064		8064		8064	
Mean of Labor Force Part	0.0428		0.0428		0.0428	

Table continues on next page.

Table 4: Continued...

	(1) Baseline		(2) + Demographics		(3) + Pension Characteristics	
2011	-0.0037***	(0.0009)	-0.0040***	(0.0009)	-0.0040***	(0.0009)
2012	-0.0067***	(0.0009)	-0.0072***	(0.0010)	-0.0072***	(0.0010)
2013	-0.0084***	(0.0011)	-0.0091***	(0.0013)	-0.0091***	(0.0013)
2014	-0.0101***	(0.0011)	-0.0113***	(0.0013)	-0.0113***	(0.0013)
2015	-0.0124***	(0.0014)	-0.0138***	(0.0015)	-0.0138***	(0.0015)
2016	-0.0130***	(0.0012)	-0.0148***	(0.0014)	-0.0149***	(0.0014)
Female	–		0.0689***	(0.0061)	0.0690***	(0.0061)
Advanced Degree	–		0.0112	(0.0084)	0.0110	(0.0084)
African American	–		0.0111	(0.0228)	0.0083	(0.0225)
Other Race	–		-0.0082	(0.0115)	-0.0065	(0.0103)
Hispanic Origin	–		0.0342	(0.0281)	0.0389	(0.0265)
Never Married	–		-0.0824***	(0.0164)	-0.0817***	(0.0153)
Never Married and Female	–		-0.0198	(0.0299)	-0.0196	(0.0299)
Separated	–		-0.0812**	(0.0367)	-0.0765**	(0.0349)
Separated and Female	–		0.1037	(0.0710)	0.1028	(0.0719)
Divorced	–		-0.0090	(0.0120)	-0.0081	(0.0114)
Divorced and Female	–		-0.0260	(0.0225)	-0.0266	(0.0223)
Widowed	–		0.1572***	(0.0190)	0.1561***	(0.0194)
Widowed and Female	–		-0.3534***	(0.0333)	-0.3520***	(0.0333)
Divorced in Past Year	–		-0.0227	(0.0356)	-0.0192	(0.0361)
Widowed in Past Year	–		0.0630*	(0.0350)	0.0624*	(0.0347)
Eligible for Full Retirement	–		–		0.0035	(0.0028)
Observations	8064		8064		8064	
Mean of Labor Force Part	0.0428		0.0428		0.0428	

Standard errors clustered at the state level in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Single Female Teachers by Marital Status

	(1) All Single		(2) Divorced		(3) Never Married		(4) Widowed	
Included in SS	-0.0708	(0.1289)	-0.0877	(0.2161)	0.0786	(0.1816)	-0.3311	(0.2163)
	[-0.0051]		[-0.0055]		[0.0065]		[-0.0281]	
60 Years Old	-0.1431	(0.1568)	0.1313	(0.2573)	-0.5607	(0.4394)	-0.6881*	(0.3847)
61 Years Old	0.5487***	(0.1068)	0.4910***	(0.1531)	1.0206***	(0.2122)	0.0252	(0.3160)
62 Years Old	0.4466***	(0.1152)	0.3890**	(0.1635)	0.7230***	(0.2697)	0.1672	(0.2210)
63 Years Old	0.8023***	(0.2050)	0.8738***	(0.3054)	0.7755***	(0.2653)	0.6016*	(0.3197)
64 Years Old	1.0291***	(0.1653)	0.9526***	(0.2109)	1.1311**	(0.4671)	1.2471***	(0.1994)
65 Years Old	0.9141***	(0.1184)	1.0598***	(0.1617)	-0.2222	(0.5188)	1.0964***	(0.3002)
66 Years Old	1.2697***	(0.1516)	1.0966***	(0.2159)	1.3339***	(0.3913)	1.4830***	(0.3586)
67 Years Old	1.6684***	(0.1635)	1.7355***	(0.2230)	1.5602***	(0.5503)	1.5108***	(0.2695)
68 Years Old	1.7794***	(0.2216)	1.9616***	(0.3588)	1.7622***	(0.5591)	1.4501***	(0.2564)
69 Years Old	1.5272***	(0.1913)	1.5526***	(0.2470)	1.4974***	(0.3016)	1.4751***	(0.3564)
70 Years Old	1.5615***	(0.3068)	1.6334***	(0.4296)	2.1265***	(0.4488)	0.9941*	(0.5193)
Included in SS and 60 Years Old	0.7655***	(0.2207)	0.4103	(0.3503)	1.2093**	(0.5206)	1.5072***	(0.4964)
	[0.0654]		[0.0292]		[0.1260]		[0.1085]	
Included in SS and 61 Years Old	0.1372	(0.1602)	0.2478	(0.2542)	-0.2589	(0.3371)	0.4354	(0.5338)
	[0.0082]		[0.0180]		[-0.0305]		[0.0108]	
Included in SS and 62 Years Old	0.7467***	(0.1925)	0.7704***	(0.2684)	0.4765	(0.4007)	1.2255***	(0.3399)
	[0.0963]		[0.0878]		[0.0985]		[0.1339]	
Included in SS and 63 Years Old	0.3052	(0.2473)	0.2392	(0.3579)	0.3618	(0.3759)	0.4978	(0.4621)
	[0.0361]		[0.0223]		[0.0765]		[0.0261]	
Included in SS and 64 Years Old	0.2471	(0.2411)	0.2684	(0.3242)	0.4647	(0.5459)	0.0610	(0.4608)
	[0.0302]		[0.0278]		[0.1113]		[-0.0534]	
Included in SS and 65 Years Old	0.5764***	(0.1884)	0.6485**	(0.2633)	0.9074	(0.5944)	0.4981	(0.4547)
	[0.0902]		[0.1032]		[0.1077]		[0.0342]	
Included in SS and 66 Years Old	0.3728	(0.2287)	0.6437*	(0.3413)	0.1778	(0.5806)	0.1530	(0.4784)
	[0.0607]		[0.1032]		[0.0552]		[-0.0395]	
Included in SS and 67 Years Old	-0.0638	(0.2345)	-0.2959	(0.2952)	-0.3635	(0.6561)	0.5795	(0.4358)
	[-0.0291]		[-0.0776]		[-0.0581]		[0.0587]	
Included in SS and 68 Years Old	-0.1095	(0.3018)	-0.3334	(0.4032)	-0.3907	(0.7934)	0.5254	(0.3830)
	[-0.0401]		[-0.0919]		[-0.0703]		[0.0448]	
Included in SS and 69 Years Old	0.1187	(0.2679)	0.3831	(0.3245)	-0.3608	(0.5851)	-0.0863	(0.5793)
	[0.0102]		[0.0633]		[-0.0562]		[-0.0868]	
Included in SS and 70 Years Old	0.5859	(0.3712)	0.8361	(0.5436)	-0.4944	(0.6399)	0.6291	(0.5716)
	[0.1179]		[0.1742]		[-0.0985]		[0.0600]	
Observations	13461		7998		2930		2533	

Table continues on next page.

Table 5: Continued...

	(1) All Single		(2) Divorced		(3) Never Married		(4) Widowed	
2011	-0.0806	(0.0990)	-0.1549	(0.1286)	0.0202	(0.1628)	-0.0535	(0.1908)
2012	-0.1895*	(0.1149)	-0.1947	(0.1483)	-0.5075**	(0.2433)	0.0407	(0.1670)
2013	-0.2891**	(0.1195)	-0.4392***	(0.1488)	-0.1155	(0.2330)	-0.1219	(0.2250)
2014	-0.3392**	(0.1465)	-0.4982***	(0.1529)	-0.3700	(0.2626)	0.0633	(0.2137)
2015	-0.3714***	(0.1376)	-0.4082***	(0.1508)	-0.5181**	(0.2494)	-0.1882	(0.2423)
2016	-0.4195***	(0.1108)	-0.4408***	(0.1348)	-0.6024***	(0.1953)	-0.1949	(0.1881)
Advanced Degree	-0.1545**	(0.0730)	-0.1374*	(0.0746)	-0.2288	(0.1506)	-0.1221	(0.1399)
African American	-0.0490	(0.0665)	0.0248	(0.1179)	-0.1328	(0.1654)	-0.1640	(0.1337)
Other Race	-0.2293	(0.2792)	-0.1930	(0.3764)	-0.4629	(0.3234)	-0.0529	(0.2661)
Hispanic Origin	-0.2409**	(0.1080)	-0.1603	(0.1239)	-0.1004	(0.1475)	-0.7590*	(0.4123)
Divorced	-0.3230***	(0.0797)	–		–		–	
Widowed	-0.1033	(0.0867)	–		–		–	
Divorced in Past Year	0.3091	(0.2212)	0.2911	(0.2291)	–		–	
Widowed in Past Year	-0.0495	(0.1410)	–		–		-0.0623	(0.1515)
Eligible for Full Retirement*	0.4380***	(0.0867)	0.5660***	(0.1810)	0.4670***	(0.1667)	0.0105	(0.1765)
Observations	13461		7998		2930		2533	

Standard errors clustered at the state level in parentheses. Marginal Effects in brackets.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Single Male Teachers by Marital Status

	(1) All Single		(2) Divorced		(3) Never Married		(4) Widowed	
Included in SS	-0.0887 [-0.0077]	(0.2295)	0.2969 [0.0208]	(0.3993)	-0.0114 [-0.0011]	(0.2388)	-4.4880*** [-0.3531]	(1.3413)
60 Years Old	0.5998*	(0.3228)	1.0849**	(0.4616)	0.3828	(0.4180)	-1.8508	(1.1811)
61 Years Old	0.3398	(0.3671)	0.6964	(0.5840)	-0.0180	(0.3365)	-0.3589	(1.1700)
62 Years Old	0.1386	(0.5358)	0.2616	(0.5802)	0.3391	(0.7827)	-1.8360	(1.2365)
63 Years Old	1.2302***	(0.2051)	1.5392***	(0.4599)	1.5601***	(0.4691)	-1.3508	(1.3905)
64 Years Old	0.3265	(0.3032)	0.9942	(0.6815)	0.0263	(0.3123)	3.3060**	(1.3210)
65 Years Old	1.5175***	(0.3945)	2.4936***	(0.6563)	1.0246**	(0.4506)	-2.1120***	(0.7366)
66 Years Old	0.6735*	(0.3505)	0.9827***	(0.3521)	1.3138***	(0.4063)	4.4811***	(1.4661)
67 Years Old	1.3634***	(0.5045)	1.7861***	(0.6349)	1.2993**	(0.5151)	0.1065	(0.7437)
68 Years Old	1.7695***	(0.3508)	1.7861***	(0.5577)	2.7199***	(0.4638)	0.2092	(1.1738)
69 Years Old	1.2812***	(0.4650)	1.7408**	(0.7683)	1.0753*	(0.6354)	0.3268	(1.0894)
70 Years Old	1.7604***	(0.5372)	2.2570**	(0.9680)	1.4508**	(0.5763)	0.4303	(1.9190)
Included in SS and 60 Years Old	-0.7469* [-0.0957]	(0.4370)	-1.0338* [-0.0832]	(0.6188)	-0.8315 [-0.0933]	(0.6102)	3.5455* [-0.0987]	(1.8304)
Included in SS and 61 Years Old	-0.0586 [-0.0170]	(0.6037)	-0.1521 [0.0166]	(0.8387)	-0.3878 [-0.0387]	(0.8036)	4.2731** [-0.0363]	(2.0867)
Included in SS and 62 Years Old	0.9829* [0.1334]	(0.5807)	1.0071 [0.1742]	(0.6573)	0.6748 [0.1143]	(0.8494)	4.2562** [-0.0239]	(2.1645)
Included in SS and 63 Years Old	-0.4864 [-0.1013]	(0.4373)	-0.5703 [-0.0466]	(0.6928)	-0.9780 [-0.2015]	(0.8441)	–	
Included in SS and 64 Years Old	0.9980** [0.1472]	(0.3927)	0.3336 [0.1057]	(0.7584)	1.0739** [0.1746]	(0.4913)	–	
Included in SS and 65 Years Old	-0.4956 [-0.1200]	(0.4915)	-1.6045** [-0.2738]	(0.7241)	0.1572 [0.0282]	(0.6151)	6.0867*** [0.2465]	(1.6833)
Included in SS and 66 Years Old	0.1579 [0.0108]	(0.5770)	-0.2314 [0.0087]	(0.7663)	-1.1694 [-0.2105]	(0.9600)	–	
Included in SS and 67 Years Old	-0.6546 [-0.1300]	(0.6456)	-2.0261** [-0.2198]	(0.9576)	0.8985 [0.1948]	(0.8084)	3.0060 [-0.2469]	(1.8663)
Included in SS and 68 Years Old	0.0385 [-0.0118]	(0.4639)	-0.5686 [-0.0530]	(0.7399)	0.0243 [0.0026]	(0.9391)	5.3325** [0.1890]	(2.1042)
Included in SS and 69 Years Old	0.4732 [0.0852]	(0.6200)	0.1708 [0.1028]	(0.9241)	0.0099 [-0.0003]	(1.3519)	4.0280* [-0.0877]	(2.0861)
Included in SS and 70 Years Old	-1.7935** [-0.3251]	(0.8123)	-1.8351 [-0.2869]	(1.1764)	–		–	
Observations	2805		1513		1062		201	

Table continues on next page.

Table 6: Continued...

	(1) All Single		(2) Divorced		(3) Never Married		(4) Widowed	
2011	-0.1963	(0.2490)	-0.1047	(0.3275)	-0.8671***	(0.3273)	2.0993**	(1.0154)
2012	0.1233	(0.2201)	0.0853	(0.2347)	-0.1607	(0.3501)	1.1189	(1.2011)
2013	0.2761	(0.2165)	0.0923	(0.2467)	0.2342	(0.3682)	1.7486	(1.1009)
2014	0.1416	(0.2725)	0.0118	(0.4650)	0.0437	(0.2945)	-0.1233	(1.0439)
2015	-0.6535***	(0.2425)	-0.6574**	(0.3221)	-0.6880	(0.4398)	-0.6685	(1.0113)
2016	-0.1029	(0.2381)	-0.1594	(0.3206)	-0.1182	(0.2918)	0.4294	(0.8951)
Advanced Degree	0.1435	(0.1425)	0.3128*	(0.1816)	-0.0421	(0.2746)	-0.2456	(0.5499)
African American	-0.2013	(0.1890)	-0.1265	(0.3506)	-0.8468*	(0.4510)	1.6527**	(0.7128)
Other Race	-0.3524	(0.4104)	0.2559	(0.6112)	-1.2378***	(0.4558)	4.1337**	(1.6150)
Hispanic Origin	0.1234	(0.2759)	0.0419	(0.4034)	0.4272	(0.3060)	–	
Divorced	-0.2985*	(0.1733)	–		–		–	
Widowed	-0.0597	(0.2811)	–		–		–	
Divorced in Past Year	-0.2961	(0.4845)	-0.1866	(0.4899)	–		–	
Widowed in Past Year	-0.2181	(0.5023)	–		–		0.2996	(0.5931)
Eligible for Full Retirement*	0.4034**	(0.1829)	0.0754	(0.2959)	0.6173**	(0.2430)	3.6098**	(1.4836)
Observations	2805		1513		1062		201	

Standard errors clustered at the state level in parentheses. Marginal Effects in brackets.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Married Teachers by Gender

	(1) Married Women		(2) Married Men	
Included in SS	0.0960	(0.1069)	-0.1541	(0.1549)
	[0.0074]		[-0.0105]	
60 Years Old	0.5676***	(0.1643)	0.4633*	(0.2688)
61 Years Old	0.7098***	(0.1013)	0.4477*	(0.2526)
62 Years Old	0.9451***	(0.0933)	0.8493***	(0.2447)
63 Years Old	1.0428***	(0.0983)	0.9278***	(0.3114)
64 Years Old	0.8516***	(0.1248)	0.6246***	(0.1905)
65 Years Old	1.4244***	(0.1619)	0.9442***	(0.2498)
66 Years Old	1.4839***	(0.1059)	0.8704***	(0.2445)
67 Years Old	1.3242***	(0.1379)	1.1017***	(0.3166)
68 Years Old	1.4275***	(0.1832)	1.4834***	(0.2493)
69 Years Old	1.6376***	(0.2204)	1.2306***	(0.1762)
70 Years Old	1.6469***	(0.2193)	1.3742***	(0.2529)
Included in SS and 60 Years Old	-0.2793	(0.1895)	-0.0503	(0.3039)
	[-0.0226]		[-0.0228]	
Included in SS and 61 Years Old	-0.1624	(0.1251)	0.0204	(0.2909)
	[-0.0095]		[-0.0159]	
Included in SS and 62 Years Old	0.0736	(0.1386)	0.0789	(0.2700)
	[0.0300]		[-0.0120]	
Included in SS and 63 Years Old	-0.0486	(0.1467)	-0.2355	(0.3368)
	[0.0087]		[-0.0625]	
Included in SS and 64 Years Old	0.1332	(0.1522)	0.4586**	(0.2120)
	[0.0407]		[0.0480]	
Included in SS and 65 Years Old	-0.1419	(0.1936)	0.3246	(0.2841)
	[-0.0098]		[0.0312]	
Included in SS and 66 Years Old	-0.0309	(0.1659)	0.6198**	(0.2939)
	[0.0144]		[0.0878]	
Included in SS and 67 Years Old	0.4171**	(0.1684)	0.3424	(0.3436)
	[0.1152]		[0.0380]	
Included in SS and 68 Years Old	0.3192	(0.2369)	0.2279	(0.3257)
	[0.0937]		[0.0161]	
Included in SS and 69 Years Old	-0.1188	(0.2709)	0.6247**	(0.2464)
	[-0.0052]		[0.1017]	
Included in SS and 70 Years Old	0.0599	(0.2707)	0.6567*	(0.3483)
	[0.0363]		[0.1128]	
Observations	30296		10726	

Table continues on next page.

Table 7: Continued...

	(1) Married Women		(2) Married Men	
2011	0.0467	(0.0673)	0.0064	(0.1309)
2012	0.0895	(0.0883)	0.0639	(0.0950)
2013	0.0745	(0.0872)	-0.2633**	(0.1054)
2014	-0.0015	(0.0865)	-0.1582	(0.1011)
2015	-0.0097	(0.0902)	-0.1644	(0.1078)
2016	-0.0899	(0.1007)	-0.1507	(0.1075)
Advanced Degree	-0.1848***	(0.0341)	-0.1428**	(0.0652)
African American	-0.2458	(0.3231)	-0.8721**	(0.3609)
Other Race	-0.1632	(0.1240)	-0.2844	(0.2485)
Hispanic Origin	-0.2041*	(0.1203)	-0.6501***	(0.2014)
Spouse is $<$ 55 Years Old	-0.1498*	(0.0859)	-0.3896***	(0.0906)
Spouse is 60 Years Old	0.1589**	(0.0761)	0.1083	(0.1305)
Spouse is 61 Years Old	0.0925	(0.0778)	-0.0242	(0.1134)
Spouse is 62 Years Old	0.0925	(0.0670)	-0.0448	(0.1425)
Spouse is 63 Years Old	-0.0033	(0.0830)	0.0060	(0.1023)
Spouse is 64 Years Old	0.1758**	(0.0799)	-0.0045	(0.1398)
Spouse is 65 Years Old	0.1377	(0.0948)	0.0327	(0.1702)
Spouse is 66 Years Old	0.0301	(0.0904)	-0.3297**	(0.1367)
Spouse is 67 Years Old	0.0062	(0.1114)	0.2472	(0.1814)
Spouse is 68 Years Old	-0.0467	(0.1065)	-0.1638	(0.2429)
Spouse is 69 Years Old	-0.0409	(0.1241)	-0.2399	(0.2186)
Spouse is 70 Years Old	-0.0517	(0.1112)	-0.5476*	(0.3263)
Spouse is $>$ 70 Years Old	-0.2067**	(0.0882)	-0.1100	(0.3219)
Spouse is a Teacher	0.0552	(0.0665)	0.2138***	(0.0669)
Spouse is Not in Labor Force	0.7229***	(0.0482)	0.9222***	(0.0658)
Spouse Has Advanced Degree	0.1418***	(0.0425)	0.3137***	(0.0787)
Spouse is African American	-0.0512	(0.2862)	0.5874*	(0.3401)
Spouse is Other Race	-0.3058**	(0.1227)	-0.1549	(0.1926)
Spouse is Hispanic Origin	-0.0554	(0.1318)	-0.0118	(0.1615)
Eligible for Full Retirement*	0.3245***	(0.0893)	0.2633**	(0.1195)
Observations	30296		10726	

Standard errors clustered at the state level in parentheses. Marginal effects in brackets.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Data Appendix

A Retirement Data

Data on the retirement of teachers comes from the American Community Survey (ACS) from 2010 to 2016.[15]

Classifying teachers:

> Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours. If this person had no job or business last week, give information for his/her last job or business.

We classify an individual as a teacher following Harris and Adams (2007). This includes: kindergarten teachers, primary and secondary school teachers, special education teachers, and other teachers not otherwise classified. This excludes all post-secondary teachers.

Worked within the last year:

> When did this person last work, even for a few days?
>
> 1. Within the past 12 months
> 2. 1 to 5 years ago − SKIP to [L]
> 3. Over 5 years ago or never worked − SKIP to question 47

The population of teachers is restricted to those who report working in the last year. Retired teachers are defined as individuals whose most recent reported occupation was a teacher and who worked last year, but are currently not in the labor force.

Retirement status:

> LAST WEEK, did this person work for pay at a job (or business)?
>
> 1. Yes → SKIP to question 30
> 2. No Did not work (or retired)
>
> LAST WEEK, was this person on layoff from a job?

[15] Steven Ruggles, Katie Genadek, Ronald Goeken, Josiah Grover, and Matthew Sobek. Integrated Public Use Microdata Series: Version 7.0 American Community Survey. Minneapolis: University of Minnesota, 2017

1. Yes → SKIP to question 35c
2. No

Has this person been informed that he or she will be recalled to work within the next 6 months OR been given a date to return to work?

1. Yes → SKIP to question 37
2. No

During the LAST 4 WEEKS, has this person been ACTIVELY looking for work?

1. Yes
2. No → SKIP to question 38

LAST WEEK, could this person have started a job if offered one, or returned to work if recalled?

1. Yes, could have gone to work
2. No, because of own temporary illness
3. No, because of all other reasons (in school, etc.)

We use employment status from the ACS to determine whether an individual is employed. Employment status in the ACS is categorized as (1) employed, (2) unemployed, or (3) not in the labor force. It is determined by the respondents answers to the above questions.

B Other Occupation Categories

We define two occupation groups as counterfactuals for teachers. The first are state government employees who are not teachers. We identify state government employees using the following ACS question:

Was this person Mark (X) ONE box.

1. an employee of a PRIVATE FOR-PROFIT company or business, or of an individual, for wages, salary, or commissions?
2. an employee of a PRIVATE NOT-FOR-PROFIT, tax-exempt, or charitable organization?
3. a local GOVERNMENT employee (city, county, etc.)?
4. a state GOVERNMENT employee?

5. a Federal GOVERNMENT employee?
6. SELF-EMPLOYED in own NOT INCORPORATED business, professional practice, or farm?
7. SELF-EMPLOYED in own INCORPORATED business, professional practice, or farm?
8. working WITHOUT PAY in family business or farm?

The second, and broader, counterfactual group consist of individuals from the following occupation categories: management, business, science, and arts occupations; business operations specialists; financial specialists; computer and mathematical occupations; architecture and engineering occupations; life, physical, and social science occupations; community and social services occupations; legal occupations; arts, design, entertainment, sports, and media occupations; sales and related occupations; and office and administrative support occupations. We classify individuals into these categories using the "most recent occupation" question listed above.

Table A1: Age-Specific Retirement Rates

	(1) All	(2) Not Included in SS	(3) Included in SS
55-59 Years Old	0.0829	0.0800	0.0847
	(0.276)	(0.271)	(0.279)
60 Years Old	0.137	0.141	0.134
	(0.344)	(0.348)	(0.341)
61 Years Old	0.159	0.165	0.155
	(0.366)	(0.371)	(0.362)
62 Years Old	0.218	0.191	0.235
	(0.413)	(0.393)	(0.424)
63 Years Old	0.225	0.224	0.226
	(0.418)	(0.417)	(0.418)
64 Years Old	0.233	0.206	0.251
	(0.423)	(0.404)	(0.433)
65 Years Old	0.282	0.267	0.293
	(0.450)	(0.443)	(0.455)
66 Years Old	0.311	0.278	0.333
	(0.463)	(0.448)	(0.471)
67 Years Old	0.336	0.318	0.349
	(0.472)	(0.466)	(0.477)
68 Years Old	0.365	0.342	0.382
	(0.482)	(0.474)	(0.486)
69 Years Old	0.354	0.336	0.368
	(0.478)	(0.472)	(0.482)
70 Years Old	0.387	0.350	0.414
	(0.487)	(0.477)	(0.493)
Total	0.159	0.153	0.163
	(0.365)	(0.360)	(0.369)
N	60890	23531	37359

mean coefficients; sd in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A2: Age-Specific Teacher Labor Force Participation Rates

	(1) All	(2) Not Included in SS	(3) Included in SS
55-59 Years Old	0.0611	0.0606	0.0614
	(0.0383)	(0.0364)	(0.0395)
60 Years Old	0.0563	0.0562	0.0564
	(0.0417)	(0.0402)	(0.0426)
61 Years Old	0.0509	0.0503	0.0513
	(0.0398)	(0.0343)	(0.0430)
62 Years Old	0.0429	0.0444	0.0420
	(0.0335)	(0.0323)	(0.0343)
63 Years Old	0.0376	0.0380	0.0373
	(0.0323)	(0.0296)	(0.0340)
64 Years Old	0.0327	0.0350	0.0313
	(0.0280)	(0.0257)	(0.0293)
65 Years Old	0.0268	0.0289	0.0254
	(0.0256)	(0.0249)	(0.0259)
66 Years Old	0.0213	0.0234	0.0200
	(0.0213)	(0.0195)	(0.0223)
67 Years Old	0.0180	0.0203	0.0166
	(0.0194)	(0.0173)	(0.0204)
68 Years Old	0.0143	0.0165	0.0129
	(0.0175)	(0.0163)	(0.0181)
69 Years Old	0.0130	0.0154	0.0116
	(0.0185)	(0.0166)	(0.0195)
70 Years Old	0.0106	0.0127	0.00941
	(0.0166)	(0.0141)	(0.0178)
Total	0.0428	0.0437	0.0422
	(0.0378)	(0.0354)	(0.0392)
N	8064	2184	5880

mean coefficients; sd in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3: Teacher Labor Force Participation Rates Weighting Each Cell Equally

	(1) Baseline		(2) + Demographics		(3) + Pension Characteristics	
Included in SS	0.0060	(0.0051)	0.0047	(0.0049)	0.0046	(0.0049)
60 Years Old	-0.0050	(0.0030)	-0.0061**	(0.0030)	-0.0063**	(0.0030)
61 Years Old	-0.0110**	(0.0043)	-0.0131***	(0.0040)	-0.0133***	(0.0040)
62 Years Old	-0.0165***	(0.0030)	-0.0183***	(0.0031)	-0.0185***	(0.0029)
63 Years Old	-0.0223***	(0.0026)	-0.0252***	(0.0026)	-0.0254***	(0.0027)
64 Years Old	-0.0272***	(0.0028)	-0.0304***	(0.0030)	-0.0306***	(0.0030)
65 Years Old	-0.0331***	(0.0032)	-0.0360***	(0.0033)	-0.0362***	(0.0032)
66 Years Old	-0.0364***	(0.0051)	-0.0402***	(0.0050)	-0.0404***	(0.0047)
67 Years Old	-0.0445***	(0.0041)	-0.0485***	(0.0045)	-0.0487***	(0.0044)
68 Years Old	-0.0456***	(0.0043)	-0.0501***	(0.0048)	-0.0503***	(0.0048)
69 Years Old	-0.0464***	(0.0036)	-0.0508***	(0.0040)	-0.0510***	(0.0040)
70 Years Old	-0.0521***	(0.0042)	-0.0561***	(0.0047)	-0.0563***	(0.0047)
Included in SS and 60 Years Old	-0.0032	(0.0035)	-0.0030	(0.0035)	-0.0029	(0.0035)
Included in SS and 61 Years Old	0.0014	(0.0048)	0.0021	(0.0047)	0.0022	(0.0047)
Included in SS and 62 Years Old	-0.0055	(0.0040)	-0.0054	(0.0040)	-0.0053	(0.0039)
Included in SS and 63 Years Old	-0.0014	(0.0037)	-0.0004	(0.0037)	-0.0003	(0.0037)
Included in SS and 64 Years Old	-0.0053	(0.0040)	-0.0047	(0.0039)	-0.0046	(0.0040)
Included in SS and 65 Years Old	-0.0058	(0.0041)	-0.0060	(0.0040)	-0.0060	(0.0040)
Included in SS and 66 Years Old	-0.0088	(0.0057)	-0.0082	(0.0057)	-0.0082	(0.0056)
Included in SS and 67 Years Old	-0.0060	(0.0051)	-0.0052	(0.0050)	-0.0052	(0.0050)
Included in SS and 68 Years Old	-0.0090*	(0.0051)	-0.0082	(0.0050)	-0.0081	(0.0050)
Included in SS and 69 Years Old	-0.0077*	(0.0044)	-0.0070	(0.0043)	-0.0069	(0.0043)
Included in SS and 70 Years Old	-0.0045	(0.0050)	-0.0039	(0.0047)	-0.0038	(0.0048)
Observations	8064		8064		8064	
Mean of Labor Force Part	0.0359		0.0359		0.0359	

Table continues on next page.

Table A3: Continued...

	(1) Baseline		(2) + Demographics		(3) + Pension Characteristics	
2011	-0.0019	(0.0018)	-0.0019	(0.0017)	-0.0019	(0.0017)
2012	-0.0063***	(0.0020)	-0.0058***	(0.0020)	-0.0058***	(0.0020)
2013	-0.0086***	(0.0014)	-0.0082***	(0.0013)	-0.0082***	(0.0013)
2014	-0.0086***	(0.0016)	-0.0079***	(0.0016)	-0.0079***	(0.0016)
2015	-0.0098***	(0.0016)	-0.0088***	(0.0016)	-0.0088***	(0.0016)
2016	-0.0104***	(0.0014)	-0.0094***	(0.0015)	-0.0094***	(0.0015)
Female	–		0.0502***	(0.0051)	0.0502***	(0.0051)
Advanced Degree	–		0.0254***	(0.0067)	0.0254***	(0.0067)
African American	–		-0.0195	(0.0143)	-0.0196	(0.0142)
Other Race	–		-0.0045	(0.0053)	-0.0045	(0.0053)
Hispanic Origin	–		-0.0171	(0.0171)	-0.0169	(0.0173)
Never Married	–		-0.0474***	(0.0130)	-0.0474***	(0.0130)
Never Married and Female	–		-0.0232	(0.0227)	-0.0232	(0.0227)
Separated	–		-0.0647**	(0.0258)	-0.0647**	(0.0258)
Separated and Female	–		0.0559	(0.0442)	0.0560	(0.0442)
Divorced	–		0.0053	(0.0090)	0.0053	(0.0090)
Divorced and Female	–		-0.0261	(0.0186)	-0.0261	(0.0186)
Widowed	–		0.0664***	(0.0188)	0.0664***	(0.0188)
Widowed and Female	–		-0.1098***	(0.0279)	-0.1098***	(0.0278)
Divorced in Past Year	–		-0.0485	(0.0393)	-0.0483	(0.0394)
Widowed in Past Year	–		0.0290	(0.0383)	0.0290	(0.0383)
Eligible for Full Retirement	–		–		0.0007	(0.0036)
Observations	8064		8064		8064	
Mean of Labor Force Part	0.0359		0.0359		0.0359	

Standard errors clustered at the state level in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A4: Single Women Participation in the Teacher Labor Force (Short Table)

	(1) All Single		(2) Divorced		(3) Never Married		(4) Widowed	
Included in SS	-0.00156	(0.00664)	-0.00505	(0.00744)	0.00159	(0.00643)	0.00726	(0.00921)
60 Years Old	-0.000309	(0.00692)	-0.00434	(0.0101)	0.00257	(0.00663)	0.00932	(0.0114)
61 Years Old	-0.0201***	(0.00386)	-0.0198***	(0.00572)	-0.0234***	(0.00471)	-0.0154	(0.0114)
62 Years Old	-0.0129**	(0.00573)	-0.00829	(0.00794)	-0.0173**	(0.00666)	-0.0177*	(0.00942)
63 Years Old	-0.0236***	(0.00384)	-0.0268***	(0.00542)	-0.0206***	(0.00757)	-0.0166	(0.0123)
64 Years Old	-0.0259***	(0.00480)	-0.0163**	(0.00698)	-0.0287***	(0.00784)	-0.0469***	(0.0125)
65 Years Old	-0.0302***	(0.00654)	-0.0323***	(0.00806)	-0.0202***	(0.00684)	-0.0343***	(0.0101)
66 Years Old	-0.0466***	(0.00413)	-0.0465***	(0.00550)	-0.0371***	(0.00721)	-0.0535***	(0.00860)
67 Years Old	-0.0536***	(0.00449)	-0.0539***	(0.00559)	-0.0441***	(0.00881)	-0.0580***	(0.00848)
68 Years Old	-0.0645***	(0.00511)	-0.0725***	(0.00657)	-0.0522***	(0.00580)	-0.0604***	(0.00926)
69 Years Old	-0.0621***	(0.00787)	-0.0657***	(0.00844)	-0.0442***	(0.0105)	-0.0669***	(0.00881)
70 Years Old	-0.0645***	(0.00369)	-0.0643***	(0.00529)	-0.0515***	(0.00782)	-0.0711***	(0.00908)
Included in SS and 60 Years Old	-0.00546	(0.00787)	-0.00107	(0.0115)	-0.00788	(0.00904)	-0.0181	(0.0133)
Included in SS and 61 Years Old	0.0110*	(0.00579)	0.0124	(0.00880)	0.00907	(0.00725)	0.00846	(0.0149)
Included in SS and 62 Years Old	-0.0149**	(0.00600)	-0.0141	(0.00881)	-0.0210***	(0.00713)	-0.0113	(0.0128)
Included in SS and 63 Years Old	-0.00556	(0.00544)	0.00484	(0.00774)	-0.00750	(0.00975)	-0.0359***	(0.0132)
Included in SS and 64 Years Old	-0.0134**	(0.00581)	-0.0206**	(0.00868)	-0.0113	(0.00941)	-0.0000599	(0.0133)
Included in SS and 65 Years Old	-0.0140**	(0.00647)	-0.00993	(0.00877)	-0.0123	(0.00879)	-0.0278**	(0.0133)
Included in SS and 66 Years Old	-0.00712	(0.00564)	-0.00702	(0.00762)	-0.00966	(0.00962)	-0.0104	(0.00991)
Included in SS and 67 Years Old	-0.000579	(0.00534)	0.00225	(0.00652)	-0.00385	(0.00986)	-0.00819	(0.0114)
Included in SS and 68 Years Old	0.00200	(0.00523)	0.0128*	(0.00724)	0.000137	(0.00660)	-0.0176	(0.0112)
Included in SS and 69 Years Old	-0.00444	(0.00819)	-0.000802	(0.00870)	-0.0149	(0.0116)	-0.00895	(0.0107)
Included in SS and 70 Years Old	-0.00634	(0.00488)	-0.00590	(0.00751)	-0.00348	(0.00934)	-0.0134	(0.0105)
2011	-0.00829***	(0.00303)	-0.00995***	(0.00357)	-0.00396	(0.00563)	-0.00934*	(0.00538)
2012	-0.00964***	(0.00254)	-0.00845**	(0.00334)	-0.00648	(0.00494)	-0.0178***	(0.00540)
2013	-0.0129***	(0.00363)	-0.0136***	(0.00432)	-0.0120**	(0.00489)	-0.0123	(0.00787)
2014	-0.0133***	(0.00237)	-0.0147***	(0.00337)	-0.00827*	(0.00430)	-0.0169***	(0.00586)
2015	-0.0196***	(0.00372)	-0.0224***	(0.00352)	-0.0120*	(0.00669)	-0.0234***	(0.00645)
2016	-0.0207***	(0.00324)	-0.0271***	(0.00320)	-0.00979*	(0.00515)	-0.0206***	(0.00715)
Observations	11168		3904		3573		3691	
Mean of Labor Force Part	0.0620		0.0719		0.0489		0.0538	

Standard errors clustered at the state level in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A5: Single Men Participation in the Teacher Labor Force

	(1) All Single		(2) Divorced		(3) Never Married		(4) Widowed	
Included in SS	-0.00291	(0.00229)	-0.00344	(0.00274)	-0.00253	(0.00392)	0.000795	(0.0115)
60 Years Old	-0.00294	(0.00284)	-0.00622	(0.00440)	-0.000323	(0.00425)	0.00582	(0.00780)
61 Years Old	-0.00782**	(0.00363)	-0.00539	(0.00498)	-0.0104**	(0.00455)	-0.0117	(0.0191)
62 Years Old	-0.00592*	(0.00335)	-0.00387	(0.00348)	-0.00720	(0.00519)	-0.0147	(0.0121)
63 Years Old	-0.00874***	(0.00281)	-0.00711*	(0.00414)	-0.0120***	(0.00404)	-0.00487	(0.0132)
64 Years Old	-0.0133***	(0.00345)	-0.0146***	(0.00421)	-0.0111*	(0.00573)	-0.0130	(0.0103)
65 Years Old	-0.0164***	(0.00307)	-0.0189***	(0.00389)	-0.0167***	(0.00476)	-0.00370	(0.0159)
66 Years Old	-0.0151***	(0.00318)	-0.0126***	(0.00407)	-0.0198***	(0.00436)	-0.0136	(0.0129)
67 Years Old	-0.0165***	(0.00266)	-0.0152***	(0.00358)	-0.0182***	(0.00411)	-0.0163	(0.0115)
68 Years Old	-0.0224***	(0.00279)	-0.0202***	(0.00430)	-0.0245***	(0.00461)	-0.0231**	(0.0111)
69 Years Old	-0.0193***	(0.00237)	-0.0183***	(0.00282)	-0.0218***	(0.00531)	-0.0165	(0.0117)
70 Years Old	-0.0232***	(0.00306)	-0.0235***	(0.00452)	-0.0232***	(0.00512)	-0.0206*	(0.0117)
Included in SS and 60 Years Old	0.00224	(0.00388)	0.00246	(0.00519)	-0.000181	(0.00647)	0.0140	(0.0189)
Included in SS and 61 Years Old	0.00400	(0.00447)	0.00260	(0.00599)	0.00694	(0.00619)	-0.00165	(0.0212)
Included in SS and 62 Years Old	-0.00361	(0.00443)	-0.00615	(0.00499)	-0.000640	(0.00668)	0.00128	(0.0141)
Included in SS and 63 Years Old	0.00189	(0.00348)	-0.000312	(0.00486)	0.00437	(0.00491)	0.00268	(0.0173)
Included in SS and 64 Years Old	0.00187	(0.00369)	0.00377	(0.00494)	-0.00200	(0.00604)	0.00309	(0.0107)
Included in SS and 65 Years Old	0.00180	(0.00398)	0.00454	(0.00491)	0.00144	(0.00623)	-0.0111	(0.0178)
Included in SS and 66 Years Old	-0.00103	(0.00405)	-0.00177	(0.00499)	0.00115	(0.00627)	-0.00498	(0.0131)
Included in SS and 67 Years Old	-0.00108	(0.00312)	-0.000915	(0.00431)	-0.00317	(0.00504)	-0.000631	(0.0122)
Included in SS and 68 Years Old	0.00159	(0.00305)	0.00142	(0.00497)	0.00121	(0.00495)	-0.00160	(0.0118)
Included in SS and 69 Years Old	-0.00162	(0.00304)	-0.00246	(0.00336)	-0.000820	(0.00643)	-0.00420	(0.0134)
Included in SS and 70 Years Old	0.000343	(0.00316)	0.00258	(0.00504)	-0.00183	(0.00529)	-0.00533	(0.0126)
2011	-0.000160	(0.00175)	-0.00177	(0.00224)	0.00390	(0.00427)	-0.00552	(0.00542)
2012	-0.00332*	(0.00177)	-0.00663***	(0.00221)	0.000876	(0.00280)	0.0000904	(0.00557)
2013	-0.00468***	(0.00160)	-0.00764***	(0.00198)	-0.000476	(0.00311)	-0.00364	(0.00527)
2014	-0.00623***	(0.00129)	-0.00750***	(0.00185)	-0.00557**	(0.00269)	-0.00143	(0.00511)
2015	-0.00429**	(0.00191)	-0.00534**	(0.00235)	-0.00457	(0.00313)	0.00432	(0.00625)
2016	-0.00620***	(0.00155)	-0.00850***	(0.00224)	-0.00295	(0.00311)	-0.00503	(0.00478)
Observations	10249		3799		3555		2895	
Mean of Labor Force Part	0.0196		0.0201		0.0200		0.0159	

Standard errors clustered at the state level in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6: Married Men and Women Participation in the Teacher Labor Force

	(1) Married Women	(2) Married Men
Included in SS	-0.0011	0.0012
	(0.0051)	(0.0016)
60 Years Old	-0.0059	0.0013
	(0.0090)	(0.0023)
61 Years Old	-0.0095	0.0010
	(0.0100)	(0.0034)
62 Years Old	-0.0200*	-0.0017
	(0.0116)	(0.0033)
63 Years Old	-0.0193	-0.0033
	(0.0128)	(0.0035)
64 Years Old	-0.0240*	-0.0017
	(0.0139)	(0.0038)
65 Years Old	-0.0326**	-0.0053
	(0.0154)	(0.0044)
66 Years Old	-0.0325**	-0.0056
	(0.0154)	(0.0044)
67 Years Old	-0.0271	-0.0093*
	(0.0165)	(0.0051)
68 Years Old	-0.0294*	-0.0098
	(0.0170)	(0.0060)
69 Years Old	-0.0316*	-0.0116*
	(0.0174)	(0.0060)
70 Years Old	-0.0342*	-0.0148**
	(0.0183)	(0.0066)
Included in SS and 60 Years Old	0.0010	0.0013
	(0.0042)	(0.0022)
Included in SS and 61 Years Old	-0.0015	-0.0006
	(0.0061)	(0.0028)
Included in SS and 62 Years Old	0.0025	0.0015
	(0.0052)	(0.0021)
Included in SS and 63 Years Old	-0.0006	0.0008
	(0.0039)	(0.0024)
Included in SS and 64 Years Old	0.0022	-0.0040**
	(0.0054)	(0.0017)
Included in SS and 65 Years Old	-0.0015	-0.0006
	(0.0060)	(0.0020)
Included in SS and 66 Years Old	-0.0033	-0.0017
	(0.0044)	(0.0019)
Included in SS and 67 Years Old	-0.0115**	-0.0015
	(0.0053)	(0.0025)
Included in SS and 68 Years Old	-0.0068	-0.0032
	(0.0056)	(0.0029)
Included in SS and 69 Years Old	-0.0014	-0.0034*
	(0.0050)	(0.0020)
Included in SS and 70 Years Old	-0.0003	-0.0039
	(0.0050)	(0.0028)
2011	-0.0055**	-0.0019*
	(0.0021)	(0.0010)
2012	-0.0143***	-0.0025***
	(0.0021)	(0.0009)
2013	-0.0179***	-0.0027***
	(0.0027)	(0.0008)
2014	-0.0206***	-0.0049***
	(0.0027)	(0.0009)
2015	-0.0250***	-0.0060***
	(0.0030)	(0.0008)
2016	-0.0256***	-0.0061***
	(0.0029)	(0.0009)
Observations	4025	4032

Standard errors clustered at the state level in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$