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Teaching, Teachers Pensions and Retirement across Recent Cohorts of College Graduate Women

Maria D. Fitzpatrick
Cornell University and NBER

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Author Contact: maria.d.fitzpatrick@cornell.edu, 103 MVR Hall, Department of Policy Analysis and Management, Cornell University, Ithaca NY 14853.

Introduction

Previous chapters in this book detail the increased labor force participation rates of older women across the educational attainment spectrum. In this chapter, I focus on the increased likelihood of continued work at older ages among college-educated women. Labor force participation rates of college-educated women ages 60 to 64 increased by 20 percent (10 percentage points) between 2000 and 2010. One potential explanation for this increase stems from the fact that, although the college degree receipt of women increased by a factor of 5 between the 1925 and 1950 cohorts (increasing from 5 to 25 percentage points), a lower proportion of the college-educated women in the more recent cohorts were teachers. As I show, the propensity of women to obtain a college degree increased by a factor of 5 between the 1925 and 1950 cohorts (increasing from 5 to 25 percentage points). Since the number of female teachers remained relatively constant over this period. Consequently, the fraction of college-educated women who were teachers fell precipitously.

This occupational shift among college-educated women could drive the recent increases in labor force participation for any number of reasons. For example, if teachers retire earlier than college-educated women in other occupations because teaching is more stressful, then this would cause more recent cohorts of college-educated women to retire at older ages than previous cohorts. Alternatively, if teachers are more likely than other college-educated women to be secondary earners, they may retire earlier in order to time retirement with an older spouse.

In this chapter, I examine a third potential difference between teachers and workers in other occupations: pension eligibility (and wealth). Public school teachers are almost universally covered by defined benefit pensions and, generally, defined benefit pensions allow workers to retire at earlier ages than Social Security. Therefore, as the fraction of college-educated women

without access to defined benefit pensions increased, the older age labor supply of college-educated women increased. I provide evidence supporting this hypothesis and show that older college-educated women who worked as teachers do not experience increases in labor force participation as large as their counterparts who never taught.

The Changing Nature of College-Educated Women's Occupations

Over the course of the last century, women made enormous strides in their educational attainment. In Figure 1, I reproduce Figure 1 of Godin, Katz and Kuziemko (2006), which plots college graduation rates (by age 35) by gender and cohort. Focusing on the cohorts most relevant for this study, the female graduation rate starts around 5 percent in 1925 and begins to climb. By the 1940 cohort, female graduation rates had more than doubled and by the 1950 cohort they doubled again, reaching nearly 25 percent.

As more women graduated college they began to be represented in a more diverse set of occupations. In Figure 2, I plot the fraction of employed college-educated women in the CPS between the ages of 46 and 50 who report being a teacher, by cohort.¹ The fraction of teachers decreases from around 40 percent for the cohorts born before 1940 to 30 percent for those born in 1950 and further still to just 15 percent for the cohorts born after 1959. This shift in occupational choice may have implications for the labor supply of older women because, as described in the next section, teachers, who are mostly public employees, have access to pensions that are quite different than those in other sectors.

¹ The Current Population Survey only collects information about occupation and industry of those who report being employed. The fraction of college-educated women who are employed between the ages of 46 and 50 across the cohorts born between 1920 and 1965 varies little. Also, restricting to women ages 46 to 50 allows me to create a time-series for cohorts as far back as 1920. The fraction of college-educated women who are employed and report being teachers by cohort is similar when measured at earlier ages.

A Brief History of Teacher Pensions

Although the first statewide systems of teacher pensions in the U.S. were introduced in the last quarter of the 19th century, very few were in place before 1910 (Clark et al. 2003). At that time, Social Security did not exist and teaching was an occupation largely reserved for unmarried women. Those who remained in teaching for many years were those who never married and therefore could not rely on a spouse's income for retirement support.² As such, teacher pension systems were seen as a mechanism to provide assistance women who might not otherwise have late-in-life support. During the early part of the 20th century the use of pensions expanded until, by the late 1920s, teachers in 28 states were covered by pensions.³ By 2013, public school teachers in all states participated in a publicly funded pension plan.

Pensions generally take one of two forms: defined benefit or defined contribution. In a traditional defined benefit pension plan, upon retirement the employee receives a set benefit for life; the benefit size is determined by age, time spent with the employer and earnings history while employed. In 2013, teachers in 44 states participated in either a traditional (39 states) or hybrid (5 states) defined benefit pension system. In a defined contribution pension plan, employer and employee contributions are made throughout the employee's tenure with the firm and employees choose among investment options for the contributions. In 2013, only one state, Alaska, offered teachers only a defined contribution plan.⁴ In the remaining five states, public school teachers had a choice of participating in a defined benefit plan, defined contribution plan or some combination thereof.

² Many districts had marriage bars that banned married women from working. For more information, see Goldin (1991a, 1991b and 2006).

³ In contrast to the pensions systems available to most policemen and firefighters at the time, which were operated by municipalities, most teachers participated in statewide pension plans.

⁴ Even in Alaska the defined contribution plan is new, meaning that teachers in the cohorts relevant for this study participate in the preexisting defined benefit plan.

Therefore, an overwhelming majority of public school teachers in the U.S. participate in some form of defined benefit pension program. It is important to note that the current widespread use of defined benefit pensions is unique to employers in the public sector. In 2006, 65 percent of older workers in the public sector participated in some form of defined benefit plan, while only 39 percent of private sector workers did (Gustman et al. 2010). Moreover, while only 22 percent of private sector workers participate only in a defined benefit plan, the same is true of 57 percent of public sector workers.⁵

Although relatively few people in the private sector have access to a defined benefit pension, nearly all private sector workers are covered by Social Security, which is itself a type of defined benefit pension. Teachers in many states also participate in Social Security, although that was not always the case. Starting in 1954, the Social Security Act was amended to allow state and local government employees who were members of a public retirement system to participate in the Social Security program. Since then, state employees have been able to gain membership in Social Security by majority vote of the employees. In 35 states, such votes were passed and all teachers participate in Social Security; in another 3 states teachers some districts participate in Social Security. Estimates suggest that between 61 and 73 percent of teachers participate in Social Security (Doherty et al. 2012).

The Structure of Teacher Pensions

Why might the type of pension plan influence labor supply at older ages? One notable characteristic of defined benefit pension plans is clearly defined rules governing eligibility for

⁵ The shift towards defined contribution plans in the private sector began in the 1980s. Potential causes include the introduction of 401(k) defined contribution plans, a shift in private sector employment away from heavily unionized industries, and the increased funding requirements for private sector pension plans.

benefit collection and benefit size. In addition to plan rules being clearly delineated, the rules are often structured such that past a certain point an employee's return to continued employment is negative. These rules often lead to large discrete changes in the returns to retiring at a particular age or year of tenure. This is in stark contrast to defined contribution pensions where an employee can begin collecting benefits at almost any time and the present value of the pension wealth increases steadily with contributions (and oscillates only with market fluctuations).⁶ Due to the lack of large eligibility-rule-induced discrete changes in the present value of defined contribution pension accounts at specific ages or year of tenure, there is no clear incentive for those with this type of pension to retire at a particular age or level of experience.

However, even U.S. employees without defined benefit pensions from their employer still participate Social Security. The earliest age of retirement in Social Security is 62 and full retirement age ranges from 65 to 67 depending on year of birth. As with any defined benefit pension system, Social Security eligibility ages are influential in the decision making of older Americans. About 40 percent of Social Security recipients begin collecting benefits at age 62 and another 10 percent begin collection at the full retirement age.⁷ At issue is how these age-specific retirement incentives in Social Security compare with those in the defined benefit pensions provided to public school teachers.

Rules regarding eligibility for defined benefit pension collection for teachers are based on age, years of service within the public school retirement system, or some combination thereof. For example, in California, teachers who have vested in the system can retire at age 55. Teachers

⁶ In 401k plans there is a 10 percent increase in present value of pension wealth when a worker hits age 55 and retires, at which point she avoids the early withdrawal penalty. If the worker retires before 55 or converts the 401k into an IRA, she must wait until age 59.5 to avoid the early withdrawal penalty.

⁷ Based on my calculations using data on claiming from the Social Security Administration.

in the New York State pension system may retire with 35 years of service regardless of their age.⁸ Still many other states use the combination of age and years of service. For example, in the Texas Teachers' Retirement System, eligibility is determined by the rule of 80: any combination of age and years of service totaling at least eighty makes someone eligible to begin collecting retirement benefits as long as the employee is at least age 60.⁹

As illustrated in the examples of these three states, the eligibility rules in public sector defined benefit pensions tend to allow employees to retire much earlier than they become eligible for Social Security. Figure 3 presents the earliest age at which a continuously-employed teacher who started working at age 22 becomes eligible for an unreduced retirement benefit, known as the normal retirement benefit. The figure shows that the age of retirement eligibility for career teachers ranges from 47 to 67. The bulk of states (35) have retirement eligibility ages between 52 and 60. Recall that the first age at which Americans are eligible for normal benefit collection in Social Security is 65. In comparison, only 3 states systems have pension eligibility rules for career teachers that would preclude them from collecting their full pension benefits by age 65.

What makes the comparison more remarkable is that the information in Figure 3 is about teachers' eligibility for an unreduced retirement benefit, also called a normal retirement benefit. Teachers in many state pension systems can retire even earlier if they are willing to accept a reduction in their annual benefit.¹⁰ The size of the reduction is based on how early the worker

⁸ Tier I members (those that started before 1973) of the New York State Teachers' Retirement System can begin collecting benefits with 35 years of service at any age. They can also collect benefits at age 55 with at least five years of service. The rules have changed over time and teachers entering New York state public schools since 2010 are eligible to receive benefits at age 55 with 10 years of service. (<https://www.nystrs.org/Benefits/Service-Retirement>, Accessed August 12, 2015)

⁹ If she entered the Texas Teacher Retirement System for the first time after 2014, the member must have at least 80 years of combined age and experience and be at least 62.

¹⁰ For example, if a teacher in Texas satisfies the rule of 80 requirement, but is not yet 60 years of age, she can retire, but her benefit will be reduced by five percent for each year she is younger than age 60. In other words, the

claims benefits. This is known as an early retirement option or early retirement benefit. Almost all state pensions systems (46) have an early retirement option for teachers. This option is similar to the early retirement option in Social Security, where benefit collection can start at age 62 with a reduction in the size of the benefit. I do not know of any source that has carefully cataloged the early retirement ages in teacher pension systems. However, since only 11 states have full retirement ages that are higher than the early retirement age in Social Security, it is safe to say that the vast majority of teachers can collect early retirement benefits at a younger age than Social Security participants.

In addition to eligibility rules that allow earlier retirement in teaching than other occupations, there is another dimension of defined benefit pensions that encourages retirement at relatively young ages. Typically, there is a maximum allowed benefit. For example, in Illinois, the maximum benefit payable to a retiree is 75 percent of her final average salary, which is similar in size to the maximum benefit in other states. The annual benefit amount in a defined benefit plan is generally determined by years of service and some measure of final average salary. To be specific, the annual annuity, B , is defined by the formula:

$$B = F \times \text{Years of Service} \times \text{Final Average Salary}$$

where F is known as the benefit factor. Benefit factors for these cohorts are generally around 2 percent or more per year of service. Given these benefit factors, career teachers often reach the maximum benefit point within 30 to 35 years of service, or in their mid-fifties to early-sixties. After reaching the maximum benefit point, the return to continued work decreases precipitously because benefits no longer accrue at two percent per year.

Texas teacher who started teaching at age 22 and worked continuously is eligible for a normal retirement benefit at age 60. She can retire at age 51 (with 29 years of service) with a benefit that is just 55 percent of what her normal benefit would have been, at 52 with a benefit 60 percent as large, and so on.

The combination of these eligibility and benefit rules lead to changes in accrued pension wealth that lead to very clear incentives to retire at certain points. The present value of benefits increases sharply when a worker becomes eligible for early retirement. This makes early retirement eligibility a popular time for teacher retirement. Pension wealth then continues increasing at a relatively fast rate (as compared to earlier in one's career) until the teacher hits the normal retirement age. At this point, the present value of pension wealth may still increase with time on the job, but it will do so more slowly than it did between early and normal retirement eligibility. Eventually, when the employee hits the point where she will receive the maximum benefit, her pension wealth accrual with an additional year of employment actually begins *decreasing*. This is because, despite the increase in the salary used to calculate benefits, by continuing employment she forgoes some of the benefit payments entitled to her if she retired.

The large effect of these rules on teacher retirement behavior has been well-documented in the literature. For example, Harris and Adams (2007) calculated that nationally, in 2005, 54 percent of the teachers first reaching early retirement eligibility took that option. Another three-quarters of teachers who reach normal retirement age began collecting benefits at that point. Therefore, nearly 90 percent of career teachers have retired by the normal retirement age in teaching, which, as I described, is at an earlier age in most states than the early retirement age in Social Security. Other researchers show that pension eligibility leads to similar increases in retirement using state administrative data (Brown 2013; Mahler 2014; Koedel et al, 2014). For example, in Missouri, the median retirement age is 57 (Koedel et al. 2014).

Finally, in addition to pensions, there is one other notable piece of retirement-related compensation available for former public school teachers (and other public sector workers) that is not as widely available for workers in the private sector: retiree health insurance. As of 2009,

every state offered some form of retiree health insurance to its government employees, including teachers (Clark and Morrill 2010). These state-sponsored retiree health insurance programs provide subsidized health insurance to teachers collecting benefits from the state pension system. Therefore, these employees have access to health insurance with no employment requirement at younger ages than most people can receive it from the federal government (generally at age 65, through Medicare). Research has shown that the offer of retiree health insurance leads public school teachers to retire earlier than they would have otherwise (Fitzpatrick 2014).

Evidence from the Health and Retirement Study

The existing literature, therefore, clearly illustrates that teachers leave their main jobs as public school teachers when they reach retirement eligibility. While informative, this does not give us a complete understanding of the labor supply of female teachers, or of how it compares to other college-educated women. This is, in part, because teachers can continue to work even after collecting retirement benefits from their pension system. Most existing research on teacher retirement uses administrative data from teacher pension systems. Although such data offer large sample sizes, they do not include information on labor supply outside of a particular teachers' retirement system. Continued work unobserved in administrative data could include teaching for another school system or employment in another occupation or sector entirely.

I turn to the Health and Retirement Study to create a more comprehensive picture of the older-age labor supply of female teachers as compared to other college-educated women. The Health and Retirement Study is a nationally representative survey of American households with individual over the age of 50. The survey began in 1992 with a group of respondents aged 51 to 61 and continued interviewing them every two years. Since then, samples of older Americans

have been added such that the study now represents all Americans 51 and older. For this study, I limit the sample to women who report having obtained a Bachelor's degree.

I include information on women born between 1931 and 1950, whom I can observe at almost all ages between 60 and 64. Because of the relatively small sample sizes, I present information for the following groups of cohorts: 1931 to 1935, 1936 to 1940, 1941 to 1945 and 1946 to 1950. The most recent wave of the HRS was conducted in 2014, so age 60 to 64 outcomes for the last cohort group (the 1946 to 1950 cohorts) are incomplete. In discussing comparisons below, I detail where this data limitation may be important for interpretation.

HRS respondents are asked a series of questions about their occupations at different points in time. These questions vary across waves of the survey. The most consistent way to identify teachers across waves of the survey is to categorize anyone who responds to any of the occupation questions as a teacher. More precisely, I compare outcomes for college-educated women who were teachers at any point in their lives to other college-educated women. Note that this includes both public and private school teachers; I use this definition because many teachers who spent time as private school teachers were also once public school teachers. Because there are relatively few private school teachers, I cannot examine them separately and the results are unchanged if they are omitted.

There are important differences in training and professionalization between teaching and many other occupations, even those in which other college-educated women are employed. Therefore, I also present comparisons between college-educated women who were teachers and other college-educated women in the same general occupation category, managerial and professional specialization occupations.

Just as in the CPS, the HRS data show evidence of a shift in the occupations of college-educated women (Figure 4). While over 45 percent of college-educated women born between 1931 and 1940 were employed as teachers at some point in their work-lives, just 31 percent of those born between 1946 to 1950 report ever being employed as teachers.¹¹ Over this twenty-year span of birth cohorts, there was a 30 percent decline in the fraction of college-educated women who spent time employed as teachers.

Over these cohorts, teachers do not experience the same increases in labor force participation at older ages that other college-educated women do, particularly other women in the same category of managerial and professional specialization occupations (Figure 5).¹² Employment of teachers increased from 53 to 59 for the 1931 to 1935 and the 1946 to 1950 cohorts, respectively, an increase of 6 percentage points. This is only slightly over half the increase in employment of other college-educated women in these cohorts, which was 11 percentage points. The employment rate of other college-educated women in managerial and professional specialty occupations increased by nearly 20 percentage points between the same cohorts. Therefore, the increase in employment of teachers was only 30 percent as large as the increase for other college-educated women in these similarly professionalized occupations. Clearly, the difference in occupational choices between these cohorts is related to the longer work-lives of more recent cohorts of college-educated women.

¹¹ The HRS asks information about occupation and pensions for the jobs about which it collects information. This includes jobs held at the time of each survey, the last job held and as well as up to three previous jobs if they were held for at least 5 years.

¹² The censoring of data in 2014 means the set of women in the 1946 to 1950 cohorts is on average younger than the set of women in the earlier cohorts. This likely makes the employment rates for these cohorts slightly higher than they should be. 90 percent of career teachers retire when they reach pension eligibility milestones, which occur in one's late 50s and early 60s. There is no similar decline in employment of women when they reach Social Security eligibility. Therefore, the censoring of the data is likely leading me to underestimate the differences in employment growth across teachers and other college-educated women.

Although teachers were just as likely to be working between the ages of 60 and 64 as other college-educated women in the early cohorts, this was no longer the case for women born between 1946 and 1950 (Figure 5). Instead, teachers in the more recent cohorts are about 10 percent (6 percentage points) less likely to be employed at ages 60 to 64 than the rest of their college-educated peers. The difference in employment rates is even starker when compared to other women in managerial and professional specialization occupations. Over three quarters (77 percent) of college-educated women born between 1946 and 1950 who worked in broader managerial and professional specialization occupations were employed at ages 60 to 64. In other words, college-educated women in occupations similar to teaching have a 30 percent (18 percentage points) higher employment rate than teachers. Relatedly, the retired fraction of women in professional service occupations has gone down by 11 percentage points (over 30 percent), but the fraction of former teachers who say they are retired has increased by about 2 percentage points (Figure 6).

The pattern of differences in pension and Social Security benefit collection across teachers and other college-educated women are slightly different than the differences in labor supply. As can be seen in Panel A of Figure 7, the fraction of teachers collecting pension benefits between ages 60 and 64 hovered around 40 percent for those born between 1931 and 1945. Teacher Social Security benefit collection also remained steady over these cohorts (around 25 percent). Over the same cohorts of other college-educated women, Social Security benefit collection remains stable, but pension benefit collection falls by 5 percentage points (approximately 25 percent).

For both teachers and other college-educated women, there is a precipitous decline in pension benefit collection among the 1946 to 1950 cohorts. This is a distinct break from pattern,

particularly for the teachers. Likely, the censoring of the data for these cohorts drives the drop. Only two of these cohorts (1946 and 1947) are observed at all of the ages from 60 to 64. The other cohorts are only observed at the youngest ages in the 60 to 64 range, meaning the set of workers observed in the HRS in these cohorts is younger, on average, than the set of workers observed from other cohorts. Since defined benefit pension collection, particularly among teachers, occurs in the late 50s and early 60s, the censoring causes the pension benefit collection rates among these workers to be lower than if we were able to observe these cohorts at all ages from 60 to 64.

To determine whether the censoring is likely to be driving the drop in pension benefits, in Panel B, I present pension and Social Security benefit collection for the same cohorts, but at ages 55 to 59. This is possible because by observing people at earlier ages I avoid the problem with censoring. Other than an uptick in pension benefit collection for the 1941 to 1945 cohorts, the benefit collection of teachers in their late 50s is steady across these cohorts.¹³ Therefore, the pension collections of teachers in the 1946 to 1950 cohorts in their late 50s is similar to that of earlier cohorts of teachers in their late 50s. This provides evidence that the censoring of the data for the 1946 to 1950 cohorts when in their mid-sixties drives the lower pension receipt seen in Panel A of Figure 7. If we extrapolate from their behavior at earlier ages, we would expect their fully-realized pension receipt between ages 60 and 64 to be near 40 percent and similar to that of earlier cohorts of teachers.

¹³ Why is there an uptick among the 1941 to 1945 cohorts? Those cohorts reached their late 50s in the late 1990s, which was a period of increased pension generosity and pension buyouts that enabled teachers to retire earlier than they would have otherwise. We can also see the influence of the buyouts and other benefit generosity changes of the late 1990s in the slight increase in retirement of teachers ages 60 to 64 from the 1936 to 1940 cohorts.

Notice that, unlike with teachers, the benefit collection of other college-educated women in their late-fifties decreases for the 1946 to 1950 cohorts relative to earlier cohorts (Figure 7, Panel B). It is therefore likely that the decreased benefit collection in their early-sixties among the college-educated women of 1946 to 1950 cohorts who were not teachers seen in Panel A is driven partly by a true change in underlying labor supply and partly by the censoring of the data. That the dip in pension benefit collection reflects a broader change in labor supply is supported by the evidence that the likelihood of pension receipt among college-educated women in their early-sixties was declining even among the earlier cohorts.

Concurrent Employment and Pension Collection

To this point, I have shown that teachers have different patterns of labor supply and retirement at older ages than their similarly educated and professionalized counterparts. Namely, while the patterns of older teachers' employment and retirement did not change much for the cohorts between 1931 and 1950, other older college-educated women saw significant increases in the propensity to be employed and decreases in the likelihood of being retired. Retirement and employment are not binary; people may continue to work even once they consider themselves retired or begin collecting pension benefits. This may be particularly true for teachers who begin collecting benefits from a state pension system, but are not precluded from working for other employers.

In Figure 8, I examine whether there were shifts in concurrent employment and pension benefit collection among 60- to 64-year-old teachers and other college-educated women born between 1931 and 1950. In the figure, the solid lines plot the rates of employment for women who were collecting pension or Social Security benefits in their early sixties. There is little change across cohorts in the rate of employment for these "retired" older women regardless of

their occupation. Rather, the increases in labor supply documented in Figure 5 are driven almost entirely by women who are not collecting pension or Social Security benefits.

Teachers or Public Sector Workers?

While many women are employed as teachers, teachers are not the only employees with employer-provided defined benefit pension that incentivize early retirement. The most obvious group of other employees with defined benefit pensions are other public sector workers. The labor supply of college-educated women ages 60 to 64 who worked in the public sector has increased by 5 percentage points across the cohorts born between 1931 to 1935 and 1946 to 1950 (Figure 9). As such, the labor supply of government workers more closely mirrors that of teachers, rather than that of other college-educated workers who were not teachers. This makes sense since both groups have disproportionate access to defined benefit pensions relative to college-educated women in other occupations.

It is worth noting that the relative number of government employees who are not teachers has changed little over these cohorts. Government employees make up about 30 percent of college-educated women throughout the 1931 to 1950 cohorts. As such, on its own, the behavior of college-educated women in non-teaching jobs can offer little explanation for the changing retirement patterns of older college-educated women in the U.S.

Evidence from a State-Level Analysis

To further support the connection between the declining prominence of teaching among college-educated women and women's later retirement, I now turn to state-level analyses using the Current Population Survey from 1970 to 2010. I look for an association between the fraction of college-educated women employed as teachers between age 46 and 50 and the employment rate of those women when they are ages 60 to 64 for a given cohort and state. I conduct the

analyses separately for states where teachers do and do not participate in Social Security. Teachers participating in Social Security may be less likely to retire in their early sixties than those whose only pension wealth comes from an employer-provided defined benefit pension with an earlier eligibility age.

First, I find support for the hypothesis that teachers have more access to employer-provided pensions (columns 1 and 3 of Table 1). Indeed, when more women are teachers, more college-educated women have employer provided pensions. In fact, a ten percentage point increase in the fraction of a cohort that is employed in teaching is related to a three percentage point increase in the fraction of a cohort that has an employer provided pension at the same ages. The effect is similar in states where teachers do and do not participate in Social Security.

In the second column of Table 1, the results suggest that, in states where teachers participate in Social Security, the propensity of college-educated women who are teachers at ages 46 to 50 is not related to the probability of these women being employed between the ages of 60 and 64. In states where teachers do not participate in Social Security, however, there is a negative and statistically significant relationship between the fraction of college-educated women employed as teachers at ages 46 to 50 and the employment of 60 to 64 year old college-educated women (column 4, Table 1). This suggests that the incentives inherent in teachers' defined benefit pensions may lead them to retire earlier when they do not also have access to Social Security.

Conclusion

To summarize, teachers have different patterns of retirement and labor supply at older ages than their similarly educated and professionalized counterparts. Namely, recent cohorts of teachers are less likely to be employed and more likely to be retired between the ages of 60 and

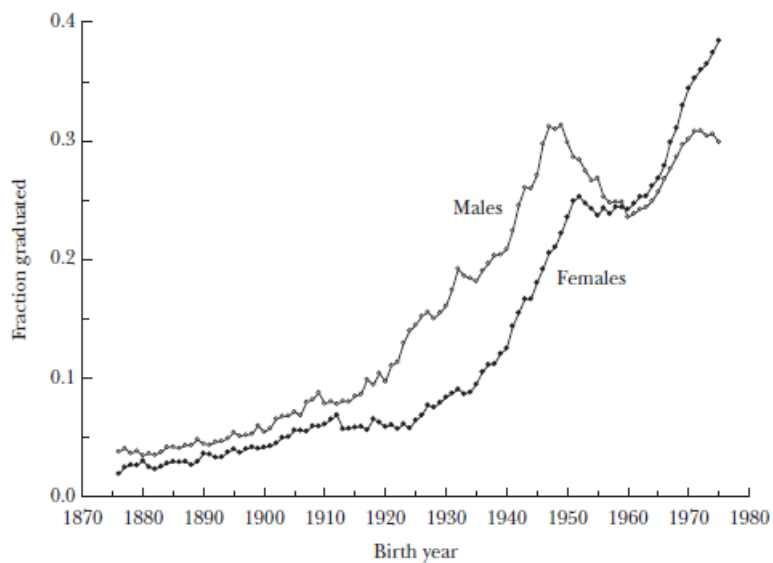
64 than recent cohorts of similarly educated and professionalized women. A likely reason for these differences is that teachers have access to traditional defined benefit pensions, while women working in the private sector do not. As shown, these defined benefit pensions allow for, and even incentivize, retirement at earlier ages than Social Security. Support for this hypothesis stems from similar patterns of employment between ages 60 and 64 among teachers and other government workers, who also have access to defined benefit pensions.

This difference in pension access across occupations is also likely a primary driver of changes in the patterns of labor supply among older, college-educated women. Specifically, while the patterns of older teachers' employment and retirement did not change much for the cohorts between 1931 and 1950, other older college-educated women saw significant increases in the propensity to be employed and decreases in the likelihood of being retired. There was a large decrease in the use of defined benefit pensions in the private sector over the course of recent decades. Similarly, there was a large decline in the propensity of college-educated women to work as teachers, meaning more and more older college-educated women were employed in the private sector. The combination of these two shifts seems to have played a significant role in the recent increase in labor supply of older college-educated women.

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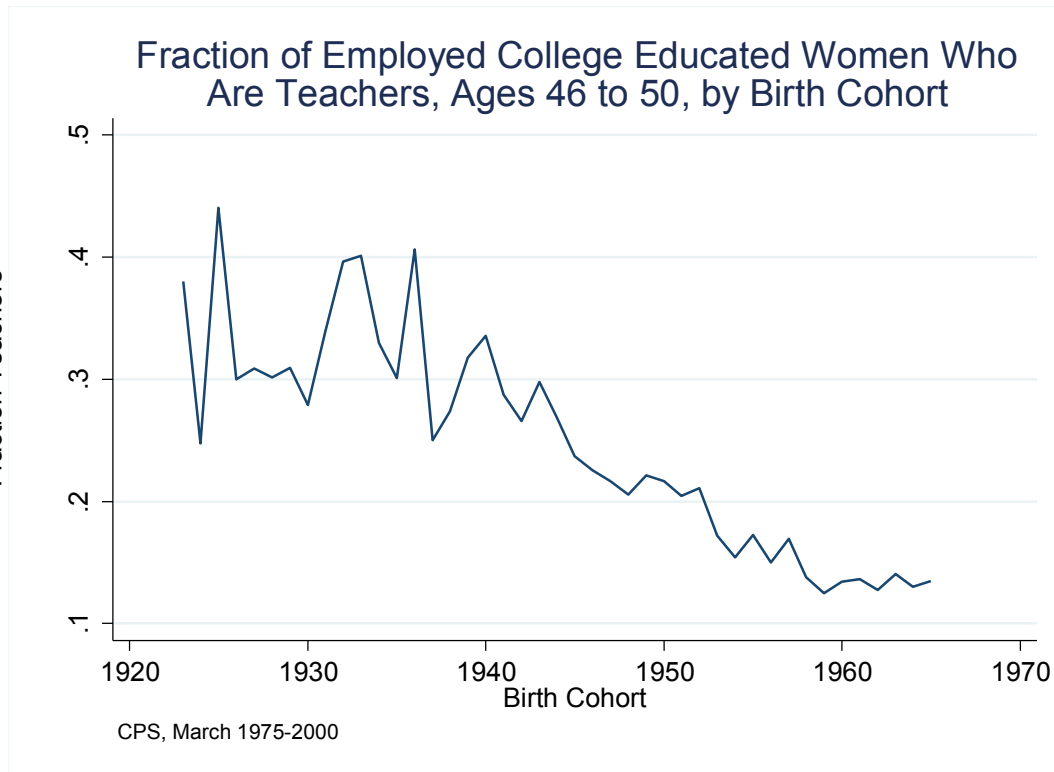
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Figure 1. College Graduation Rates (by 3) years for Men and Women: Cohorts Born from 1876 to 1975



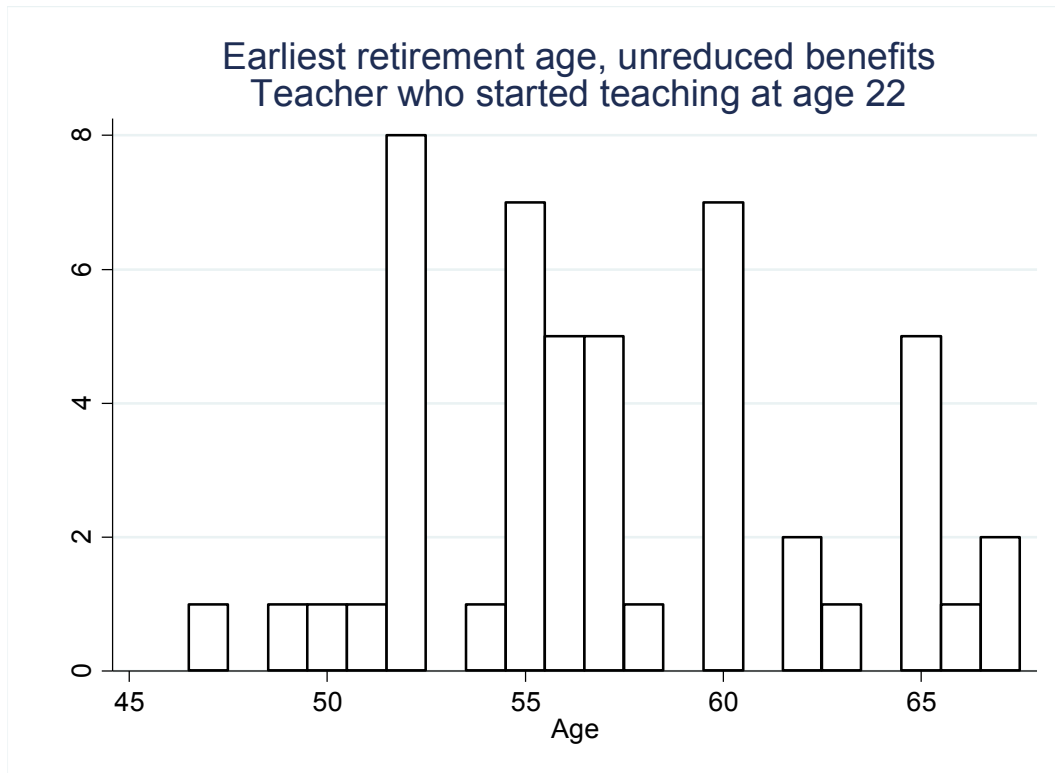
Source: Goldin, Katz and Kuziemko, 2006.

Figure 2. Occupations of Employed College-Educated Women, by Birth Cohort



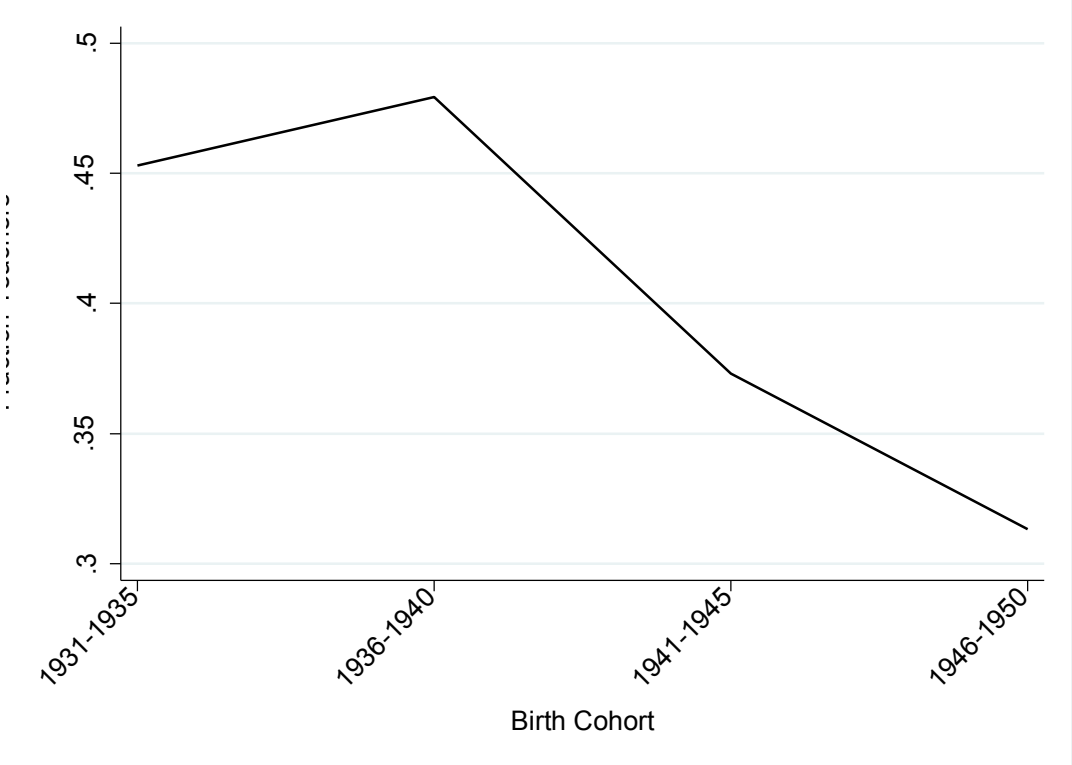
Note: Based on the author's calculations using the Current Population Survey, 1975 to 2000. Sample includes employed college-educated women ages 46 to 50.

Figure 3. Number of States with Each Normal Retirement Age for State Teacher Pensions Systems



Source: Dougherty et al. 2012. Includes the 49 states with defined benefit pension systems for teachers in 2011.

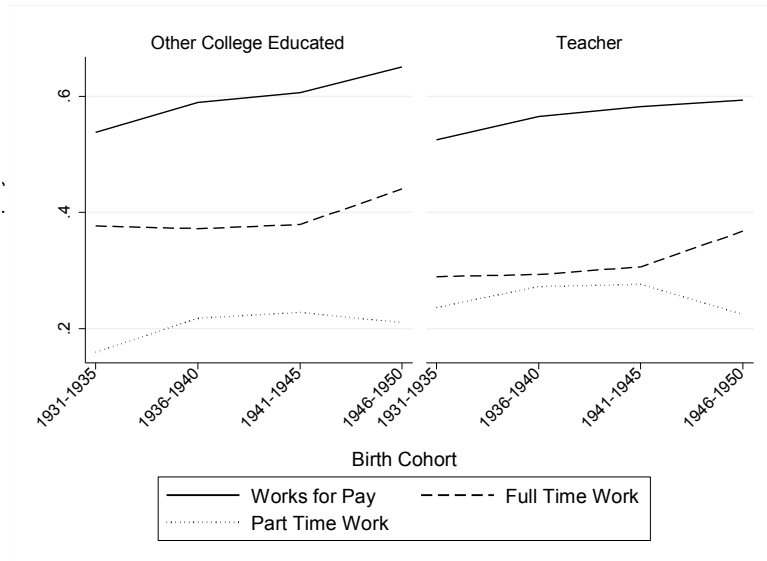
Figure 4. Fraction of College-Educated Women Ages 60 to 64 in the Health and Retirement Study Reporting Having Ever Been Employed As a Teacher, by Birth Cohort



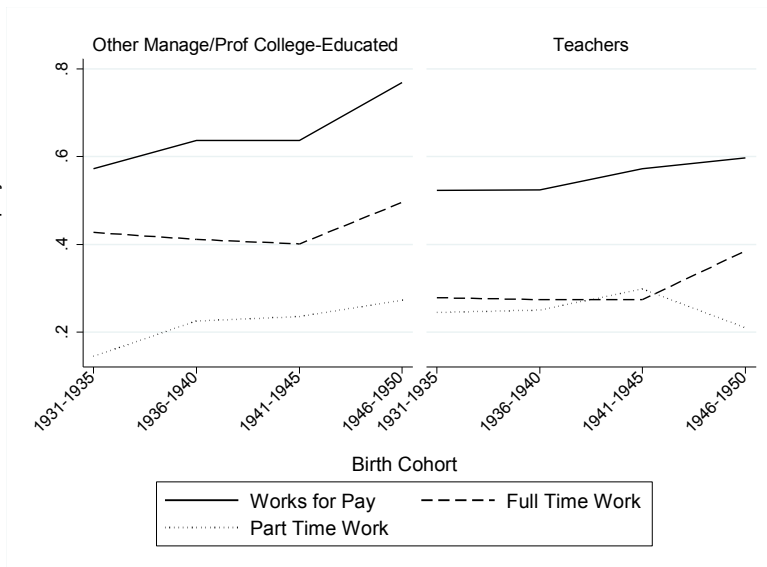
Note: Based on the author’s calculations using the Health and Retirement Study. Respondents were asked the type of work done at each job about which they were surveyed (current, last and previous). A woman is classified as a teacher if the occupation recorded was teaching for any of these jobs. The sample includes all college-educated women between the ages of 60 and 64.

Figure 5. Fraction of College-educated Women Ages 60 to 64 Employed, by Occupation and Birth Cohort

Panel A. Teachers versus other college-educated women



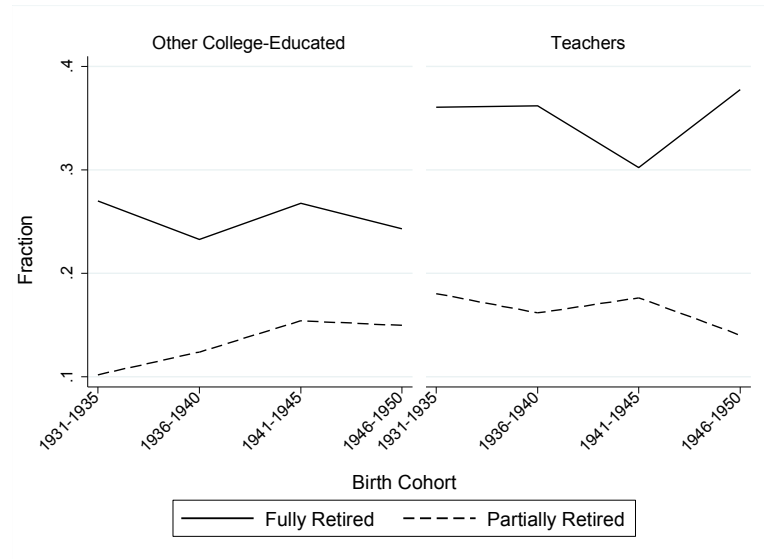
Panel B. Teachers versus other college-educated women in managerial and professional specialization occupations



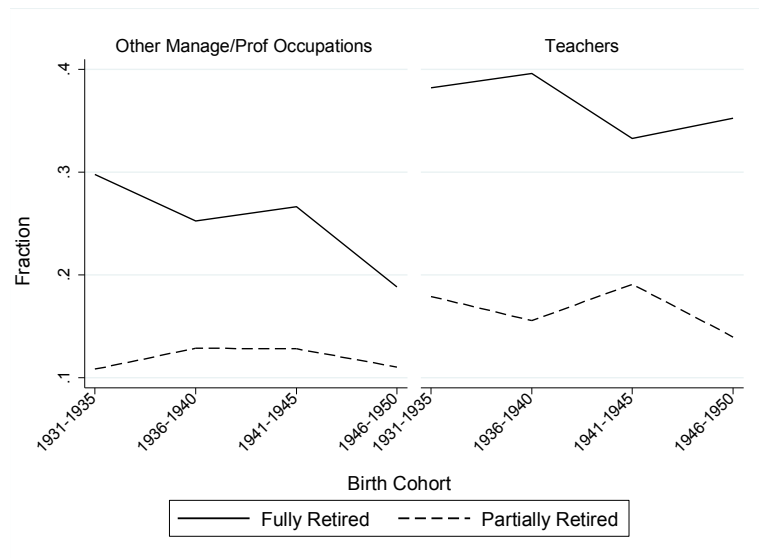
Note: Based on the author's calculation using the Health and Retirement Study. Respondents were asked the type of work done at each job about which they were surveyed (current, last and previous). A woman is classified as a teacher if the occupation recorded was teaching for any of these jobs. Women were classified into the managerial and professional specialty occupations using similar methodology. The sample includes all college-educated women between the ages of 60 and 64.

Figure 6. Fraction of College-educated Women Ages 60 to 64 Retired, by Occupation and Birth Cohort

Panel A. Teachers versus other college-educated women



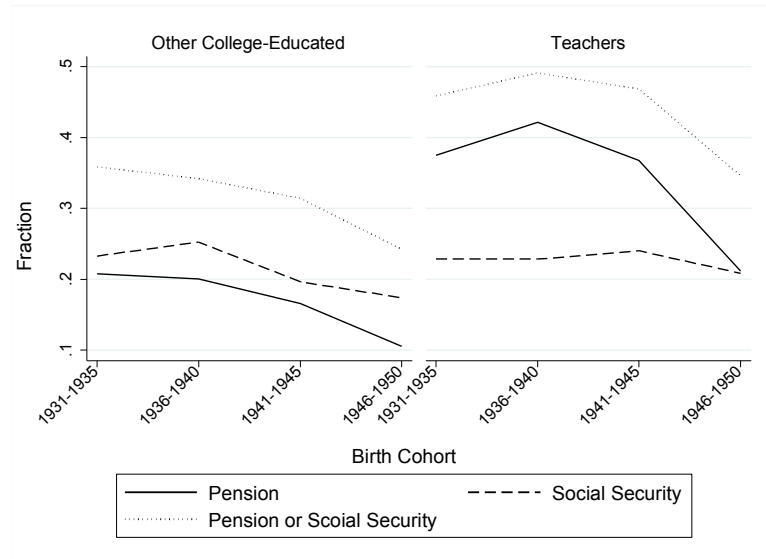
Panel B. Teachers versus other college-educated women in managerial and professional specialization occupations



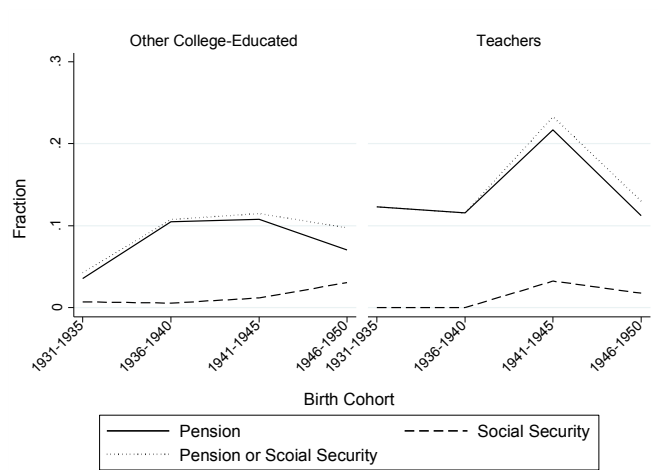
Note: Based on the author's calculation using the Health and Retirement Study. Respondents were asked the type of work done at each job about which they were surveyed (current, last and previous). A woman is classified as a teacher if the occupation recorded was teaching for any of these jobs. Women were classified into the managerial and professional specialty occupations using similar methodology. The sample includes all college-educated women between the ages of 60 and 64.

Figure 7. Fraction of College-educated Women Collecting Employer Pensions and Social Security Benefits, by Occupation, Age and Birth Cohort

Panel A. Teachers versus other college-educated women, Ages 60 to 64



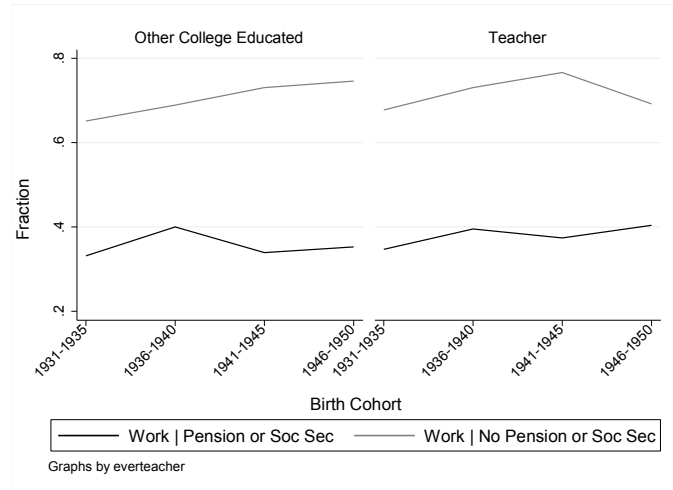
Panel B. Teachers versus other college-educated women, Ages 55 to 59



Note: Based on the author's calculation using the Health and Retirement Study. Respondents were asked the type of work done at each job about which they were surveyed (current, last and previous). A woman is classified as a teacher if the occupation recorded was teaching for any of these jobs. Women were classified into the managerial and professional specialty occupations using similar methodology. The sample includes all college-educated women between the ages of 55 and 64. Pension and Social Security benefit collection is determined by whether a respondent reports any income from an employer-provided pension or Social Security, respectively.

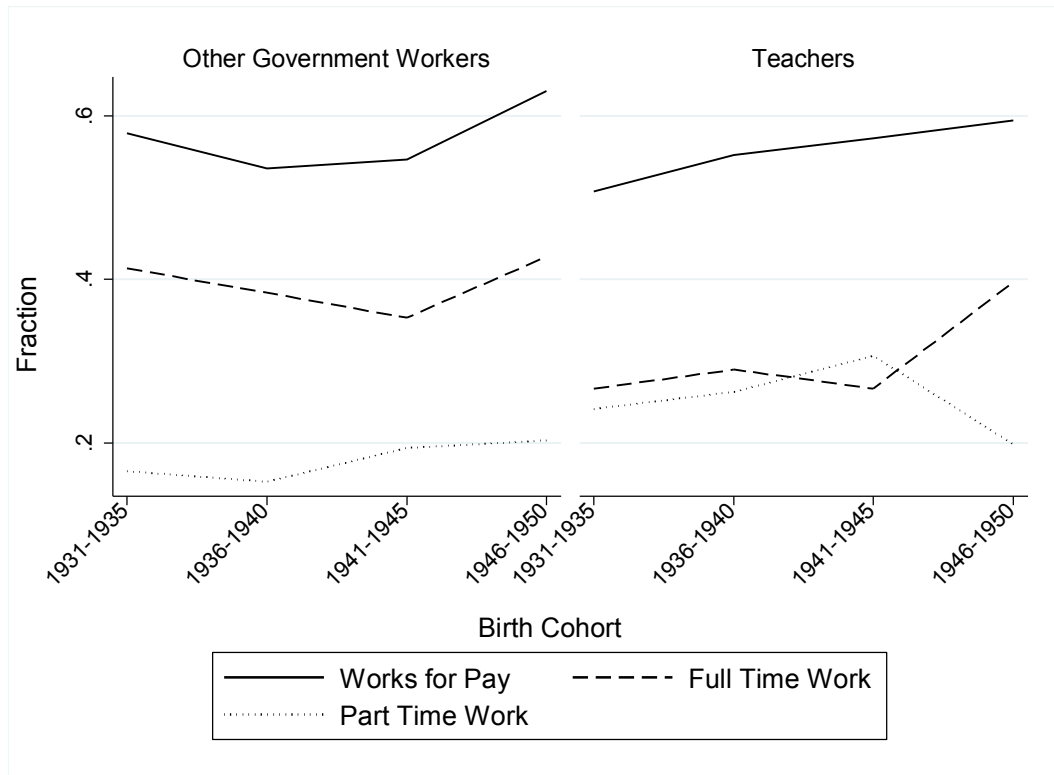
Figure 8. Fraction of College-educated Women Working While Collecting Employer Pensions and Social Security Benefits, by Occupation, Age and Birth Cohort

Panel A. Teachers versus other college-educated women, Ages 60 to 64



Note: Based on the author's calculation using the Health and Retirement Study. Respondents were asked the type of work done at each job about which they were surveyed (current, last and previous). A woman is classified as a teacher if the occupation recorded was teaching for any of these jobs. Women were classified into the managerial and professional specialty occupations using similar methodology. The sample includes all college-educated women between the ages of 60 and 64. Pension and Social Security benefit collection is determined by whether a respondent reports any income from an employer-provided pension or Social Security, respectively.

Figure 9. Fraction of College-educated Women Ages 60 to 64 Employed, by Occupation and Birth Cohort



Note: Based on the author's calculation using the Health and Retirement Study. Respondents were asked the type of work done at each job about which they were surveyed (current, last and previous). A woman is classified as a teacher if the occupation recorded was teaching for any of these jobs. Women were classified into the managerial and professional specialty occupations using similar methodology. The sample includes all college-educated women between the ages of 60 and 64.

Table 1. State-Level Analyses of the Link Between the Fraction of a Cohort that is Employed as Teachers and the Fraction that Are Working Later in Life.

	(1)	(2)	(3)	(4)
	Pension on Job, Ages 46 to 50	Employed, Ages 60 to 64	Pension on Job, Ages 46 to 50	Employed, Ages 60 to 64
Fraction Teachers	0.287***	0.011	0.319***	-0.115**
	(0.036)	(0.030)	(0.052)	(0.051)
Sample	Only states where teachers participate in Social Security		Only states where teachers do not participate in Social Security	
Observations	647		280	

Note: Based on author's calculations using the Current Population Survey. Sample includes college-educated women born between 1931 and 1950. The data are at the state-cohort level. The dependent variables of interest are (i) whether employees between the ages of 46 and 50 have access to an employer provided pension and (ii) whether women between the ages of 60 and 64 are working. The independent variable of interest is the fraction of college-educated women in a state between the ages of 46 and 50 who are employed as teachers and state and cohort fixed effects are also included.