

Mandatory Retirement and Faculty Retirement Decisions

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Abstract

As a result of the 1986 Age Discrimination in Employment Act, colleges and universities were no longer allowed to impose mandatory retirement on faculty members at age 70 after 1994. This paper estimates the change in retirement rates of faculty before and after the ending of mandatory retirement using data from the University of North Carolina (UNC) system. The analysis reveals a sharp decline in the probability of faculty at UNC retiring at age 70 once the university was unable to impose forced retirement.

Federal legislation outlawing mandatory retirement significantly altered the human resource policies of many academic institutions. The Age Discrimination in Employment Act (ADEA) was passed in 1967 making discrimination against workers aged 40 to 65 illegal. At that time, employers could continue to impose mandatory retirement at age 65. In 1978, the ADEA was amended, making the use of mandatory retirement prior to age 70 illegal; however, institutions of higher education were allowed to continue to impose mandatory retirement at age 65 until 1982. In 1986, the ADEA was amended to prohibit mandatory retirement at any age for most occupations. Once again, colleges and universities were granted an exemption until 1994.¹

Ashenfelter and Card (2002) provide the only national study of the impact of ending mandatory retirement on faculty retirement rates. Using the Faculty Retirement Survey with access to TIAA-CREF pension information, they find that the abolition of mandatory retirement had no effect on faculty retirement rates for faculty under the age of 70. However, the retirement rates of 70- and 71-year-old faculty members were significantly reduced after the elimination of mandatory retirement. Their results are based on a sample of university faculty all of whom are participants in TIAA-CREF, a defined contribution pension plan. One method of evaluating and extending their findings is through case studies of specific institutions that may provide more detailed information on older faculty. This paper provides such a case study by examining data from the 15 tenure-granting institutions in the University of North Carolina (UNC) system. The UNC includes a broad variety of institutions of different sizes and missions. There are two research universities, two other doctoral-granting institutions, eight masters-granting institutions, and three baccalaureate institutions.²

Since 1971, newly-hired faculty employed in the UNC system have been able to choose between the state pension plan or one of several optional retirement plans (ORPs).³ The state

plan is a final-pay defined benefit plan⁴ while the ORPs are all defined contribution plans.⁵ Currently, faculty have the option of enrolling in one of four ORPs (TIAA-CREF, Lincoln National, Fidelity, and VALIC). Thus, while the sample we examine is not nationally representative of all institutions of higher education, it does provide information on a diverse group of faculty from all types of public universities and includes respondents who are covered by defined benefit pension plans as well as defined contribution plans.

The University of North Carolina Data

The data used in this analysis are based on the annual faculty censuses that each campus is required to submit to the General Administration of the UNC. These are the employment records for all faculty employed as of September of each academic year and are available for each year from 1984 to 2002.⁶ Information on each faculty member includes age, date of hire, rank, gender, race, tenure status, annual salary, and type of pension plan. The annual records can be linked across years so it is possible to determine whether an individual remains in his or her faculty position from one year to the next. Thus, data on retirement flows are available for each year from 1984 until 2001. The analysis is limited to tenured and tenure-track faculty.

The first column of Table 1 provides summary statistics for the sample of faculty used in this analysis. Since we are concerned with the implications of the ADEA amendments on the decision to retire, the sample is limited to faculty who are ages 58 and over in each sample year. Approximately 71 percent of faculty ages 58 and over are participants in the state defined benefit pension plan. The average pension wealth for the faculty participating in the state pension plan (in 1996 dollars) is \$326,080.⁷ Information on pension wealth is only available for faculty who are participants in the state pension plan. We did not have access to the account records from

any of the ORP providers to determine the size of pension accumulations for ORP participants. During the sample period, there were no significant changes in the state retirement plan nor where there any changes in the contribution rates to the ORP plans.

[Table 1]

Retirement Patterns

Mandatory retirement for faculty was eliminated in 1994 and the UNC maintained a policy of mandatory retirement until that time. However, individual faculty members were occasionally permitted to work beyond age 70.⁸ Retirement rates for faculty ages 58 to 72 are shown in Figure 1. The figure separates these age-specific retirement rates for the years before 1994 from those after 1994. For faculty under the age of 70, there appears to be little difference in the retirement rates before and after 1994, with the exception of a small drop in the spike occurring at age 65. However, there was a sharp decline in retirement at ages 70, 71, and 72. Prior to 1994, the retirement rate was 59 percent for faculty age 70, 67 percent for faculty age 71, and 100 percent for faculty age 72. After the policy of mandatory retirement was removed, 24 percent of faculty age 70, 19 percent of faculty age 71, and 17 percent of faculty age 72 retired.

[Figure 1]

As mentioned above, newly-hired faculty members were first given the choice between the state defined benefit pension plan and an optional retirement program (ORP) beginning in 1971. Prior to that date, all faculty were enrolled in the state plan. Thus, the majority of older faculty included in the years of this study are enrolled in the state defined benefit plan because many were hired prior to 1971.⁹ For faculty over the age of 69, the proportion who are participants in the state plan is even higher. For most of the years covered by this analysis, the

retirement rate at age 70 is generally lower for participants in the ORP than for participants in the state plan. This is likely due to differences in the retirement incentives that are inherent in these two types of plans.

Considerable research has been published describing the retirement incentives of defined benefit and defined contribution retirement plans (see, for example, Burkhauser (1979); Kotlikoff and Wise (1989); Quinn, Burkhauser and Myers (1990); and Samwick (1998). To the extent that participation in these plans increases lifetime wealth, older workers covered by retirement plans will tend to retire earlier compared to similar workers who have not participated in an employer-provided pension. All of the faculty in our sample participate in either the defined benefit state plan or an ORP. The accumulated wealth in these plans differs depending on the age at hiring, the rate of earnings growth, investment choices, and the actual investment experience of the participants' individual portfolios in the defined contribution plans.

In addition to wealth effects, defined benefit plans have large, age-specific retirement incentives at the early and normal retirement ages. Past research has shown that there are significant spikes in the retirement hazard rates at these ages. In addition, the present value of these benefits rises more slowly, and can actually decline, once the worker becomes eligible to start receiving benefits. In contrast, defined contribution plans are more age neutral in their retirement effects and the present value of the pension continues to rise with continued employment.

Most studies examining the effect of pensions on the age-specific retirement hazard rates have concentrated on retirement patterns as workers approach and then reach the ages for early and normal retirement as specified in their pension plan. This study is primarily concerned with changes in retirement for persons aged 70 and over, well beyond the typical pension retirement

ages. These longer workers, or survivors of the retirement hazards at earlier ages, have passed the ages where the large retirement incentives in the defined benefit plan occur. Prior to 1994, they may have been constrained from making optimal retirement incentives by being forced to retire too early. Our objective is to determine how the removal of the mandatory retirement constraint affected retirement behavior of all faculty and determine the differences in these effects for the individuals who were participants in the state plan and those in an ORP.

Logit Analysis of Retirement Behavior

Table 1 presents the results of a discrete-time logistic regression estimating age-specific retirement rates of UNC faculty.¹⁰ Column 2 provides the estimated coefficients using the entire sample of UNC faculty from 1984 to 2001. The estimates indicate that there was a substantial drop in the mean retirement rate at ages 70 and 71 after 1993. The mean retirement rate fell by approximately 33 percent for faculty age 70 and by over 40 percent for faculty age 71.¹¹ The estimates also indicate that females have significantly higher retirement hazards, while nonwhites are significantly less likely to retire. The two research institutions have lower retirement rates than do the other types of institutions in the UNC system. These differences in retirement rates may possibly arise due to alternative teaching loads or differences in working environments.

The specification in column 2 also includes a dichotomous variable for the respondent's type of pension plan. The coefficient on "state plan" is positive and significant implying that older UNC faculty who are participants in the state defined benefit plan have a higher retirement rate than those who are participants in one of the ORPs. This finding is consistent with past studies of retirement and the incentives imbedded in the two types of retirement plans (Clark,

Ghent, and Kreps, 2000). In general, the higher retirement rates illustrate the effect of the change in pension wealth from continued working for faculty in the two types of plans. For persons in the ORPs, pension wealth grows due to new contributions and the returns of previous contributions (assuming there are no withdrawals). In addition, the annuitized value of income that can be derived from the pension account rises as the number of years of remaining life decline. In contrast, pension wealth of state plan participants will tend to grow more slowly as gains in annual benefits from additional years of service and potentially higher earnings are offset by the reduced number of years of life remaining over which to receive benefits. Another aspect of these estimates is the rapid rise in equity prices during the post-1993 period. If participants in the ORPs anticipated a continuation of this trend, they had an incentive to delay retirement and the annuitization of their pension assets so that future retirement income would be much greater.

Logit Analysis of Retirement Behavior by Plan Type

To further examine the differing effects defined benefit and defined contribution plans on retirement behavior, the sample was divided by pension type and the discrete-time logistic regression model was estimated for each group separately. The results are shown in columns 3 and 4 of Table 1. Over 70 percent of the sample are participants in the state pension plan. The interesting result is that the drop in the average retirement rate at age 70 is smaller for faculty who are participants in one of the ORPs. In fact, the coefficient on the interaction between age 70 and the end of mandatory retirement is statistically significant only at the 10-percent level for ORP participants. These results indicate that a smaller fraction of the ORP participants who continued to work as they approached age 70 were constrained from reaching their desired

retirement age by mandatory retirement laws. On the other hand, state plan participants who continued employment despite the built-in incentives to retire once eligible were more affected by the presence of mandatory retirement. A likelihood-ratio test was used to test the null hypothesis that the logit equations are the same across the two types of pension. The test statistic, which is distributed chi-square with degrees of freedom equal to the number of restrictions imposed, is 106.62. Since this is much larger than the critical value at any conventional level of significance, the null hypothesis is rejected.

The last column of Table 1 shows the results from a discrete-time logistic estimation that includes measures for pension wealth and pension accrual.¹² Since we do not have detailed pension information on participants in ORPs, this estimation is limited to state plan participants only. As expected, pension wealth is positively related to retirement probabilities, while pension accrual is inversely related. These findings correspond to predictions based on economic theory and are consistent with the estimates of retirement probabilities in many previous studies. The inclusion of pension wealth in the estimation does not significantly alter the size of the implied change in the average retirement rate at ages 70 and 71 after the end of mandatory retirement.

Changes in Retirement Behavior over Time

When estimating the impact of any policy change, analysts must consider both the immediate response to the change in constraints as well as the long-term impact of the new conditions. Thus, the discrete-time logistic model described above was re-estimated with the inclusion of two separate time period interactions for faculty ages 70 and 71. Specifically, we compare the effects of the ADEA amendment for the first three years after the exemption for higher education expired (1994-96) with the effects for years 1997 to 2001. The results are

presented in Table 2. The first column of Table 2 reports the results for the full sample. The impact of the end of mandatory retirement on retirement rates at ages 70 and 71 is slightly larger in the later period (1997-2001) than in the period immediately following the change in law.¹³

However, we demonstrated earlier that it is appropriate to estimate these retirement hazard equations separately for faculty members in the state defined benefit plan and those in the defined contribution ORPs. These results are presented in the last two columns of Table 2. As shown in column 3, the estimated drop in the retirement rate of age 70 faculty participating in the defined benefit plan was over 37 percent for the years 1994 to 1996, but increased to over 41 percent for 1997 to 2001. For 71-year-old state plan participants, the drop in retirement is smaller for the 1994-1996 period (just over 35 percent), but rises dramatically to over 44 percent for the later years of our sample period. Because there were no ORP participants age 71 before 1994, our analysis of the effects of the end of mandatory retirement is limited to ORP participants at age 70. The drop in the retirement rate at age 70 for these faculty is actually slightly smaller in the later period (1997-2001).

These results indicate that the impact of the ADEA amendments may be felt for some time at the UNC. Faculty participants who are ages 70 and over now appear to have no greater likelihood of retirement than those several years younger, and this change in retirement behavior does not seem to be temporary.

Conclusions

Ashenfelter and Card (2002) provide an important contribution to the retirement literature and their analysis reveals significant new evidence of the changes in the academic labor market associated with the ending of mandatory retirement. They demonstrate that there was a

significant decline in retirement rates at ages 70 and 71 after universities were forced to terminate their mandatory retirement policies. However, they acknowledge that their analysis contained two limitations: the data were limited to faculty participating in defined contribution pensions and their analysis was only able to follow faculty for a few years after mandatory retirement was eliminated.

This paper provides a case study to extend the work by Ashenfelter and Card. Faculty members at UNC institutions are offered a choice between a state defined benefit pension plan and one of several defined contribution ORPs. Additionally, data from the UNC are available through 2001 (seven years beyond the elimination of mandatory retirement). Our baseline estimates for North Carolina are similar to their national findings. Retirement rates for 70- and 71-year old faculty were significantly reduced after the ending of mandatory retirement, while retirement rates at other ages were not visibly affected. This drop in retirement rates was greater for those faculty participating in the state defined benefit pension than for those in a defined contribution ORP. In addition, the decline in the retirement rates of faculty ages 70 and 71 continued throughout the seven-year period following the end of mandatory retirement.

These results may have important implications for the UNC in terms of costs, quality, and hiring. In general, more experienced faculty members cost more than younger, inexperienced faculty. Any delay in retirements also likely means a decline in the ability of the system to hire new faculty, which may in turn alter the education and research quality of its institutions. Therefore, it is important for the UNC (and other institutions of higher education) to examine trends in faculty retirement in order to adjust human resource policies in order to achieve the optimal mix of faculty.

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Notes

¹ Hammond and Morgan (1991) and Rees and Smith (1991) provide careful reviews of these changes and their expected impact on faculty retirement patterns.

² The division of the UNC institutions is based on the widely used Carnegie classifications. The Carnegie Foundation for the Advancement of Teaching distinguishes between doctoral-granting institutions based on their level of research activity. Details can be found at <http://www.carnegiefoundation.org>.

³ In addition to their participation in a employer provided pension plan, faculty at UNC institutions are covered by Social Security. Retired faculty are also covered by the same health insurance program as active faculty.

⁴ The retirement benefit in the state plan is determined by multiplying the number of years of service times the average salary during the high four years of earnings times 1.82 percent. Unreduced benefits are available at age 65, at age 62 with 20 years of service, or at any age with 30 years of service. The state defined benefit plan also has a mandatory employee contribution of 6.0 percent of salary.

⁵ The ORPs are funded by annual contributions of 6.84 percent of salary by the university and 6.0 percent of salary by the faculty member.

⁶ The year indicated is the academic year. For example, “1984” corresponds to the academic year beginning in fall of 1983 and ending in spring of 1984.

⁷ Pension wealth for faculty in the state retirement plan is calculated using their actual annual earnings, the benefit formula described above, a national life table, and a 3 percent real interest rate.

⁸ No faculty member worked beyond age 72.

⁹ In fact, almost 90 percent of faculty ages 58 to 72 were state plan participants in 1984. This proportion has steadily declined over time, falling to just under 50 percent by 2001.

¹⁰ Ashenfelter and Card (2002) demonstrate that restricting the retirement rates to be the same before and after the elimination of mandatory retirement for all ages except 70 and 71 is easily accepted. Given their results and the retirement rates shown in Figure 1, we adopt the same specification. Each of the models includes a full set of unrestricted age dummies.

¹¹ The results are consistent with those found by Ashenfelter and Card (2002).

¹² To estimate these values, we calculate the present value of pension wealth for each year for those faculty who are in the state retirement plan. Pension accrual is the change in the present value of pension wealth resulting from working one additional year.

¹³ Of course other changes were occurring in the academic labor market during this period, most notably changes in Social Security including the increase in the normal retirement age and the elimination of the earnings test for those between the normal retirement age and age 70. However, these changes would have had their greatest impact on faculty younger than 70. As seen above, our results (and those of Ashenfelter and Card) indicate that retirements rates for faculty between ages 58 and 69 remained basically unchanged.

Table 1
Sample Means and Hazard Estimates for Discrete-Time Logit Model of Retirement: Effect of Ban on Mandatory Retirement, University of North Carolina, 1984-2001^a

Variable	(1) Sample Means	(2) Full Sample	Pension Plan		
			(3) ORP	(4) State Plan	(5) State Plan
Age 70 × After 1993	0.0088	-1.44*** (0.26)	-1.30* (0.70)	-1.48*** (0.29)	-1.56*** (0.29)
Age 71 × After 1993	0.0050	-2.02*** (0.60)	---- ^b	-2.24*** (0.62)	-2.31*** (0.62)
Doctoral	0.0897	0.54*** (0.08)	0.75*** (0.16)	0.46*** (0.10)	0.54*** (0.10)
Masters	0.4299	0.47*** (0.06)	0.59*** (0.13)	0.44*** (0.07)	0.58*** (0.07)
Baccalaureate	0.0470	0.46*** (0.12)	0.53 (0.35)	0.41*** (0.13)	0.61*** (0.13)
Female	0.1842	0.31*** (0.06)	0.42*** (0.13)	0.29*** (0.07)	0.36*** (0.07)
Nonwhite	0.1705	-0.48*** (0.07)	-0.71*** (0.20)	-0.44*** (0.08)	-0.45*** (0.08)
Log Salary	11.0911	-0.11*** (0.05)	-0.06 (0.09)	-0.14** (0.06)	-0.29*** (0.06)
State Plan	0.7055	0.52*** (0.06)	----	----	----
Log Pension Wealth	12.6949	----	----	----	0.19*** (0.03)
Pension Accrual / 1000	1.7106	----	----	----	-0.01*** (0.00)
Sample Size (N)	24,350^c	24,350	7,169	17,187	17,187

<i>Implied Change in Mean Retirement Rate after the End of Mandatory Retirement (percent):</i>					
At Age 70	----	-32.8 (6.6)	-24.4 (9.1)	-33.5 (5.9)	-31.0 (5.8)
At Age 71	----	-44.3 (6.4)	---- ^b	-47.4 (5.4)	-42.8 (5.2)

* $\alpha < 0.10$, ** $\alpha < 0.05$, *** $\alpha < 0.01$

^a Standard errors are in parentheses. Models are fit to retirement probabilities for ages 58-72 in 1984-2001. All models include unrestricted age dummies.

^b The interaction between Age 71 and After 1993 was dropped due to collinearity. All faculty age 71 before 1993 were participants in the state pension plan.

^c The sample for the two pension variables is limited to those covered by the state pension plan. Thus, the sample size for pension wealth and pension accrual is 17,187.

Table 2
Hazard Estimates for Discrete-Time Logit Model of Retirement: Short-Term and Long-Term Effects of Ban on Mandatory Retirement, University of North Carolina, 1984-2001^a

Variable	(1) Full Sample	Pension Plan	
		(2) ORP	(3) State Plan
Age 70 × 1994-1996	-1.66*** (0.35)	-1.49* (0.81)	-1.68*** (0.40)
Age 71 × 1994-1996	-1.69*** (0.64)	---- ^b	-1.59*** (0.69)
Age 70 × 1997-2001	-1.79*** (0.30)	-1.31** (0.67)	-1.94*** (0.34)
Age 71 × 1997-2001	-1.74*** (0.53)	---- ^b	-2.26*** (0.60)
Doctoral	0.54*** (0.08)	0.72*** (0.16)	0.46*** (0.10)
Masters	0.47*** (0.06)	0.57*** (0.13)	0.43*** (0.07)
Baccalaureate	0.46*** (0.12)	0.52 (0.35)	0.42*** (0.13)
Female	0.31*** (0.06)	0.41*** (0.13)	0.29*** (0.07)
Nonwhite	-0.49*** (0.07)	-0.71*** (0.20)	0.45*** (0.08)
Log Salary	-0.12*** (0.05)	-0.06 (0.09)	-0.15** (0.06)
State Plan	0.52*** (0.06)	----	----
Sample Size (N)	24,350	7,169	17,187

<i>Implied Change in Mean Retirement Rate after the End of Mandatory Retirement (percent):</i>			
At Age 70 1994-1996	-36.7 (6.6)	-26.2 (8.7)	-37.3 (5.7)
At Age 71 1994-1996	-36.1 (6.1)	---- ^b	-35.3 (5.3)
At Age 70 1997-2001	-38.7 (6.4)	-24.1 (8.5)	-41.2 (5.6)
At Age 71 1997-2001	-36.8 (6.0)	---- ^b	-44.1 (4.9)

* $\alpha < 0.10$, ** $\alpha < 0.05$, *** $\alpha < 0.01$

^a Standard errors are in parentheses. Models are fit to retirement probabilities for ages 58-72 in 1984-2001. All models include unrestricted age dummies.

^b The interaction between Age 71 and After 1993 was dropped due to collinearity. All faculty age 71 before 1993 were participants in the state pension plan.

**Figure 1 – Retirement Rates by Age Before and After the Elimination of Mandatory Retirement,
University of North Carolina: 1984-2001**

