THE ELIMINATION OF MANDATORY RETIREMENT: IMPLICATIONS FOR THE ACADEMIC LABOR MARKET

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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. These results from North Carolina are compared to the findings of a national study by Ashenfelter and Card.

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 this 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. 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 examing 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 doctoral-granting institutions, eight masters-granting institutions, and three baccalaureate institutions. Since 1971, faculty employed in the UNC system have been able to choose between the state pension plan or

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[1] National Research Council (1991) and Rees and Smith (1991) provide careful reviews of these changes and their expected impact on faculty retirement patterns.

one of several optional retirement plans (ORPs).[2] The state plan is a final-pay defined benefit

plan[3] while the ORPs are all defined contribution plans.[4] 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.[5] 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.

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[2] 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.

[3] 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.

[4] 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. The state defined benefit plan also has a mandatory employee contribution of 6.0 percent of salary.

[5] 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.

Column 1, Table 1 provides summary statistics for the sample of faculty used in this analysis. Since we are concerned with the implications for retirement, 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 $326,065.[6] Information on pension wealth is only available for older 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.

[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. Retirement rates for faculty ages 58 to 72 are shown in Figure 1. The figure separates these age specific retirement rates before 1994 with those after 1994. For faculty under the age of 70, there appears to be little difference in the retirement rates before and after 1994. 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]

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[6] Pension wealth for faculty in 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.

As mentioned above, 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, most of the older faculty over the

years of this study are enrolled in the state defined benefit plan because many were hired prior to

that time.[7] For faculty over the age of 69, the proportion who are participants in the state plan is

even higher. There are no faculty at age 70 who are ORP participants in 1986, 1987, 1989, and

1991. As expected, the retirement rates at age 70 fall after 1994 and remain lower through the

sample period. However, the retirement rate at age 70 is generally lower across all years 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.

<p style="text-align:center">Logit Analysis of Retirement Behavior</p>

Table 1 presents the results of a logistic regression analysis to estimate age specific

retirement rates of UNC faculty.[8] Column 2 provides the estimated coefficients using the entire

sample of UNC faculty from 1984 to 2001. There was a substantial drop in the mean retirement

rate at ages 70 and 71 after 1994. The mean retirement rate fell by approximately 33 percent for

faculty age 70 and by over 40 percent for faculty age 71.[9] Our estimates also indicate that

females have significantly higher retirement hazards, while nonwhites are significantly less

likely to retire. Doctoral, masters-granting, and baccalaureate institutions all have higher

retirement rates than the two research institutions in the UNC system. The specification in

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[7] 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.
[8] Ashenfelter and Card 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 2, we adopt the same specification.
Each of the models includes a full set of unrestricted age dummies.

column 2 also includes a dummy 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.

Logit Analysis of Retirement Behavior by Plan Type

To examine further, the difference in retirement behavior, the sample was divided by pension type and the logistic regression model was estimated for each group separately. The results are shown in columns 3 and 4. 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. 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 logistic regression that includes measures for pension wealth and pension accrual.[10] 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

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[9] The results are remarkably similar to those found by Ashenfelter and Card (2002).

consistent with the estimates of retirement probabilities in many previous studies. The inclusion of pension wealth in the estimation does not alter the size of the implied change in the average retirement rate at ages 70 and 71 after the end of mandatory retirement.

UNC and National Estimates

As noted earlier, the primary analysis of the effect on the academic labor of the elimination of mandatory retirement is Ashenfelter and Card (2002). They acknowledge two potentially important limitations of their study. First, their sample analysis is limited to individuals who were participating in defined contribution pension plans from a single provider, TIAA-CREF. Thus, their analysis ignored the large number of faculty who are participants in state-sponsored defined benefit plans in many public universities.[11] Given that these two types of pensions offer different retirement incentives[12], analysis of the impact of the ADEA amendments on faculty retirement behavior is incomplete and possibly misleading if faculty enrolled in defined benefit plans are excluded from the analysis.[13]

The results presented in the previous section showed that the retirement behavior of participants in the two types of pension plans are significantly different and that the change in behavior in the post mandatory retirement period was greater for UNC faculty enrolled in the state pension plan. The implication of these results is that the estimates of Ashenfelter and Card

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

[11] A 2000 survey by the American Association of University Professors (AAUP) indicated that more than half of the public universities and colleges surveyed offered faculty a choice between a defined benefit and a defined contribution pension plan.

[12] The incentives inherent in most defined benefit pension plans are clearly illustrated in Kotlikoff and Wise (1989) and Quinn, Burkhauser, and Myers (1990).

[13] A study by Clark, Ghent, and Kreps (2001) estimates age-specific retirement probabilities for faculty at Duke University, UNC-Chapel Hill, and North Carolina State University. In this

based solely on participants in defined contribution plans are likely to underestimate the actual decline in retirement rates among all faculty 70 and over.

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. This issue concerned Ashenfelter and Card who were able to examine retirement responses in only three academic years after mandatory retirement was eliminated. Thus, it is difficult to determine from their analysis if the drop in retirement rates at ages 70 and 71 were only temporary or if they would continue over time. Our data for the UNC faculty proceeds through 2001, so we are able to examine eight academic years after the end of mandatory retirement.

The logistic regressions described above were reestimated with the inclusion of two separate time period interactions for faculty ages 70 and 71. The post-mandatory retirement period is divided into two subsamples: the time frame analyzed by Ashenfelter and Card (1994-1996) and the extended years of data available in our sample (1997-2001). The results are presented in Table 2. The first column of Table 2 shows the coefficients from an estimation that has the same right side variables as the results in column 2 of Table 1 with the exception of the interactions between the age 70 and age 71 effects with the post-mandatory retirement period. 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).[14]

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analysis, participants in the state defined benefit plan are found to have significantly higher retirement probabilities than comparable individuals in one of the defined contribution plans.

[14] 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 70. However, these changes would have had their greatest impact on faculty younger than 70. As seen above,

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. Thus, the separate results for participants in each of the two pension plans are presented in the last two columns of Table 2. The majority of UNC faculty are participants in the state plan. As shown in column 3, the estimated drop in the retirement rate of age 70 faculty was over 37 percent for the years 1994 to 1996, but increased to over 40 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 is again smaller for ORP participants than for state plan participants. Additionally, the drop in retirement is slightly smaller in the later period (1997-2001) than in the period covered by the Ashenfelter and Card study (1994-1996). Thus, the limited time period employed by Ashenfelter and Card probably affected their estimates. The extended time period also strengthens the conclusion that not including faculty who participated in defined benefit plans affected their baseline findings.

Conclusions

Ashenfelter and Card provide an important contribution to the retirement literature and their analysis provided significant new evidence of the changes in the academic labor market associated with the ending of mandatory retirement. They demonstrated that there was a significant decline in retirement rates at ages 70 and 71 after universities were forced to

our results (and those of Ashenfelter and Card) indicated that retirements rates for faculty

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.

We employ data from the UNC system to extend the work by Ashenfelter and Card.

Faculty 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 (eight 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 by this law, while retirement rates at other ages

were not visibly affected.

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between 58 and 59 remained basically unchanged.

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Table 1
Sample Means and Paramater Estimates for Pooled Hazard Model of Retirement: Effect of Ban on Mandatory Retirement, University of North Carolina, 1984-2001[a]

Variable	(1) Sample Means	(2) Full Sample	(3) ORP Participants	(4) State Plan Participants	(5) State Plan Participants
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)	**24,360[c]**	**24,350**	**7,169**	**17,313**	**17,313**

Implied Change in Mean Retirement Rate after the End of Mandatory Retirement (percent):					
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)

[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 17,318.

Table 2
Parameter Estimates for Pooled Hazard 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	(2) ORP Participants	(3) State Plan Participants
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**	**17,313**

Implied Change in Mean Retirement Rate after the End of Mandatory Retirement (percent):			
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)

[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