Analysis Of Faculty Retirement Intention: Using A Proportional Odds Model

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Abstract

This paper uses data from a random national sample of faculty, age 50 and older, and explores factors affecting faculty member's retirement decisions for three expected retirement age categories. The variables such as end of mandatory retirement, age, current salary, expected others sources of income, early retirement incentives, and years of education have a significant effect on faculty retirement decisions. An understanding of these factors can help decision making for staffing purposes.

Introduction

The academic labor market has been changing dramatically in recent years, and it will continue to change in years to come. These changes have been occurring for many reasons. First, the end of mandatory retirement, the 1986 amendments to the Age Discrimination in Employment Act (ADEA), abolished mandatory retirement for tenured faculty members in Colleges and Universities after 1 January 1994. Mandatory retirement is no longer an integral part of the human resources planning in Colleges and Universities. This gave a new right to faculty members to stay on the job if they chose or, in most cases, to sell back the benefits to the institutions in exchange for earlier retirement. The second reason is the aging of faculty at Colleges and Universities; for example, between 1986 and 1996, percentage of faculty under 40 at the University of Wisconsin declined from 26 percent to 18 percent (Harrigan, 1997). Between 1988 and 1997, the percentage of faculty age 55 or older at Duke University,

the University of North Carolina, and North Carolina State University increased from 24 percent to 29 percent. The same trend is prevalent in the Colleges and Universities nationwide. This trend in aging is the result of an increase in the average age of newly hired faculty and a decrease in the retirement rate of existing faculty members (Clark and Hammond, 1999). The third reason is that higher education has been faced with financial constraints and public demand for more accountability and efficiency (Clark and Hammond, 1999). Fourth, the proportion of minorities, women, and foreign-born faculty members has been increasing and will continue to increase in the future (Clark and Hammond, 1999). Fifth, technological changes are altering the way the instructions are delivered. Confronted with these changes, officials and administrators of Colleges and Universities are concerned about human resource planning and other by-products of these changes. They are especially concerned about the end of mandatory retirement and aging faculty.

The end of mandatory retirement raised the following concerns. (1) The remaining senior

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professors who are on the job longer will hinder the ability of Colleges and Universities to hire newly trained and promising young faculty who are more adaptable to changing technology and ideas and better able to communicate with students and other constituencies. (2) Delayed retirement will reduce quality of instruction and research productivity of faculty. (3) Delayed retirement also may reduce the flexibility of Colleges and Universities in reassigning positions in emerging areas of interest and in responding to shifts in curriculum demand. (4) Delayed retirement also has adverse effects on the budgets of Colleges and Universities (Clark and Hammond, 1999; Milbank, 1997; Chronister and Reed, 1994; Morrel, 1993). To respond to these concerns, many Colleges and Universities have devised some incentive policies to make retirement more attractive for faculty. The incentive plans have many forms and include: buyouts, padded pensions, modified institutional contribution to pension plans, additional cash payments, phased retirement options, and eligibility for healthcare insurance after retirement. Some institutions have developed a vigorous post-tenure review of performance of their faculty. Others base salary increases on performance and merit, and some are proposing to replace academic tenure with a system of renewable contracts for shorter terms. Normally, incentives are made available to faculty who have worked for a given number of years with a specific institution and have reached a given age at which the extra benefits would be available (Clark and Hammond, 1999; Milbank, 1997; Chronister and Reed, 1994; Morrel, 1993; Lozier and Dooris, 1991). By passage of the Higher Education Amendments of 1998 which allow Colleges and Universities to offer retirement incentive programs with an upper age limit, use of these programs by higher educational institutions may further increase. Because most of the professors who were hired in the 1960's and early 1970's period of academic expansion are now approaching their retirement age, interest about these issues will intensify. Hence, further understanding of factors affecting faculty retirement decisions would help human resource plan-

ning in academia. This paper uses data from a random national sample of faculty aged 50 and older and explores the possible impacts of some financial, personal, and institutional factors on individual faculty member's retirement decisions.

Previous Research Findings

Ashenfelter and Card (1998) used employment records of thirty-seven institutions for the years 1986-1995 and estimated parameters affecting an individual's decision to retire. Their findings indicated that the elimination of mandatory retirement caused the fraction of faculty retiring at age 70 to decline, and this effect is more significant at research Universities. They also concluded that faculty with higher salaries are less likely to leave their jobs (Clark and Hammond, 1999). Dunkl (1997) studied the influence of selected factors on individual faculty retirement intentions at the University of Virginia and found that high salary, active involvement in research, receiving funding, and job satisfaction were significant factors in delaying faculty retirement. Conroy (1996) studied the early retirement incentive impacts on retirement decisions at Carleton University (Canada). She found that faculty who anticipate desirable benefits in satisfaction with the quality of life due to accepting an early retirement incentive are more inclined to express an interest in the program than those who perceive losses. Kim and Fledman (1997) used a logit model to predict acceptance of early retirement incentives by faculty in the University of California system and found that poor health, low current salary, higher pension benefits, and decline in productivity were significantly related to a faculty member's early retirement decision. Holden and Hansen (1989) used data from a survey of faculty and institutions and found that increasing mandatory retirement age from 65 to 70 would increase "the average age of retirement by slightly more than one year for tenured faculty at institutions that previously had a mandatory retirement age of sixty-five".

Previous studies show a variety of factors

affect faculty members' decision to retire. Findings of many studies are often inconsistent with one another and many were done before mandatory retirement was abolished. Most of these studies also used different variables and their samples often involved a specific region of the country. The present study uses a national random sample of all areas of specialization and attempts to incorporate the most important variables used in the previous studies, including abolishment of mandatory retirement. This study also uses a proportional odds model that is appropriate for estimating the probability of independent variables impacts on an ordered categorical dependent variable (for examples, see Morgan, 1992, and Stokes, Davis, and Koch, 1995).

Data

This paper uses data from a random national sample of faculty members age 50 and older. Questionnaires were mailed to about 3000 randomly selected university faculty throughout the United States in February 1998. A total of 558 usable returns were received. These 558 responses were divided into three categories, faculty members with expected age of retirement between 50 and 65 ($n=203$), at age 65 ($n=172$), and over age 65 ($n=183$). The survey targeted those faculty who were 50 years of age or older. The survey included faculty who were teaching in all areas of specialization and excluded those teaching in two-year community Colleges. The average expected age for retirement was about 65.07 years. The average age of respondents was about 60.5 and approximately 63 percent of respondents were over 60 years of age.

The Model

The simple work-leisure choice of labor

supply and labor participation, wherein an individual compares the wage-determined budget constraint with work-leisure preferences and decides whether or not to be a labor force participant, must be extended and embellished when applied to faculty retirement decisions. This study integrates the simple work-leisure choice model with life-cycle theory, which hypothesizes that people make work, consumption, and some other decisions simultaneously over many time periods. Their current decision for the future depends upon the values of relevant variables today and on current expectations of their values in the future. Hence, the model employed in the present study is:

$$ERA = f(FF, PF, IF)$$

where ERA is expected retirement age (before 65, at 65, after 65), FF are financial factors, PF are personal factors, and IF are institutional factors. The main financial factors FF included in this model are current salary, expected social security income, other incomes (e.g., spouse's income, pension income, and property income), and early retirement incentives. Personal factors PF used in this study are age, health status, health status of spouse, preferences for leisure (e.g., gardening, golfing, and spending time with family), rank, tenure status, years of education, years of experience in academia, and overall productivity. Institutional factors IF are working conditions (e.g., changing technology, work rules, and pressure to retire because of budget cuts), and the end of mandatory retirement. To estimate the parameters of independent variables and probability of their impacts on the expected retirement age of different categories, complex cumulative logit functions are modeled to perform ordered logistic regression using the proportional odds model.

The model when used to predict probability is of the form:

$$P(ERA < 65) = \frac{e^{\alpha_1 + \beta_1 X_1 + \dots + \beta_k X_k}}{1 + e^{\alpha_1 + \beta_1 X_1 + \dots + \beta_k X_k}} \text{ and } P(ERA \leq 65) = \frac{e^{\alpha_2 + \beta_1 X_1 + \dots + \beta_k X_k}}{1 + e^{\alpha_1 + \beta_1 X_1 + \dots + \beta_k X_k}}, \alpha_1 \leq \alpha_2,$$

where $X_1, \dots, X_k$ are the independent predictors of the probability of retirement "before age 65" or "at and before age 65". Note that $P(ERA > 65) = 1 - P(ERA \leq 65)$ and $P(ERA = 65) = 1 - P(ERA < 65) - P(ERA > 65)$, so that each probability of retirement category can be found from the proportional odds model.

These independent predictors come from the financial factors, personal factors, and institutional factors that may affect retirement age. The use of this model will serve two purposes. The model will incorporate only independent variables that are statistically significant in the determination of the probability of retirement age category and will thus convey which of the independent variables are important in predicting early retirement. The coefficients to the independent variables tell whether the odds of early retirement are increased or decreased (as indicated by the sign of the coefficient). The coefficient will also determine the size of the percent of increase or decrease in the odds of early retirement for a one-unit increase in the independent variable.

Analysis of Maximum Likelihood Estimates

The proportional odds model has a concordance equal to 81 percent, meaning that 81 percent of the faculty responding to the survey are being correctly classified into the correct retirement age category. This high level of concordance indicates that the proportional odds model fits the data very well and is appropriate for this analysis. The proportional odds model estimates the parameters of the independent variables using maximum likelihood methodology. It is important to note that the proportional odds model used in this study discriminates all the factors that are significant in all three categories (i.e., faculty with expected age of retirement between 50 to 65, at 65, and over 65). The estimated coefficient of the variable for the 1986 Amendments to Age Discrimination in Employment Act (ADEA), which ended the mandatory retirement age for college faculty, is highly significant and positive. This demonstrates that the elimination of mandatory retirement age has increased the likelihood of late retirement of some faculty members. This likelihood doubled according to the model when looking at the odds ratio column of Table 1. The coefficient of the age variable (AG) is significant at the 0.01 level and negative, implying a decrease in the probability of early retirement as the faculty member ages. In

fact, the odds ratio of 0.321 for the age variable means an increase of one year in a faculty member's age will reduce the probability of retirement before age 65 to about one-third of the previous year. The longer a faculty member remains on campus, the less likely the faculty member will retire early. In general, a positive parameter estimate in Table 1 means the independent variable is causing an increase in the probability of early retirement while a negative parameter estimate will indicate a decrease in the probability of early retirement. Three of the current salary variables (CS₁, CS₄ and CS₅) are significant and indicate that the higher the current salary, the greater the probability that a faculty member will stay on the job. This is consistent with the previous studies as indicated in the literature review section. One of the variables for expected other income (EOI₂) is significant at 0.05 level, implying that other source of income available for a faculty will increase the likelihood of his/her retirement. The coefficient of the early retirement incentives variable (ERI) is highly significant and shows that these incentives greatly increase the chances of retirement. Only one of the expected social security income variables (ESSI₂, \$12,000-\$15,999 range) is significant, showing that, compared with the reference group (SSI of less than \$12,000), higher social security income decreases the chance of retirement. The variable for the preference for leisure (PL) is highly significant and negative, showing that desire for more personal interests (e.g., fishing, traveling, etc) decreases the probability of delaying retirement. The teaching effectiveness variable (TE) is significant at 0.01 level and indicates that if faculty members believe they are effective teachers, they are more likely to delay their retirement. Faculty members working in public institutions (TI) are more likely to retire earlier than their counterpart at private institutions. Finally, the coefficient of the variable for years of education for those faculty members with doctorate degree (YE₂) is significant at 0.01 level, indicating that faculty members with a doctorate degree are inclined to retire later than those without a doctorate degree. These faculty

Table 1
Proportional Odds Model Analysis on ERA.

Variable	Parameters Estimate	Standard Error	Wald Chi-Square	Odds Ratio
Intercept 1	-2.0928	0.5012	17.4349 ^a	
Intercept 2	-0.1543	0.4923	0.0982	
ADEA	0.7347	0.0725	102.8336 ^a	2.085
Age	-1.1376	0.1922	35.0438 ^a	0.321
CS ₁	0.4815	0.2385	4.0752 ^b	0.775
CS ₄	0.1869	0.0788	5.6225 ^b	2.131
CS ₅	0.1548	0.0505	9.3771 ^a	0.770
EOI2	-0.281	0.1272	4.8802 ^b	1.572
ERI	-0.2612	0.0605	18.6564 ^a	1.259
ESSI ₂	0.4523	0.1187	14.5317 ^a	0.563
PL	-0.2544	0.0717	12.5945 ^a	1.167
TE	0.2306	0.065	12.5932 ^a	1.206
TI	-0.5737	0.2155	7.0879 ^b	0.755
YE ₂	0.7566	0.2391	10.0114 ^a	1.618

^a statistically significant at the 0.01 level

^b statistically significant at the 0.05 level

Note: A stepwise procedure is used to select all significant variables and drop all independent variables that had no statistically significant effect on the probability of ERA category.

members have a greater investment in human capital that requires a longer stay on the job for an adequate return on their investment.

Conclusion and Discussion

This study shows that twelve factors affect the retirement decisions of faculty age 50 and older regardless of their expected age of retirement. An understanding of these factors and the direction of their effects on faculty retirement decisions provide an insight for administrators and policymakers in their human resources planning and decision-making. Although the variable for the uncapping of mandatory retirement is highly significant and according to the odds ratio causes the probability of late retirement to double, it is unlikely to induce a very large number of faculty members to postpone their retirement. Retirement to a large extent is a personal decision and each faculty member is affected with a different set of factors. On the other hand, the elimination of mandatory retirement may induce some ineffective faculty members to stay on the job beyond the age of 70, and this may hinder some institutions to do their job ef-

fectively and efficiently. In this study, about 20 percent of respondents reported their expected age of retirement at age 70 and about 7 percent reported over 70 years of age.

If compensations of older faculty, who are less productive, could be reduced to reflect their productivity decline, delaying retirement may not cause problems. However, workplace culture and age discrimination legislation make such an option difficult to implement. Higher education officials need to devise some fair policies to induce these faculty members to retire. Annual performance evaluation, capping the salary of those who continuously perform unsatisfactorily, and a meaningful post-tenure evaluation combined with a system of a well-designed merit raise may encourage some faculty to retire.

Because financial factors such as current salary, other sources of income, and early retirement incentives have significant effects on the likelihood of retirement decisions, financial incentive programs could induce some faculty members not to delay their retirement. Retire-

ment incentives with some kind of phased-retirement option or partial retirement could also influence retirement decisions. Partial retirement options may help faculty members to remain productive and allow them the flexibility to pursue other interests. For instance, since preference for leisure is a significant factor in retirement decisions, partial retirement options allow faculty members to spend more time with their family and engage in other activities such as golfing, gardening, and consulting. These options also provide opportunities to faculty members to maintain segments of their job descriptions that they are more interested in and better able to perform (e.g., teaching or research). This may also reduce some financial burdens of the institutions and other concerns in higher education. Partial retirement options, such as a 50-percent appointment or greater that makes faculty members eligible for employment benefits or a special arrangement that provides full employment benefits to faculty members, are more appropriate strategies and may induce more faculty to choose the options. It is also important to design the early retirement incentives options in a way to avoid encouraging the most productive people to take advantage of them and move to other employment. This and other studies show that expected retirement age differs between private and public institutions, and some of the factors affecting retirement decisions are different for faculty members depending on the characteristics of institutions. Hence, each university must devise and introduce the kind of policies appropriate to its own unique situation. Although some of the significant variables in the model are not controllable, an understanding of these variables provides insight for higher education officials. These officials will know their limitations and the types of policy initiatives that are effective.

Suggestions for Future Research

Because the baby boomer generation is reaching retirement age, faculty retirement and retirement in general is becoming an important area of research in the future. Some suggestions for future research are to examine the impact of changing instructional delivery mode due to technological changes on retirement decisions and the conse-

quences that the retirement of baby boomers will have on the labor force. Other topics worthy of future study include determining what social accommodations are needed to improve the quality of life for retirees and what impacts defined benefit pension plans versus defined contribution pension plans will have on the decision to retire. □

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