PHASING INTO RETIREMENT

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In its simplest version, the life cycle theory of labor supply predicts that workers gradually cut back labor hours as the rewards from continued work decline and the time horizon over which retirement assets can be consumed shortens. This prediction is not consistent with actual hours profiles of many – if not most -- workers, a large proportion of whom shift instantaneously from a full-time, year-around schedule to zero hours. In the US economy, workers often must quit their current full-time job if they wish to reduce weekly hours of work by having a part-time work schedule.

Recently, firms have become more interested in retaining older workers. One reason is that the relative productivity of older workers has been rising, as indicated by the increase in wage differentials by experience.[1] Another is the overall shortage of skilled labor, combined with the demographic reality that baby boomers in their 40s and 50s are far more plentiful than workers in younger cohorts.

Some firms have begun to experiment with phased retirement plans that allow workers to start receiving pension benefits while they continue to work with reduced hours. A survey by Watson Wyatt (1999) found that 16 percent of a sample of nearly 600 employers had such programs, with 44 percent saying they expect such arrangements to become more common in their organizations over the next five years. When asked the primary reason why they adopted phased retirement plans, almost half (49 percent) said it was to retain skilled workers and 70 percent thought that programs like phased retirement would help companies manage the emerging labor shortage. In a similar survey, Mercer (2001) found that 23 percent of the companies in its sample had formal arrangements for phased retirement.[2]

Phased retirement plans raise issues from both a human resource strategy and public policy standpoint. Firms that are considering implementing such a system will find

[1] Katz and Autor (1999).

nothing more than a short list of case histories describing the characteristics of phased retirement plans at various organizations. How many workers will elect phased retirement? In the absence of a phased retirement program, would phased retirees have fully retired or remained on the job full-time? How will the introduction of phased retirement affect the productivity of the workforce? Policy issues arise because pension regulations limit the options available to employers in designing phased retirement programs. Before deciding whether regulations intended to increase retirement security now should be amended to encourage phased retirement, it would be useful to have some rigorous, empirical evidence on phased retirement programs.

This paper examines the experience of a single organization with phased retirement – tenured faculty in the University of North Carolina system. University faculty are by no means representative of the overall labor force; they are highly skilled and have self-selected into a career track with the prospect of lifetime job security. However, they face the same optimization problem of how to balance labor and leisure over the life cycle as every other worker. The tenure system does not generally allow for part-time work.

From the employer standpoint, there are some unique issues involving university faculty. With the lifting of the ban on mandatory retirement in 1994, university leaders are concerned that their faculty may end up with a higher percentage of older members than is optimal. Further, as professors born in the baby boom near retirement eligibility, the risk of having no openings for junior scholars has to be balanced against the risk that there will be more openings than can be staffed with qualified applicants – a situation already facing some disciplines.

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[2] France, Germany, and Sweden have introduced special provisions for partial retirement in their social security system; see Latulippe and Turner (2000) for details.

Our analysis focuses on two main issues. First, how many faculty members have selected phased retirement and what is the likely effect going to be on faculty retention? A key issue here is whether those selecting phased retirement are doing so instead of working full-time or instead of retiring fully. This will be examined by comparing retirement behavior before and after the introduction of phased retirement, using both summary statistics and probit analysis. Second, does the provision of phased retirement have any impact on faculty productivity? As implemented in the UNC system, phased retirement could be subject to an adverse selection problem by providing a higher level of part-time income on-campus than can be earned off-campus. Yet if phased retirement encourages those who have become disenchanted with academe to start making the transition to a bridge job or retirement at an earlier age, academic productivity would be enhanced.

I. THE ECONOMICS OF PHASED RETIREMENT

Barriers to smooth hours adjustment

Life-cycle models predict that workers prefer to gradually adjust hours worked downward as long as one of the following conditions holds – wages are falling or the value of free time is rising (because of declining health or fewer years of life expectancy). In the Health and Retirement Study, roughly three-fourths say they would rather reduce their work hours gradually than stop working altogether.[3] In practice, many if not most workers make an abrupt transition from full-time work to full-time retirement. Using the 1994 and 1996 waves of the HRS, Quinn (2000) found that two-thirds of those who had retired by 1996 had entered retirement straight from a full-time, career job. About 30 percent entered retirement from a bridge job, and roughly half of those bridge jobs were part-time.

Workers can shift to part-time work and receive a full pension by taking a bridge job with another employer, a phenomenon that has been examined by Ruhm (1990) and others. A big downside to bridge jobs is low pay and a loss of benefits such as health insurance. One would naturally expect lower pay in bridge jobs for two reasons: (1) many bridge jobs are part-time and (2) the change of employer entails a loss of specific human capital from the career job. The extent of the pay loss between career and bridge jobs is not yet well documented, but one indication of its magnitude comes from Quinn's estimates of the percentage of workers in low-paying jobs. Only 35 percent of those in career jobs were receiving $5 to $10 per hour, in contrast to 61 percent of those in bridge jobs.

Receiving a pension while continuing to work for one's current employer would clearly be preferable to a bridge job for many if not most older workers, but employers and workers face barriers in making such an arrangement. ERISA forbids payment of defined benefit pensions before normal retirement age unless there is a complete severance from employment with the plan sponsor. Firms could resolve this problem by lowering the normal retirement age, but they then run the risk of reducing employee retention and raising the costs of pension funding. There also are issues involving IRS nondiscrimination rules and the risk of age discrimination litigation.[4]

Continuing with one's employer on a part-time basis without any pension benefits is a viable option for companies with defined contribution plans. However, workers in defined benefit plans that link pensions directly to salary average in the last years of service will be hesitant to elect phased retirement. Working part-time would reduce the salary average and lead to a smaller pension upon retirement.

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[3] Watson Wyatt (1999), p. 6.

Value of phased retirement

Supposing that the above limitations to working part-time for one's career employer while receiving a pension could be overcome, some employees are likely to find phased retirement to be an attractive option. Wages from the career employer are likely to be higher than wages in bridge jobs for many employees. By staying with the career employer, workers can fully apply the specific capital that they already possess and have an incentive to continue to invest in additional specific capital. Additionally, employees avoid the search and negotiation costs associated with finding a new position.

Phased retirement provides employees with an opportunity to cope more effectively with uncertainty during retirement. Through a phased retirement program, they gain free time to collect information and make more informed decisions about their future after they permanently leave their career employer. For those in defined contribution plans, there also is the ability to convert recent capital gains into an annuity without having to stop working for the career employer altogether.

From a company standpoint, the decision to initiate a phased retirement plan must be evaluated just like any other decision involving new employee benefits. There must be a persuasive argument that phased retirement either (1) lowers unit costs or (2) creates enough value for employees that they are willing to pay for it through a compensating differential. Traditionally employers have been reluctant to allow full-time employees to shift to part-time schedules because of the increased cost of coordinating employee teams and the restrictions on time available to interact with customers and suppliers. Employers have an incentive to be more flexible in work scheduling as long

[4] These issues are discussed in Purcell (2000) and the report by the Working Group on Phased Retirement (2000).

as the present value of transactions costs of maintaining two part-time work schedules is less than the present value of the costs of hiring and training a new full-time worker.

Employers also can economize on adjustment costs. Under a formal program, employees announce their intention to leave the career employer 2 to 3 years in advance – much longer than the 3 to 6 months they usually give when they decide to retire or take a bridge job. The reduced uncertainty about when individuals will leave the organization facilitates succession planning and reduces the costs associated with layoffs, early retirement buyouts, or labor shortages.

Impact on labor-leisure choice

To understand how the introduction of a phased retirement plan affects labor supply, consider initially a simple one period labor-leisure choice model.[5] To focus on the key issues at hand, suppose that workers have three choices: (1) work full-time for H hours in a career job and earn income Y with zero pension income, (2) work half-time at another employer for 0.5H hours and earn Y' with full pension income P, and (3) retire from the career job and receive P. Let worker utility be represented by U=U(y, T-h), where y = income, T = time endowment, and h = labor hours. Workers compare U_1(Y, T-H) to U_2(Y'+P, T-0.5H) and U_3(P, T) and select the option that yields the maximum utility level.

The desirability of part-time work depends on how much labor income must be sacrificed to obtain a half-time hours reduction. For reasons stated above, for most workers we expect 0.5Y > Y'; that is, the half-time salary at another employer would be less than half of the full-time salary. The greater the income sacrifice needed to obtain a part-time work schedule (Y-Y'), the lower the odds of working part-time.

[5] For a more rigorous approach to the choice of full and part time work near retirement in a life cycle context, see Gustman and Steinmeier (1986).

The odds of selecting either part-time work or full-time retirement also are affected by the structure of a company's retirement program. An increase in the present value of the pension benefits earned by the worker will be associated with a greater likelihood of both full and phased retirement. Once a worker has accumulated the rights to a pension that meets or exceeds half of his regular salary, phased retirement at half-pay allows him to receive more income while working fewer hours. Retirement odds also are influenced by the rate at which the value of pension benefits accumulates over time. If a prospective retiree faces a sizable increase in pension income by staying with an organization a few years more, then the odds of separation are expected to be quite low. On the other hand, if pension benefits do not increase, or even decrease, with continued work, the odds of retirement should be quite high. Finally, we should expect workers to time their retirement decisions in accordance with spikes in retirement income that commonly take place at the age of eligibility for reduced or full benefits under Social Security or their private pension.

The phased retirement plan provided by the UNC system offers professors the option of working half-time for half the full-time academic salary. For many faculty this represents an increase in Y', the amount of income they can earn half-time. This would have the usual income and substitution effects in a framework where there is a continuous choice of hours. The higher part-time salary makes part-time work more attractive, but also creates an incentive to work a shorter part-time schedule. But in a single-period model with only three choices for work hours, the income effect vanishes and the impact is to unambiguously increase the odds of working part-time. The labor-leisure choice of faculty who can earn half or more of their regular academic salary by working half-time off campus would not be affected by the introduction of this type of phased retirement scheme.

If one expands the framework to life-cycle optimization, two additional issues arise. First, the greater payoff to part-time work in the later stages of one's career lowers the marginal utility of income and thus increases the demand for leisure in all stages of the life cycle. This partial effect would translate into earlier shifts to part-time work and full retirement. Combining this effect with the incentive to substitute part-time work for full-time work and full-time retirement noted previously, we can trace out the full effects of phased retirement over the life cycle. The odds of working part-time in the years preceding retirement unambiguously increase, whereas the timing of complete retirement might be delayed (because of the greater incentive to work part-time) or accelerated (because more income is generated for those who would have worked part-time anyway).

Second, one must be careful to distinguish between the adjustments that would take place when phased retirement is introduced with enough lead time that workers can fully adjust their lifetime labor-leisure choice decision versus the adjustments that would take place when phased retirement is introduced unexpectedly and is available immediately. In all likelihood there was a backlog of demand for phased retirement at the time it was introduced in the UNC system, so one must be careful to examine more than one year of data to be able to gauge its impact in a steady state.

From an employer standpoint, there are two important issues associated with the introduction of phased retirement: what happens to retention and what happens to productivity? Phased retirement makes bridge jobs at other employers less attractive, thereby increasing employee retention in terms of duration of employer attachment. However, it also increases the odds that a worker will move from a full-time to a part-time schedule, so that the impact on an hours-weighted indicator of mobility is more difficult to gauge. Empirically, employers would want to know the impact of phased

retirement on the overall flow of labor out of the organization and how that outflow varies by age or experience.

Employers also are concerned about how the provision of phased retirement is likely to affect productivity. The attractiveness of phased retirement declines with part-time earnings opportunities off campus. If earnings were the only consideration in considering part-time work options, then those who can earn significantly more than half their current salary while working halftime in a bridge job would not find the phased retirement option very attractive. In contrast, those unable to earn half their current salary at part-time work elsewhere would prefer phased retirement to a bridge job. The phased retirement plan in the UNC system effectively acts as an option to sell one's labor part-time at a specified price, an option that is most valuable to the professors with the least attractive alternatives off campus. It should be kept in mind, however, that earnings opportunities will not be the overriding criterion for those faculty members who place a very high premium on the status associated with continuing their relationship with the university.

Whether this creates an adverse selection problem is an empirical question, because effects run in opposite directions. If pay rates off campus are correlated with on-campus productivity, then the introduction of a phased retirement plan increases the part-time salary of the least productive faculty. As they approach retirement, this increase in Y' makes them more likely to enter phased retirement relative to full-time work or full retirement. As noted in the discussion of labor-leisure choice above, this could lead them to shift to part-time work earlier in their career or it could lead them to extend their length of service with the university system. The net effect on faculty productivity thus depends on two issues: (1) who selects phased retirement and (2) does phased retirement shorten or lengthen employer-employee attachments? If the odds of entering phased retirement are inversely related to faculty productivity and phased

retirement shortens job durations, then the introduction of phased retirement enhances faculty productivity.

Of course, a positive correlation between on-campus productivity and off-campus pay is by no means a foregone conclusion; some academics do much better as consultants or entrepreneurs than they do in research and teaching. In fact, association with the university may actually enhance one's earnings potential in some off-campus jobs. For instance, a professor transitioning toward a second career in consulting may be able to charge higher rates if he continues to be affiliated with the university.

On every campus, regardless of its mission, there are tenured faculty members who have stopped doing research. Within this group, the payoff in free time from a half-time workload reduction will be much greater in campuses with heavy teaching loads, so it is reasonable to expect phased retirement to be more attractive on such campuses.

The purpose of this theoretical discussion of phased retirement plans has been (1) to point out the conditions under which both employees and employers would find such plans attractive, (2) to explain which employees would be most likely to select phased retirement, and (3) to understand the impact of a phased retirement plan on productivity. The implications from this discussion for empirical work are as follows:

- Some employees will view the introduction of a phased retirement plan favorably. After a plan is introduced, the sum of the rates of full and phased retirement will exceed the rate of full retirement that prevailed beforehand.
- The financial incentive for entering phased retirement depends on how the part-time salary offered under the plan compares to part-time salaries off-campus. The plan will be most attractive to those with the least attractive opportunities off-campus.
- The introduction of a phased retirement plan could have important effects on faculty productivity; the direction of those effects cannot be predicted a priori.

- The odds of entering phased retirement will be heavily influenced by pension plan characteristics.

II. INCIDENCE OF PHASED RETIREMENT PROGRAMS

Historically, relatively few firms offered workers the opportunity to remain on the job at reduced hours per week. Part-time work was deemed to be too costly due to per worker benefit costs, scheduling difficulties, and a general desire to replace older workers with younger employees. Rapid economic growth, low unemployment rates, and a slowly growing labor force apparently have changed employer attitudes. In recent years, employers throughout the economy have begun to experiment with formal phased retirement programs as a component of their human resource policies.

Figure 1 shows that the incidence of phased retirement programs in Watson Wyatt (1999) varies considerably across industries. The educational sector has the highest proportion of employers offering a phased retirement plan, making a detailed examination of the UNC system's experience especially relevant. In addition, the Watson Wyatt study found that phased retirement programs were more prevalent among firms where the average age of employees was 45 or older.

Higher education seems to be particularly well-suited for phased retirement programs because of rising concerns about managing the age structure of the professorate. The elimination of mandatory retirement for tenured faculty in 1994 meant that faculty age 70 and older now have the right to remain on the job until they decide to retire. In addition, rapid aging has dramatically altered the age structure of university faculties. Figure 2 illustrates the sharp and continuing increase in the proportion of full-time faculty age 50 and over.

In this new environment, many colleges and universities have opted to provide older faculty with the additional choice of part-time work for reduced pay. Table 1

contains information from a recent survey conducted by the Committee on Retirement of the American Association of University Professors. Of the responding institutions, 35 percent of the Research and Doctoral institutions were offering formal phased retirement plans and 29 percent of Masters and Baccalaureate institutions had adopted formal phased retirement programs. These plans were much more prevalent at private institutions.

Further examination of the responding institutions in the AAUP survey reveals that phased retirement programs are more prevalent among institutions that have a greater proportion of their faculty who are tenured and in the older age groups. For example, 17 percent of institutions with less than 40 percent of their faculty tenured offer phased retirement programs while the incidence of these plans is 27 percent when the proportion of the faculty that is tenured is 40 to 60 percent. These rates can be compared to 31 percent in institutions offering phased retirement when the tenure rate is 60 to 80 percent and 52 percent offer such plans when 80 percent or more of the faculty is tenured. In addition, 18 percent of institutions with less than 10 percent of their faculty age 60 or over offer phased retirement plans while roughly one third of those with more than 10 percent of the faculty over age 60 have introduced phased retirement plans.

III. PHASED RETIREMENT IN THE UNC SYSTEM

In 1996, the Board of Governors of the University of North Carolina (UNC) adopted a phased retirement plan that would allow older faculty with sufficient service to reduce their workloads while remaining with the university.[6] The objective of this program was to provide faculty with a new employment option of remaining on the job

[6] The UNC faculty aged rapidly between 1982 and 1999. During this period, the proportion of the faculty aged 55 and older increased from 18.2 percent to 31.2 percent and the mean age of the faculty rose from 44.5 years to 49.4 years (Clark and Ghent, 2000).

part time for a fixed period of time after their retirement. Phased retirement was introduced as a five-year trial program beginning in 1998. The program provided for a tenured faculty member to relinquish tenure in exchange for a fixed term contract that specified half-time work for half-time pay.

Each of the 15 campuses in the UNC system that grant tenure was required to implement a phased retirement program.[7] To be eligible for the program, faculty must be tenured. They also had to be age 50 with 20 years of service or age 60 with 5 years of service at the same institution. Each campus was allowed to select the length of the contract for its faculty; however, the program required a minimum length of one year and a maximum length of five years. Twelve of the 15 institutions chose a three-year phased retirement contract, two institutions chose a two-year contract, and one campus chose a five-year phased retirement contract. The program was an experiment during the time period covered by this study; it is now permanently in place.

Individuals who were considering entering the program negotiate their half-time duties with their department chairs prior to accepting phased retirement. Duties could be performed evenly across both semesters or the individual could work full-time one semester and have no specific assigned duties the next semester. Persons in phased retirement do not receive most employee benefits. If they begin their retirement benefits, they are eligible for the same health insurance as active employees.[8]

The adoption of a phased retirement program provides a unique opportunity to examine the impact of this new employment option on the retirement/retention behavior of senior faculty in a diverse university system. Using employment records for the years

[7] The NC School of the Arts is also a member of the UNC system, but it does not award tenure.

[8] Interested readers can examine the details of the phased retirement program at NC State University by looking on the World Wide Web at http://www.ncsu.edu/provost/offices/academic_personnel/policy/phased_retirement/index.html.

immediately preceding the introduction of the phased retirement program and the first three years of experience with the program, we are able to assess the determinants of phased retirement and the impact of phased retirement on the rate of full retirement. A key question in this analysis is whether phased retirees are individuals who would have been more likely to remain on the job full time if the program were not offered or whether they would have been more likely to retire in its absence.

The data used in the analysis are based on the annual faculty censuses that each campus is required to submit to the General Administration of the UNC system. These are the employment records for all faculty employed as of September of the specified year. Information on each person includes age, hire date, rank, gender, race, tenure status, annual salary, and type of pension plan. The annual records are linked across years so we are able to determine whether an individual remains in his or her faculty position from one year to the next. The census data for the years 1994 until 2000 are employed in this study. The analysis is limited to faculty members who were eligible to enter the phased retirement program. This means that the sample includes only tenured faculty who were at least age 50 with 20 or more years of service or at least age 60 with 5 or more years of service.

In the three years prior to the introduction of phased retirement, the retirement rate from UNC institutions among eligible faculty age 50 was near 9 percent (see Table 2). After the introduction of the new retirement program, the total retirement rate (full retirement plus phased retirement) increased to 10.4 percent in 1997, 11.3 percent in 1998, and 10.4 percent in 1999. The percentage of faculty selecting phased retirement was 3.2 in 1997, 2.3 in 1998, and 3.0 in 1999. The full retirement rates were 7.2 percent in 1997, 9.0 percent in 1998, and 7.4 percent in 1999. During these years, phased retirees represented between 20 and 31 percent of all retirements from the UNC system.

In absolute numbers, about 70 faculty entered the phased retirement program each year while around 225 fully retired.

Table 2 also shows how phased and full retirement rates vary by age. In most years, the full retirement rate increases steadily with age, a pattern consistent with previous research. A similar pattern holds for phased retirement in 1997, with more faculty age 70 and over selecting phased retirement than full retirement. In 1998 and 1999, the phased retirement rate rises with age through the early to mid-60s, but then declines. In all likelihood the very large response of the 70 and over group in 1997 reflects a constrained demand for phased retirement at the time it was implemented.

What would the employees selecting phased retirement have done had the option not been available? Would they have worked fulltime or fully retired? A preliminary answer comes from the patterns in Table 2. Averaged across all three years, the full retirement rate was 7.9 percent and the phased retirement rate was 2.8 percent; their sum was well above the retirement rate of 8.7 percent that prevailed before 1997 when the phased option was introduced. Assuming retirement rates are stable, this would imply that most of the faculty who selected phased retirement would have worked full-time had the phased option not been available. However, the three-year average includes a year when the full retirement rate was 9.0 percent, well above the 1994-96 average of 8.7 percent. If 1998 is thrown out as an outlier, then the overall retirement rate averages 10.4 percent in 1997 and 1999, with 7.3 percent full retirement and 3.1 percent phased retirement. Viewed this way, the introduction of phased retirement is associated with a 1.4 percent decline in the full retirement rate, implying that the remaining 1.7 percent who selected phased retirement would have continued to work fulltime. With or without the 1998 data, it appears that most phased retirees would have continued working full-time in the absence of the program.

To better understand which category the phased retirees would best fit if phased

retirement had not been an option, Ghent, Allen, and Clark (2001) estimated probit equations to determine which groups of retirees were most similar before and after the introduction of phased retirement. Ghent et al. estimated two retirement probit equations using data for 1997-98: one in which retirement was defined as full retirement only and another in which retirement was defined as either full or phased retirement. The same model was estimated for 1995-96, when full retirement was the only option. Then two different across-sample pooling tests were conducted. The tests concluded that the 1997-98 retirement probit with the dependent variable equal to one only if the individual completely retired could be pooled with the 1995-96 data to estimate a retirement equation. However, when "retirement" was defined to be both complete or phased retirement, the data could not be pooled.[9] Assuming that the estimated retirement equations were stable over time, this implies that the phased retirees "fit better" when not counted as retired.[10] Thus, the data indicate that the phased retirees of 1997-98 more closely resembled faculty members choosing to remain full-time in 1995-96 than those who chose to completely retire in 1995-96.

IV. EMPIRICAL MODEL

How does the introduction of phased retirement affect the labor-leisure decision of tenured faculty in the UNC system? How does faculty productivity change as result of

[9] When the phased retirees were included with the active workers (and thus only those who completely retired were considered as retired), the likelihood-ratio test statistic was 13.20. This is lower than the critical value of 21.03. However, when the phased retirees were included with the retirees, the likelihood-ratio test statistic was equal to 23.87. Because the test statistic exceeds the critical value, the null hypothesis that the probit equations are stable across the two time periods is rejected.

[10] Ghent, Allen, and Clark (2001) also checked to see which of the two estimated retirement equations did a better job correctly predicting the outcome of the retirement decision. The estimated retirement probit equation where the dependent variable was equal to one only if the individual completely retired correctly predicted the outcome 93 percent of the time, while the equation where the dependent variable was equal to one if the individual chose either complete or phased retirement correctly predicted the outcome 85 percent of the time.

those decisions? To examine these issues, we use a multinomial logit model, where employees have three options: work full-time (A), enter phased retirement (R), and enter full retirement (F). In this model the probabilities of employee i entering each of these three states are

$$\text{Prob}(Y_i = F) = \exp(b_F x_i)/(1+\exp(b_F x_i)+\exp(b_p x_i))$$

$$\text{Prob}(Y_i = P) = \exp(b_P x_i)/(1+\exp(b_F x_i)+\exp(b_p x_i))$$

$$\text{Prob}(Y_i = A) = 1/(1+\exp(b_F x_i)+\exp(b_p x_i))$$

The coefficients from this framework are useful for determining which variables have an impact on retirement decisions, but the entire set of coefficients must be transformed in order to determine the impact of each variable. For instance, to examine the difference in retirement odds between workers with 30 and 20 years of service, we calculate predicted probabilities for the entire sample using actual values for all x_i except years of service, which will be set at 20 years for all employees and then reset at 30 years. The difference between the two sets of predicted probabilities will indicate how a 20 to 30 year difference in time employed affects retirement odds. Similar calculations are performed to obtain the predicted impact of binary variables.[11]

The retirement decision is modeled as a function of demographics (gender, race, and age), pension incentives, employee performance, and unique variables that are likely to be associated with the impact of phased retirement on the decisions of UNC system faculty. Correlations between retirement and either gender or race (separate indicators for African-Americans, Asian or Asian- American, and other nonwhites) could reflect differences in either life expectancy or attitudes toward retirement. Binary indicators of age are used to avoid arbitrary constraints on the relationship between age and retirement and to capture any spikes in the retirement hazard.

[11] All models were estimated using the mlogit procedure in Stata, version 6.

UNC faculty members hired since 1971 have had the option of enrolling in the Teachers' and State Employees' Retirement System (TSERS) or in an optional retirement program (ORP). Currently the ORP options include TIAA-CREF, Lincoln Life, Fidelity Investments, and VALIC. TSERS is a defined benefit plan, with the benefit formula equal to the product of a constant, years of credited service, and final salary average. Employees are eligible for partial benefits when they reach age 50 and have 20 years of service[12]; for full benefits, at age 60 and 5 years of service or at 30 years of service. Once an employee is eligible for partial benefits, the constant in the benefit formula gradually increases by three to five percent for each additional year of service.

To understand the impact of pension characteristics on retirement incentives, it is useful to focus on pension wealth, pension accrual, and pension backloading. Pension wealth at time t is the present value of the expected lifetime income from a stream of pension income if one retires at time t. Higher levels of pension wealth should be associated with a greater likelihood of retirement through pure wealth effects. Pension accrual is the change in pension wealth between year t-1 and year t. Pension accrual is typically positive in a plan such as the TSERS up through the age of normal retirement, as the constant, years of service and salary average all increase with t up until that point. In a defined contribution plan, pension accrual reflects the contributions into the plan by the firm and the worker. Pension backloading arises in defined benefit plans because a large percentage of the accruals take place in the five years or so before early or normal retirement.[13] It equals the difference between maximum pension wealth (across all possible retirement ages) and pension wealth if one retires immediately. Pension accrual and backloading should be associated with a lower likelihood of retirement; high values of these variables indicate a financial incentive to delay retirement.

[12] These are identical to the eligibility criteria for phased retirement for tenured professors.
[13] See Ippolito (1985) for a full explanation.

For faculty in the TSERS, the pension benefit formula is used to construct measures of these three pension variables. Pension wealth is calculated under the assumptions of no post-retirement increases in benefits, a three percent discount rate, and a maximum life expectancy of 100 years.[14] Pension accrual is the change in pension wealth that results if the employee works for another year; salary growth is assumed to be two percent.

Option value is used in some studies to measure pension backloading, but full implementation of the model developed by Stock and Wise (1990) in a multinomial logit framework is beyond the scope of this study. We experimented with the approach used by Coile and Gruber (2000) where specific values of the risk aversion, discount rate, and disutility of work parameters were assigned so that option value could be used as one of the x_i. However, when we calculated the option value measure used by Coile and Gruber, it implied that for about half of the workers in our sample, utility would not be maximized unless they worked at least another 20 years. With a mean age of 58.3 and a maximum age of 75, we concluded that we would have to experiment with a much broader range of utility function parameters in order to successfully apply that approach over our sample.

Instead we used an alternative measure of backloading developed by Coile and Gruber called peak value. To calculate peak value, one must estimate pension wealth at all future retirement dates. Peak value equals the difference between maximum pension wealth at some future retirement date and pension wealth if an employee retires immediately. It indicates how much can be gained in pension wealth by delaying retirement.

[14] Conditional age-specific survival probabilities from Anderson (2001) were used in these calculations.

The full impact of pension incentives cannot be estimated for employees in ORPs because our data set contains no information on their pension wealth and by design there is no backloading. Pension accrual in a defined contribution plan is a function of two variables: (1) employee and employer contributions to the plan and (2) the investment performance of the assets in the plan. The latter component is not observable in our data set, so we use pension contributions (12.84 percent of salary) as our measure of accrual for those in ORPS. Pension contributions do not vary with age or years of service in the North Carolina system. An indicator of whether an employee is in TSERS or one of the ORPs is included in the model when the two samples are pooled. This variable acts as a proxy for differences in pension incentives and for differences in tastes and behavior associated with pension choice.[15] Pension backloading is set equal to zero for employees in ORPs as well as for those who would have maximized their pension wealth by retiring in an earlier year. A binary variable is included in the model to flag the latter set of individuals because they may very well have preferences on labor-leisure choice that are quite distinct from the average worker.

Current salary and years of service are included in the model as controls. Much of the variation in pension incentives across individuals in TSERS reflects variation in these two variables because they are part of the benefit formula. It would be presumptuous to omit them from the model and then claim to have produced evidence of the effects of pensions. Also, both salary and years of service could have independent causal impact. The cost of entering phased or full retirement rises with salary; years of service are an indicator of match quality.

Two variables are examined to determine how faculty productivity changes with the availability of phased retirement. There is no formal system of performance ratings

[15] Clark and Pitts (1999) empirically examine the TSERS/ORP choice faced by faculty at NC State. Ghent and Clark (2001) examine the choice for newly hired faculty at all 15 UNC

for UNC system faculty, although performance appraisals are conducted annually. Faculty pay increases in the UNC system were given strictly on the basis of merit during the sample period, so this is the most logical available measure of relative performance. The mean pay increase for each faculty member over the previous three years of employment is used in this study. The use of three years of data instead of one is intended to smooth out noise factors, such as promotion or a transitory shock to performance. We also include academic rank in the model as a performance measure. In a sample of tenured faculty eligible for retirement benefits, full professors have presumably been judged more productive than associate or assistant professors.

It is natural to expect the response of the UNC system faculty to the availability of phased retirement to vary with some unique features of the employer and its system of human resource policies. A potentially important factor is teaching loads, which vary across campuses depending on the mission of the university. Faculty workloads consist not just of teaching, but also of research, service to the university, and service to the community. Of these four dimensions, however, teaching effectiveness is the only one where time allocation can be gauged systematically and with short time lags. For the optimizing shirker interested in on-the-job leisure, the risk of being penalized for cutting back on time allocated to research and service is much lower than the risk for cutting back on time allocated to teaching. As any dean or department head knows, poor research productivity can be disguised for a while by explanations such as bad draws from the referee lottery or long lags needed for an ambitious project.

These opportunities are not available to faculty on teaching-centered campuses. With less ability to substitute on-the-job leisure for work, they are likely to find an opportunity to move to a part-time schedule more attractive than faculty on research-centered campuses. This would lead us to expect phased retirement to be less

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institutions from 1983-2000.

attractive to faculty in Research I universities (UNC-Chapel Hill, NC State) than other campuses, which fall into the categories of Doctoral, Masters, and Baccalaureate.[16]

Summary statistics for the variables used in the analysis are reported in Table 3. Although there is widespread concern about a rising share of professors age 70 and older, it should be noted that faculty in this age group represent less than two percent of a sample that excludes all faculty under 50. In fact, only 8.4 percent of the faculty in the sample are over age 65. Over half of the sample is enrolled in TSERS, and those faculty members have mean pension wealth of $436,651 if they retired immediately. Pension backloading, the difference between maximum expected future pension wealth and pension wealth if they retire now, is rather sizable (mean $56,253 for TSERS faculty) compared to pension accruals (mean $8,585 for the entire sample, mean $6,877 for TSERS faculty).

The last two columns of Table 3 show how full and phased retirement rates vary by sample characteristics. Both rates rise with age. The full retirement rate spikes after age 59, 61, 64, and 69.[17] The first spike corresponds with eligibility for full benefits in TSERS; the middle two with eligibility for early and normal Social Security benefits. The spike at age 69 may reflect peer pressure to leave by age 70, despite the elimination of mandatory retirement at that age. The phased retirement rate spikes after ages 58, 64, and 70, reflecting these same factors.

Women have higher full retirement rates than men, but phased retirement rates for men and women are not very different. Nonwhites have lower phased retirement rates than whites, but higher full retirement rates.

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[16] Other campuses in the sample by Carnegie classification are Doctoral I and II (UNC-Greensboro, East Carolina), Masters I (Appalachian State, Fayetteville State, NC A&T, NC Central, UNC-Charlotte, UNC-Pembroke, UNC-Wilmington, Western Carolina) and Baccalaureate I and II (UNC-Asheville, Elizabeth City State, Winston-Salem State).

[17] Retirement rates are calculated by comparing faculty rosters in September of year t-1 to September of year t. The age variable refers to age in year t-1.

Both full and phased retirement rates are remarkably higher for faculty in TSERS than those in ORPs, possibly reflecting self-selection. Faculty who have not reached the rank of full professor have higher full and phased retirement rates than full professors. Full and phased retirement rates are lower on the two Research I campuses than on the other 13 campuses in the UNC system.

V. EMPIRICAL RESULTS

Three samples are examined in the empirical results: the entire sample, a subsample limited to workers in the defined benefit plan (TSERS), and a subsample limited to workers in defined contribution plans (ORPs). There are three reasons for splitting the sample by type of pension plan: (1) a measure of pension wealth and an independent measure of pension accruals are only available for those in TSERS; (2) examining TSERS participants by themselves permits a cleaner estimate of the impact of pension backloading; and (3) self-selection by workers into TSERS and ORPs implies that the coefficients for each group need not be the same.

The multinomial logit coefficients are reported in Table 4. The coefficients are useful for indicating which variables have a statistically significant impact on the decision to retire, but the magnitudes of the coefficients yield no information on how much retirement rates vary with changes in the independent variables. To gain further insight, predicted values for full and phased retirement probabilities were generated for selected values of independent variables in Table 5, calculated at the sample means for all other variables in the model. The results in Table 5 are based on the entire sample, except for those pertaining to pension backloading, which are based on the TSERS sample.

The most important result in Tables 4 and 5 is that both full and phased retirement odds decrease sharply with employee performance, measured in terms of

average pay increase over the last three years. Compare two professors, one who received no pay raise for three years and the other with an average raise of eight percent (roughly twice the amount budgeted for raises during the sample period). The professor who received no raise has a 10.3 percent chance of fully retiring and a 4.3 percent chance of entering phased retirement. The professor who averaged an eight percent raise has a 5.9 percent chance of fully retiring and only a 1.7 percent chance of entering phased retirement.

What does this mean for faculty productivity? Recall the finding from section 3 that those who select phased retirement more closely resemble active employees than those selecting full retirement. Because faculty who receive low pay increases are much more likely to enter phased retirement than faculty earning sizable pay raises, the introduction of phased retirement is apparently accelerating the rate at which low-performing faculty separate from the university.

As for the other measure of employee performance, there is no difference in the rates at which full, associate, and assistant professors enter phased retirement. However, associate and assistant professors are much more likely to fully retire than full professors, so the net effect of the entire selection process is consistent with productivity enhancement.

Phased retirement is much more attractive on campuses where the main mission is teaching than on those where the main mission is research. On Research I campuses, the model predicts that 1.6 percent of faculty enter phased retirement, compared to 3.2 to 4.0 percent on other campuses. This is consistent with phased retirement providing a greater increase in free time on campuses with heavy teaching loads. Full retirement rates also are lower in research-oriented than teaching-oriented campuses.

Not surprisingly, pension incentives come into play in faculty retirement decisions. Faculty in TSERS are much more likely to enter phased retirement than faculty in ORPs. The predicted phased retirement rate for faculty who selected the defined benefit plan is 3.8 percent, compared to 1.6 percent for faculty in defined contribution plans. Full retirement rates also are higher in TSERS. These patterns most likely reflect the greater reward to continued work in ORPs; for most employees in TSERS, pension wealth is maximized once they reach their early 60s.

Pension backloading plays an important role in the decision to enter phased retirement. The odds of entering phased retirement for a person with no pension backloading (i.e., someone who has passed the age where his pension wealth is maximized in TSERS) are 5.8 percent. Those odds plummet to 1.0 percent for someone who stands to gain an additional $100,000 in TSERS by working additional years. Pension backloading is also associated with lower retirement odds of full retirement, but this effect could not be measured with precision.

The other two pension variables have modest to zero effect on retirement decisions. Pension accrual is unrelated to the odds of full retirement. The results for pension accrual and phased retirement are conflicting; there is a significant positive correlation for the entire sample but when the sample is limited to those in TSERS, the coefficient stays the same but is estimated with much less precision. Pension wealth has no correlation with full or phased retirement. This is not entirely surprising, as pension wealth is but one of many sources of assets that can be used to finance consumption during retirement.

As for the other variables, age has the expected effect on retirement decisions; the hazard rates implied by the model estimated over the entire sample (reported in

Table 5) correspond closely to the sample means in Table 3.[18] Figure 3 reports the predicted hazard rates by type of pension plan. Predicted full retirement rates for those in the defined benefit plan were consistently higher than the rates for those in the defined contribution plan, but there was no difference between the two groups in the pattern of retirement spikes. Predicted phased retirement rates for those in defined benefit and defined contribution plans were roughly equal through age 63, but at age 64 and above the predicted odds of entering phased retirement were somewhat higher for those in the defined contribution plan than for those in the defined benefit plan.

Women are more likely to fully retire than men, but there is no gender difference in the odds of phased retirement. African-Americans, Asians and Asian-Americans have lower full and phased retirement odds than whites in the multinomial logit results. The fact that African-Americans have higher full retirement rates in the raw data must reflect differences in other variables in the model. The odds of full retirement increase with years of service and salary, but the odds of phased retirement are unrelated to these variables.

VI. CONCLUSION

This paper has examined the response of UNC system faculty to the introduction of a phased retirement plan. The overall rate at which eligible workers elect to leave full-time employment with the university increased significantly, accompanied by a small decrease in the rate at which workers enter full retirement. Based on observable characteristics such as age, salary, years of service, and job characteristics, faculty members entering phased retirement more closely resemble those remaining in full-time jobs than those entering full retirement.

[18] When the sample is split between TSERS and ORP participants, there are a few age categories where no one elects phased retirement. Because of this, fewer age coefficients are estimated for these smaller samples.

The productivity impact of this increased outflow of faculty depends on whether those entering phased retirement are more or less productive than the average faculty member. On this point, the evidence is unambiguous – the odds of entering phased retirement are strongly and inversely related to employee performance, as measured by recent pay increases. Faculty members also are more likely to enter phased retirement when they have heavy teaching loads and when they are near the age-service level where their pension wealth is maximized.

On balance, the introduction of phased retirement in the UNC system seems to have been a plus from both employee and employer perspectives. Phased retirees now account for slightly more than one-fourth of all flows out of the full-time faculty, indicating that a sizable number of faculty members clearly appreciate having more degrees of freedom in making time allocation decisions. The university system is now getting advance warning about employee decisions to fully retire. Fears that the best and brightest faculty might leave academe more rapidly have thus far been unfounded.

An important caveat about these findings is that they apply to a workplace environment where workers are extremely independent and have lifetime job security. Workers who do not have the equivalent of academic tenure still have to balance time at work and away from work, so it is quite possible that the share of workers electing phased retirement reported here would be comparable across many types of jobs. However, to the extent that nonacademic employers can directly control the employee productivity through other mechanisms, our results on phased retirement and productivity may be limited to the situation at hand. By providing the first solid evidence on the impact of introducing a phased retirement option, this study provides a foundation for further work in this area.

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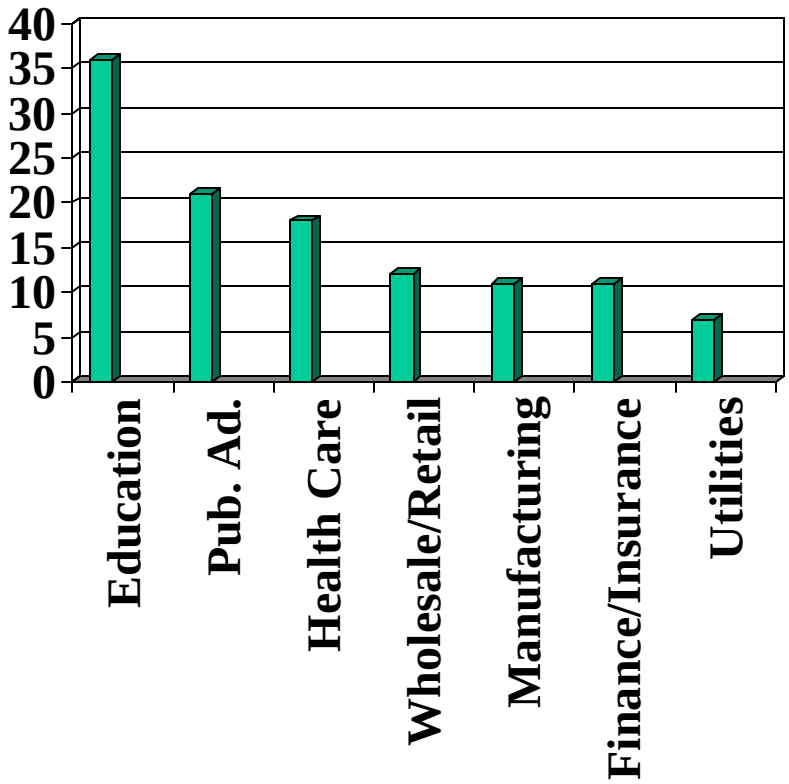
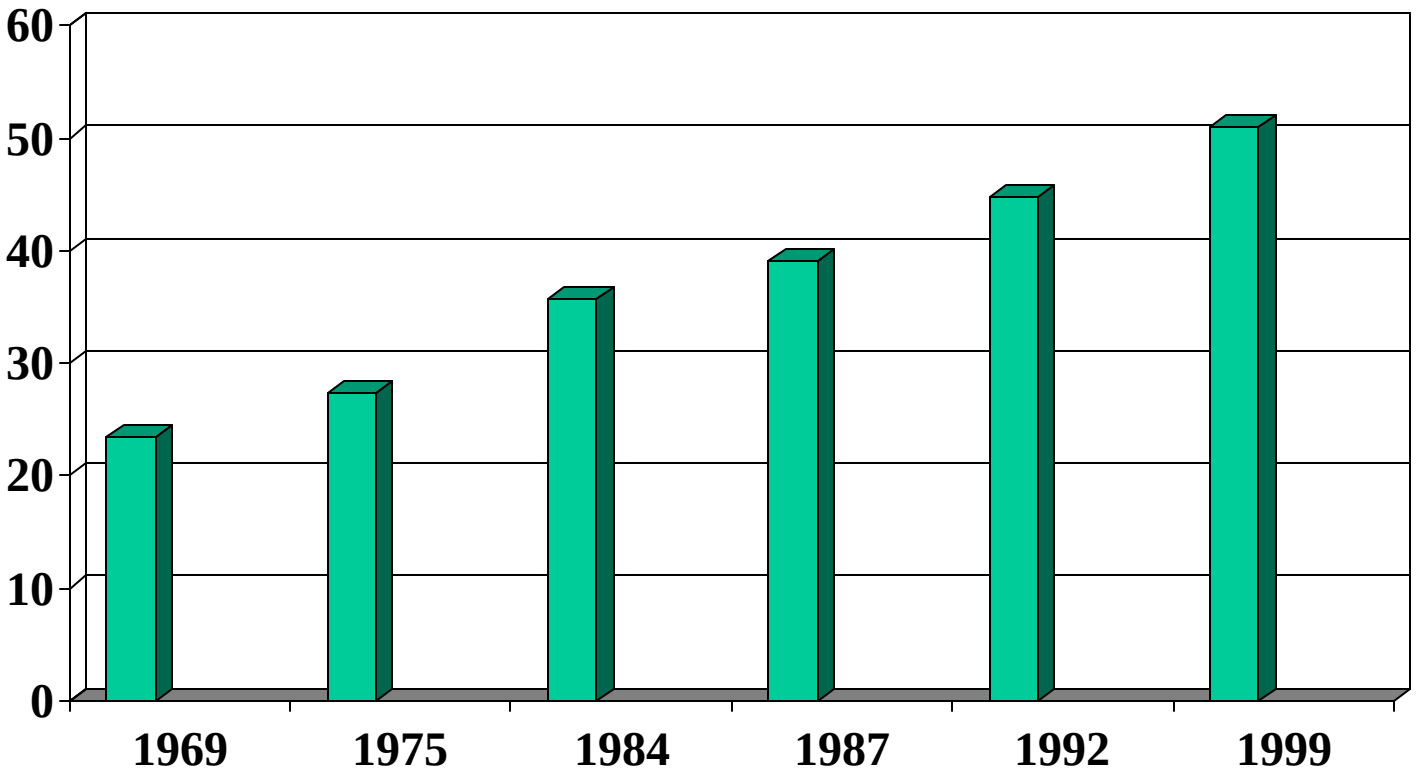
Figure 1. Percentage of Companies Offering Phased Retirement



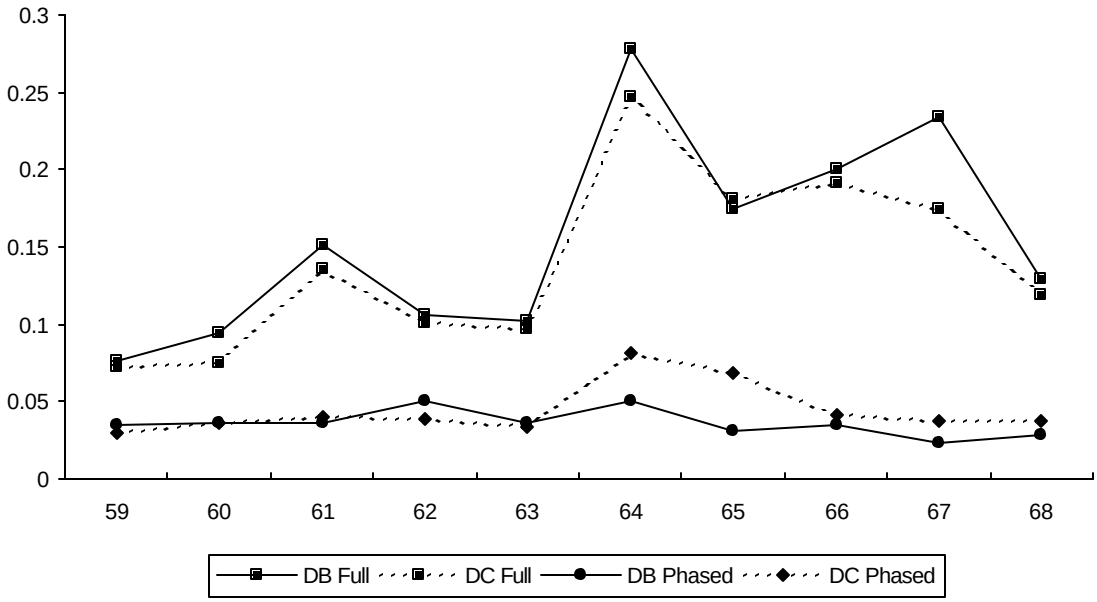
Source: Watson Wyatt (1999)

Figure 2. Percentage of Full-time Faculty Age 50 and Over



Source: AAUP Survey of Changes in Faculty Retirement Policies

Figure 3. Predicted full and phased retirement rates from multinomial logit model, by age and type of retirement plan



Note: DB indicates defined benefit plan and DC indicates defined contribution plan

Table 1. Percentage of Institutions with Phased Retirement Plans

Category	Private	Public	Total
Research and Doctoral	50	31	35
Masters	38	23	29
Baccalaureate	30	24	29
Total	35	26	30

Source: AAUP Survey of Changes in Faculty Retirement Policies

Table 2. Retirement rates, by year

Age Group	1994	1995	1996	1997 (total)	1997 (full)	1997 (phased)	1998 (total)	1998 (full)	1998 (phased)	1999 (total)	1999 (full)	1999 (phased)
50-57	2.7	2.7	2.7	3.2	2.3	1.0	4.3	3.6	0.7	4.7	3.8	0.9
58-62	9.2	6.8	9.9	13.5	8.5	4.9	12.7	9.5	3.2	10.9	7.2	3.7
63-64	18.3	24.7	18.6	19.7	14.7	5.0	20.5	17.2	3.3	25.3	17.5	7.8
65	19.5	22.1	21.7	27.3	22.1	5.2	28.8	18.6	10.2	16.3	11.6	4.7
66-69	29.2	30.0	22.9	21.2	17.2	4.0	27.7	23.7	4.0	20.0	14.8	5.2
70+	41.7	12.0	30.8	29.5	13.6	15.9	35.0	30.0	5.0	17.0	10.6	6.4
Total	8.7	8.7	8.8	10.4	7.2	3.2	11.3	9.0	2.3	10.4	7.4	3.0

Source: UNC system annual faculty censuses, 1994-2000

Table 3. Summary statistics

	Mean	Standard deviation	Full retirement rate	Phased retirement rate
Total (N=7179)			0.079	0.028
Age: 50-52	0.133	0.340	0.022	0.001
53-54	0.126	0.331	0.026	0.004
55	0.073	0.260	0.042	0.013
56	0.071	0.257	0.045	0.018
57	0.063	0.243	0.040	0.015
58	0.066	0.248	0.042	0.053
59	0.071	0.257	0.072	0.031
60	0.073	0.260	0.077	0.036
61	0.061	0.240	0.138	0.041
62	0.053	0.224	0.099	0.037
63	0.050	0.218	0.095	0.031
64	0.044	0.205	0.244	0.079
65	0.031	0.173	0.171	0.063
66	0.022	0.148	0.191	0.043
67	0.019	0.137	0.175	0.036
68	0.015	0.122	0.137	0.046
69	0.010	0.100	0.278	0.056
70	0.006	0.080	0.130	0.109
71 and over	0.012	0.109	0.198	0.081
Male	0.824	0.381	0.073	0.029
Female	0.176	0.381	0.104	0.024
White	0.867	0.339	0.078	0.030
Black	0.080	0.271	0.103	0.010
Asian	0.040	0.196	0.042	0.017
Nonwhite	0.013	0.114	0.105	0.042
Defined benefit	0.540	0.498	0.094	0.039
Defined contribution	0.460	0.498	0.061	0.015
Full professor	0.722	0.448	0.073	0.027
Associate professor	0.236	0.425	0.082	0.029
Assistant professor	0.040	0.196	0.160	0.042
Research I	0.460	0.498	0.068	0.016
Doctoral	0.171	0.376	0.104	0.048
Masters	0.336	0.472	0.077	0.035
Bachelor	0.033	0.179	0.121	0.029
Salary	79799	36681		
Years of service	24.6	6.5		
Average raise	0.042	0.038		
Pension accrual	8571	17415		
Pension backloading	50282	92685		
Pension w ealth	439226	248572		

Table 4. Coefficients and standard errors of multinomial logit model of full and phased retirement

	Entire sample		Defined benefit		Defined contribution	
Full retirement	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Age						
53-54	0.057	0.308				
55	0.524	0.315	0.311	0.373		
56	0.562	0.314	0.590	0.346		
57	0.439	0.333	0.215	0.390		
58	0.534	0.326	0.102	0.407		
59	1.092*	0.290	0.914*	0.334	0.827*	0.323
60	1.170*	0.291	1.149*	0.357	0.648	0.332
61	1.852*	0.276	1.712*	0.344	1.543*	0.277
62	1.505*	0.295	1.311*	0.378	1.247*	0.304
63	1.436*	0.301	1.253*	0.383	1.178*	0.340
64	2.686*	0.276	2.555*	0.357	2.305*	0.278
65	2.273*	0.306	1.880*	0.399	2.356*	0.344
66	2.319*	0.321	2.066*	0.415	2.237*	0.399
67	2.203*	0.336	2.259*	0.427	1.182*	0.554
68	1.758*	0.381	1.509*	0.498	1.659*	0.517
69	2.692*	0.366	2.340*	0.488	2.541*	0.417
70	1.750*	0.512	1.432*	0.651	2.541*	0.417
71 and over	2.291*	0.374	2.230*	0.500	1.857*	0.579
Female	0.577*	0.121	0.550*	0.160	0.632*	0.206
African-American	-0.376*	0.178	-0.298	0.208	-0.507	0.394
Asian or Asian-American	-1.197*	0.309	-0.990*	0.348	-1.786*	0.730
Other nonwhite	-0.073	0.359	-0.046	0.438	-0.149	0.646
Salary/10000	0.026*	0.013	0.016	0.051	0.022	0.022
Years of service	0.026*	0.008	0.034	0.018	0.019	0.012
Defined benefit plan	0.340*	0.164				
Associate professor	0.269*	0.121	0.399*	0.152	0.032	0.204
Assistant professor	0.700*	0.201	0.765*	0.231	0.444	0.458
Doctoral	0.433*	0.130	0.311	0.176	0.549*	0.198
Masters	0.295*	0.126	0.194	0.166	0.393*	0.198
Bachelor	0.757*	0.245	0.693*	0.289	n.a.	
Average raise	-8.872*	2.159	-4.839	2.625	-16.326*	3.763
Pension accrual/10000	0.035	0.036	0.035	0.040		
Pension backloading/10000	-0.027	0.016	-0.028	0.020		
Backloading < 0	-0.102	0.204	-0.175	0.232		
Pension wealth/100000			0.132	0.825		
Constant	-4.644*	0.371	-4.467	0.568	-3.852*	0.486

Partial retirement						
Age						
53-54	1.084	1.122				
55	1.970	1.076	0.880	0.649		
56	2.132*	1.063	0.905	0.631		
57	1.968	1.078	0.658	0.658		
58	3.170*	1.030	1.646*	0.584		
59	2.630*	1.047	0.850	0.641	2.477*	0.682
60	2.682*	1.040	0.885	0.642	2.353*	0.682
61	2.912*	1.042	0.961	0.658	2.928*	0.660
62	2.864*	1.050	1.303*	0.665	1.103	1.128
63	2.694*	1.060	0.904	0.701	1.996*	0.880
64	3.912*	1.037	1.551*	0.692	4.233*	0.605
65	3.542*	1.055	0.844	0.772	4.460*	0.662
66	3.055*	1.092	1.007	0.786	2.624*	1.147
67	2.945*	1.118	0.604	0.903	3.235*	0.895
68	2.919*	1.120	0.705	0.875	2.891*	1.146
69	3.280*	1.146	1.284	0.883	3.229*	1.153
70	3.972*	1.135	1.785*	0.907	3.229*	1.153
71 and over	3.681*	1.098	1.327	0.915	4.085*	0.922
Female	0.030	0.222	-0.078	0.295	0.468	0.408
African-American	-1.764*	0.444	-2.061*	0.546	-0.594	0.766
Asian or Asian-American	-1.306*	0.474	-1.340*	0.536	-1.257	1.043
Other nonwhite	-0.034	0.544	-0.143	0.632	-0.228	1.136
Salary/10000	-0.058	0.035	0.069	0.128	-0.023	0.051
Years of service	0.014	0.015	0.076*	0.038	0.015	0.022
Defined benefit plan	0.960*	0.312				
Associate professor	-0.056	0.195	-0.302	0.239	0.617	0.366
Assistant professor	0.074	0.347	0.041	0.386	-0.302	1.095
Doctoral	1.072*	0.214	0.946*	0.260	1.179*	0.402
Masters	1.008*	0.213	1.054*	0.251	0.840*	0.415
Bachelor	0.890*	0.453	1.165*	0.481	n.a.	
Average raise	-13.704*	4.090	-16.251*	5.257	-11.086	7.331
Pension accrual/10000	0.166*	0.080	0.167	0.102		
Pension backloading/10000	-0.136*	0.055	-0.193*	0.064		
Backloading < 0	0.480	0.338	0.433	0.380		
Pension wealth/100000			-0.224	0.206		
Constant	-6.663*	1.154	-5.278*	1.158	-6.727*	1.074
N	7159		3864		3295	

Note: omitted age category is 50-52 for entire sample, 50-54 for defined benefit sample, and 50-58 for defined contribution sample. Ages 69 and 70 are combined into a single category in the defined contribution sample. The binary indicator for bachelor-level universities could not be estimated for the defined contribution sample because no one in that category elected phased retirement.

* = Statistically significant at the .05 level

Table 5. Predicted retirement odds from multinomial logit model, by sample characteristics

	Predicted full retirement rate	Predicted phased retirement rate
Sample	0.079	0.028
Age		
50-52	0.026	0.002
53-54	0.027	0.006
55	0.042	0.015
56	0.043	0.018
57	0.038	0.015
58	0.040	0.046
59	0.069	0.027
60	0.074	0.028
61	0.134	0.032
62	0.099	0.032
63	0.094	0.028
64	0.244	0.067
65	0.183	0.053
66	0.194	0.034
67	0.178	0.031
68	0.123	0.033
69	0.254	0.038
70	0.115	0.085
71 and over	0.184	0.060
Male	0.072	0.029
Female	0.116	0.027
White	0.084	0.033
African-American	0.064	0.006
Asian or Asian-American	0.030	0.011
Other nonwhite	0.079	0.032
Defined benefit	0.087	0.038
Defined contribution	0.068	0.016
Full professor	0.072	0.029
Associate professor	0.091	0.026
Assistant professor	0.128	0.028
Research I	0.067	0.016
Doctoral	0.092	0.040
Masters	0.083	0.039
Bachelor	0.122	0.032
Years of service = 20	0.070	0.026
Years of service = 30	0.087	0.029
Average raise = 0	0.103	0.043
Average raise = 0.08	0.059	0.017
Pension backload = 0	0.098	0.058
Pension backload = 100000	0.082	0.010