

# The Effect of Pension Plan Type on Retirement Age: Distinguishing Plan Incentives from Career Length Preferences

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## Abstract

The widespread movement from defined benefit (DB) plans to defined contribution (DC) plans over the past few decades has transferred much of the retirement savings risk from the institution to the individual, particularly in the private sector. This study uses the *Retirement Confidence Survey of College and University Faculty, 2005* to examine the use of DC plans relative to DB plans among faculty and the impact of plan incentives on expected retirement age. This study finds that the difference in retirement wealth accrual patterns between the two types of plans generates an eight-month difference in expected retirement ages for individuals in a DC plan relative to those in a DB plan. Preferences over career length double the effect of incentives: individuals who elect to enroll in a DB plan expect to retire sixteen months earlier than those who chose to enroll in a DC plan. In addition, this paper finds that individuals choose retirement plans to diversify their sources of retirement income, which has implications for proposed policies that incorporate individual accounts into Social Security.

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# 1 Introduction

The *Retirement Confidence Survey of College and University Faculty* represents a distinctive opportunity to examine the relative use of defined contribution (DC) plans and defined benefit (DB) plans across institutions and individuals. The widespread replacement of DB plans by DC plans over the past few decades has transferred much of the retirement saving risk from the institution to the individual, particularly in the private sector.<sup>1,2</sup>

This change has likely influenced saving behavior, retirement planning, and confidence regarding lifestyle maintenance in retirement. While this particular survey examines the responses of college and university faculty, its findings are relevant to those working in the non-academic sector and to policy-makers. Both DB and DC plans are represented across academic institutions, with a substantial fraction of universities offering a choice between plans. Using the *Survey of Changes in Faculty Retirement Policies*, Ehrenberg (2001) finds that nearly 36 percent of academic institutions offer a faculty a choice between retirement plans (see Table 1). Because faculty members with a choice between plans choose the option that gives them the highest utility, analyzing determinants of plan selection can improve policy-makers understanding of how the transition from DB to DC pension plans has affected workers outside of academia. This paper finds evidence of a demand for a defined benefit income stream and a diversified portfolio of retirement assets, which is relevant to the policy debate surrounding Social Security reform.

The end of mandatory retirement for faculty in 1994 has increased the attention placed on the age composition of faculty by college and university administrators. These administrators have become increasingly interested in how pension plan type or other human

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<sup>1</sup>According to the 2004 National Compensation Survey of private industry employees, 21% of workers have access to a DB plan, while 53% have access to a DC plan (National Compensation Survey 2004, Table 1).

<sup>2</sup>In 2004, 11% of the Fortune 1000 companies sponsoring a DB plan froze or terminated their plan, which is up from 7% in 2003.

resource practices surrounding the usage of retirement savings vehicles, such as financial education, affect the retirement age of faculty. In addition, knowing how pension plan type affects retirement age will improve forecasts regarding the age distribution of faculty, which is essential for salary and hiring projections.

Differences in retirement wealth accrual patterns between DB and DC plans results in different retirement incentives across the two plans. To estimate the effect of plan incentives on retirement behavior, this analysis assumes that the menu of pension plans offered by an institution is not a primary determinant of a faculty-institution pairing. For institutions that offer a single retirement plan, the faculty member's "choice" of plan is exogenous and differences in expected retirement age across plans will be attributed to plan incentives. However, for faculty members offered a choice between enrolling in either a DC or a DB plan, this assumption is no longer valid because these individuals incorporate their retirement expectations – namely their preference for career length and work – when choosing between the two plan types. Hence the impact of pension plan type on expected retirement age will depend upon a combination of incentives and preferences for those faculty offered a choice between plans. By comparing the expected retirement ages of individuals with a choice between retirement plans to those without a choice, this study attempts to quantify the relative effect of faculty preferences and pension plan incentives on expected retirement age.

Holding other factors constant, this study finds that differences in plan incentives create an eight-month wedge in expected retirement ages: faculty in a DC plan expect to retire eight months later, on average, relative to those in a DB plan. Preferences over career length double the effect of incentives: individuals who choose to enroll in a DC plan expect to retire sixteen months later than those who chose to enroll in a DB plan. The impact of preferences appears to be slightly asymmetric with respect to plan choice: the expected

retirement age of those choosing a DC plan does not differ from those enrolled in a DC plan without a choice between plans, but those choosing a DB plan expect to retire over six months earlier than those enrolled in a DB plan without a choice; however, this difference is only marginally significant.

In addition, women expect to retire eighteen months earlier than men, as do faculty with a Bachelor's or Master's degree relative to those with doctorates or professional degrees. Financial literacy and fiscal position also have a sizable effect: those who are more financially literate expect to retire one year later as do individuals unburdened by debt. As for institutional characteristics, faculty at institutions that offer retirees health insurance expect to retire earlier than those at institutions without this insurance, although the difference is not statistically significant.<sup>3</sup>

Besides analyzing the effect of plan type on retirement expectations, this analysis examines determinants of plan selection because faculty members at a substantial number of public institutions are one of the few groups of workers who have been consistently offered a choice between plans. This paper finds that individuals choose to diversify their retirement assets: faculty members who are not covered by Social Security are substantially less likely to enroll in a DC plan when presented with a choice between plans. In addition, a lack of financial sophistication and lower household income negatively affect an individual's probability of contributing to a supplemental tax-deferred account (TDA) after electing to enroll in a DB plan as her primary employer-sponsored plan.

The next section of this paper discusses the previous literature on the end of mandatory retirement for faculty and its effect on college and university retirement policies as well as previous research on pension plan choice. Section 3 outlines a simple model of pension wealth accrual to demonstrate the difference in retirement incentives between DB and DC

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<sup>3</sup>Gruber and Madrian (1995) find that health insurance coverage for retirees increases retirement hazards by 30 percent.

plans. Section 4 describes the data used in the analysis, while Section 5 provides results from the estimation. Section 6 concludes the analysis.

## **2 Literature Review**

The effect of pension plans – particularly traditional DB plans – on turnover has been analyzed extensively in the literature. For example, Lazear (1990) shows that evaluating pension wealth using an option value approach generates the empirical regularity that turnover rates plummet as service length approaches the plan’s vesting requirement and then spike following vesting. Instead of examining the relationship between pension plans and years of service, this paper focuses on the retirement incentives created by the benefit formulas of traditional DB plans as opposed to the retirement age-neutrality of DC plans. This section first motivates the importance of understanding retirement incentives created by the two pension plan types by examining the explicit incentives used by college and universities since the end of mandatory retirement. Next, this section reviews the previous literature on pension plan selection by faculty.

### **2.1 End of Mandatory Retirement**

Analyzing the relationship between plan type and the timing of retirement has become increasingly important to academic institutions because the end of mandatory retirement has left the timing of retirement up to the individual. The relationship is also important outside of academia because terminating employment has become more difficult due to anti-discrimination statutes and the influence of collective bargaining contracts (Pencavel, 2005). Due to the large number of new faculty hired in the 1960s and 1970s, as well as low separation rates and the end of mandatory retirement, the age distribution of faculty at colleges and universities has become skewed toward older ages (Clark, 2005). As pointed

out by Clark, 31 percent of faculty members were 55 years old or older in 1998 as opposed to 25 percent in 1987. The end of mandatory retirement in 1994 changed the relationship between faculty members and academic institutions: previously, tenured faculty members enjoyed job security and academic freedom in exchange for the institution's right to end the employment relationship at age 70. Since the end of mandatory retirement, there has been a marked decrease in retirement rates among faculty at or approaching age 70. Ashenfelter and Card (2002) report that retirement rates for faculty at age 70 dropped from a rate of 75.6 percent in 1987 through 1993 to 29.1 percent between 1994 and 1996. Clark, Ghent, and McDermed (2006) also found a sharp decrease in retirement among faculty in the University of North Carolina system at age 70. It appears that mandatory retirement did constrain the career length preferences of some faculty members.

The retirement of existing faculty typically generates new positions, which allows college and university administrators to reallocate faculty across departments to respond to changes in student demand, bring new ideas into the department, and an opportunity to reduce labor costs by replacing tenured faculty positions with non-tenured professorships or part-time positions. Clark (2005) notes that this assumes that the costs of retaining older faculty – such as higher labor costs and limited promotional and hiring opportunities for younger faculty – outweigh the benefits of their teaching and researching abilities. Hence, the decision to encourage retirement of older faculty depends on the needs of the particular college or university.

With the end of mandatory retirement, colleges and universities have used other means to provide faculty with incentives to relinquish tenure. These include phased retirement programs in which faculty members resign their full-time positions – often relinquishing tenure – in exchange for the right to work half-time at half-salary for a given number of years (Allen, 2005). In general, phased retirement refers to any formal program that

smooths the transition from full-time employment to complete retirement from the academic institution. Ehrenberg (2001) reports that 27 percent of institution responding to the Survey of Changes in Faculty Retirement Policies conducted in 2000 indicate that they offer a phased retirement program.<sup>4</sup>

While phased retirement is designed to ease faculty members into retirement, institutions have also used buyout programs to abruptly reduce the number of faculty, typically in response to budget shortfalls. Buyouts can take the form of lump-sum payments or an augmentation of pension benefits if a DB pension is offered by the academic institution. Buyouts usually specify a time window during which these incentives are valid, as well as a restriction on age. Ehrenberg (2001) finds that 35 percent of colleges and universities offered buyouts since 1995.

Besides using explicit retirement incentives through buyouts or phased retirement programs, DC and DB pension plans create different retirement incentives as a result of differences in benefit accrual patterns. DC plans are basically age-neutral with respect to retirement. With an additional year of service, the value of a DC plan increases due to three factors: 1) an additional year of contributions; 2) an additional year of market return on previous contributions; and, if an annuity is purchased, 3) larger annual payments due to a shortened remaining life expectancy. In contrast to DC plans, benefits distributed through DB plans are formulaic: typically the plan multiplies an individual's years of service by an average of their final salaries (FAS) and then multiplies this product by some multiple, typically between 1 and 2 percent, to obtain the annual benefit for a single-life annuity.<sup>5</sup> If one retires before the plan's normal retirement age, benefits are reduced to

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<sup>4</sup>This survey was a joint effort by the American Association of University Professors, TIAA-CREF Institute, American Council of Education, College and University Professional Association for Human Resources, National Association of College and University Business Officers, and Cornell University.

<sup>5</sup>Final Average Salary (FAS) typically is an average of salaries earned over the final 3 to 5 years of service, but could be as simple as taking the salary earned in the final year prior to retirement.



take into account the longer remaining life expectancy at retirement (i.e. expect to collect benefits for a greater number of years). Once the worker reaches the normal retirement age, an increase in the annual benefit amount from postponing retirement one year could only come from two sources: 1) an increase in FAS by replacing a lower salary with a higher salary; and 2) an additional year of service in the benefit formula. However, the annual benefit paid is not increased to actuarially adjust for the shorter expected duration of benefits due to retiring at an older age. Hence, DB wealth typically decreases with additional years of service beyond the plan's normal retirement age. This creates an incentive to separate from the institution at this age.

Due to the differences in retirement incentives across DB and DC plans, the type of plan sponsored by the institution could affect whether an institution offers explicit retirement incentives, such as phased retirement or pension buyouts. Pencavel (2005) examines the factors that increase the use of phased retirement programs and buyouts by colleges and universities using data collected in the *Survey of Changes in Faculty Retirement Policies* in 2000. He finds that institutions with only a DC plan were 24 percent more likely to have phased retirement relative to those offering a plan with a DB component. Research universities were 10 percent more likely to have phased retirement programs and public institutions were 7 percent more likely to offer these programs relative to private institutions. Similarly, he finds that since 1994 institutions that offer a DC-only plan were 13 percent more likely to present a buyout offer to its faculty.<sup>6</sup> The finding that institutions with a DC-only plan are more likely to offer phased retirement plans is consistent with administrators implementing strategies to encourage faculty to relinquish tenure because a DC plan does not create these incentives.

Allen, Clark and Ghent (2004) conducted a study of retirement behavior of faculty

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<sup>6</sup>From this same logistic regression, public institutions were 18 percent less likely to offer a buyout and doctoral granting institutions were 17 percent more likely.

in the University of North Carolina (UNC) system, which instituted a phased retirement program in 1996. This program gives tenured faculty meeting a specified age and service length requirement the option of teaching half-time at half-pay for a fixed number of years in exchange for relinquishing tenure.<sup>7</sup> They find that this program increased the total number of faculty in or transitioning into retirement, and that those individuals with lower ability – measured in terms of pay increases – were more likely to enter phased retirement. They also find that full and phased retirement rates were higher for faculty enrolled in the state DB plan versus those enrolled in a DC plan offered by the university. This difference could be due to the economic incentives that favor retiring early once the faculty member is part of the state DB plan. Alternatively, this could be due to self-selection: faculty who chose to enroll in a DB plan have revealed a preference for a shorter career due to the benefit accrual pattern that favors early retirement.<sup>8</sup> Both selection and incentives likely play a role. Decomposing the effect of incentives and selection is important for administrators as they try to design programs to encourage retirement because the majority of academic institutions do not present their faculty with a choice between plans. This decomposition is also relevant to plan administrators and HR practitioners outside of academia. Because this paper uses data on faculty from a cross-section of universities representing a variety of pension plan menus, the effect of plan incentives can be distinguished from career length preferences.

## **2.2 Choice between Defined Contribution and Defined Benefit Plans**

As seen in Table 1, over half of public universities offer faculty a choice between enrolling in a DB and a DC plan. It is important to note that the provision of plan types is related

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<sup>7</sup>The fixed number of years ranges from two to five depending on the college or university within the UNC system.

<sup>8</sup>Faculty in the UNC system have a choice between pension plans.

to institutional characteristics: public colleges and universities typically offer DB plans, while private colleges and universities offer DC plans (Ehrenberg, 2001; Pencavel, 2005). As also seen in Table 1, public universities are much more likely to offer faculty a choice between plans as well as a combination DC-DB plan.<sup>9</sup>

The choice is typically between enrolling in a DB plan sponsored by the state for public employees or the DC plan sponsored by the academic institution. Clark and Pitts (1999) is one of just a handful of studies on retirement plan choice among employees. They examine the choice between a DB and DC plan among faculty in the UNC system. They find that the value of a DB plan relative to a DC plan increases with age when hire and actual length of service, but an increase in demand for DC plans over time.<sup>10</sup> Clark, Ghent, and McDermed (2006) extend the analysis to faculty hired into the UNC system between 1983 and 2001. Besides confirming the finding that the probability of enrolling in the DB has decreased over time, they find that women are more likely to enroll in the DB plan relative to men and that the probability of enrolling in the DB plan is increasing in the age at which the individual was hired. The analysis of plan choice in this chapter is similar to that of Clark and Pitts (1999) and Clark, Ghent, and McDermed (2006), but the main advantage of the *Retirement Confidence Survey of College and University Faculty* is that it is not limited to faculty at a single institution.

Brown and Weisbenner (2007) conduct a study of pension plan choice for employees in the State Universities Retirement System (SURS) of Illinois. Unlike Clark and Pitts (1999), Brown and Weisbenner analyze the choice for all university employees, including

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<sup>9</sup>In the data collected by the Survey of Changes in Faculty Retirement Policies, combination plans are typically a mandatory DB plan with a supplemental DC component to which faculty can elect to contribute (Pencavel, 2005).

<sup>10</sup>Because the value of a DB plan increases most in the final years before retirement, the value of DC plan relative to a DB plan is higher for those faculty who expect to leave the university before retirement. Clark and Pitts (1999) use actual service length, as measured in the administrative records, as a proxy for mobility expectation.

administrators, faculty, and staff. They find that the majority of employees (55.7 percent of workforce) do not make an active choice between the three offered plans (DC, portable-DB, and traditional-DB) and are instead defaulted into the traditional-DB plan after six months of service. Of those employees making an active choice (44.3 percent of workforce), most choose the portable-DB plan (42 percent), followed by the DC plan (34.5 percent) and the traditional-DB plan (23.5 percent). They find that married individuals with greater annual income, higher education, and who are working at an institution where a higher fraction of employees choose the DC plan are more likely to enroll in the DC plan. Because they focus on plans offered by a single institution, Brown and Weisbenner evaluate the merits of the three different plans. Interestingly, they find that under reasonable assumptions about market returns the portable-DB is the optimal plan, yet the more financially sophisticated individuals elect the DC plan.<sup>11</sup> Their case study allows for a detailed analysis of plan choice, which enables them to uncover systematic mistakes made by individuals in their selection of pension plans. However, restricting their analysis only to employees in SURS generates a few shortcomings. Besides the difficulty of generalizing their findings to other universities due the unique plan menu and benefit formulas, employees in SURS are not covered by Social Security. Thus, the authors cannot determine how Social Security coverage affects plan choice. Because the data used in this paper include faculty with and without Social Security coverage, the effect of coverage on plan choice is analyzed.

The termination of a DB plan by an employer also provides an opportunity to study plan choice because employees are typically offered the option of remaining in the DB plan or switching to the newly-created DC plan. Papke (2004) studies the plan selection of Michigan public employees, who were offered a one-time switch from the existing DB plan

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<sup>11</sup>Employees who leave the institution after vesting would have to earn an annual return of 8.5% over a 30-year time horizon in order for the DC plan to be optimal relative to the portable-DB plan (Brown and Weisbenner, 2007).

to a state-sponsored DC plan. However, the examination of determinants of plan choice was limited due to the very small fraction of employees who elected into the DC plan. Yang (2005) examines the one-time choice of workers at a non-profit institution to switch from the employer-sponsored DB plan to a DC plan. She finds that over half of the employees switched plans and workers who are female, white, and have higher incomes are more likely to choose a DC plan. In addition, those with prior experience in a DC plan and those who had a lower expected internal rate of return in the DB plan are more likely to elect the DC plan. She also finds that the default option – employees were kept in the DB plan if they did not select a plan – affected the outcome for a sizable fraction of workers. She finds that those who stayed in the DB plan by default were more similar in characteristics to those who elected the DC plan, suggesting that these workers would have been better off if they had switched plans. Similar to Brown and Weisbenner (2007), Yang provides insight into the role played by defaults; however, both of these studies are limited because the analysis is restricted to one employer.

While the economic incentives inherent in DB plans will likely decrease the retirement age of plan participants relative to those in a DC plan, this has not been tested while controlling for whether the faculty member had a choice between plans because the analyses in the literature have only looked at plan choice at a single institution. The data collected in the *Retirement Confidence Survey of College and University Faculty* allow for an analysis of how plan incentives affect retirement expectations by looking at those faculty members who do not have a choice between plans. Additionally, by comparing the expected retirement age of faculty who have a choice between pension plans with those without such a choice, this paper examines whether preferences over career length enhance differences in plan incentives.

### 3 Models of Pension Choice and Pension Wealth Accrual

This section first outlines a framework for analyzing the choice between pension plans and then explicitly examines the difference in pension wealth accrual patterns between DB and DC plans. For plan selection, individuals are assumed to choose the plan that gives them the highest expected utility. The difference between the expected utility from a DC plan and the expected utility of a DB plan can be analyzed in a latent index framework:

$$EU_i(DC) - EU_i(DB) = I(\text{mobility}_i, \text{risk aversion}_i, \text{financial literacy}_i, \text{other annuity}_i, \text{year}_i) \quad (1)$$

The difference in the expected values is not observable, but the choice made by the faculty is known. If the difference in Equation 1,  $EU_i(DC) - EU_i(DB)$ , is positive, the individual chooses the DC plan. This difference is a function of mobility risk, risk aversion, financial literacy, other annuity assets, and a time trend. DC assets are more portable than DB assets because DB plans have longer vesting requirements and because DC assets can be rolled over into another DC plan, therefore, the index is increasing in mobility risk. The index is decreasing in risk aversion because DC assets expose the individual to more investment risk. It should be noted that the possibility of default is a legitimate risk of DB plans, which has become clear recently in the private sector due to under-funding of pension funds. Because DC plans require the individual to make contribution and investment decisions, the index is increasing in financial literacy. Holding other defined benefit retirement assets, such as Social Security, reduces the value of a DB plan from the standpoint of asset diversification and thus increases the value of the index. Finally, since there has been a shift to DC plans over time, particularly in the private sector, individuals hired in later years could be more familiar with these savings plans and thus may be more likely to choose this type of plan.

Many of the aforementioned factors in the above index are not directly observable in the data and thus other characteristics will be used as proxies. Job position and education will be used as proxies for mobility risk as well as for career length preferences (the underlying assumption being that individuals with doctorates have a greater preference for a long career than individuals with Bachelor's or Master's degrees). Gender will be used as a proxy for risk aversion: females are assumed to be more risk averse than males. In the survey, faculty were asked whether they have calculated the amount of savings they will need to live comfortably in retirement; responding affirmatively to this question is a proxy for financial literacy or savvy. Another measure of financial literacy, or fiscal health, is whether debt is a major or minor concern for the individual. The presence of other defined benefit assets in the individual's retirement portfolio is measured by whether the individual is covered by Social Security.<sup>12</sup> The increasing popularity of DC plans is captured by a series of binary variables for the decade in which the individual was hired (i.e. the year she made a choice between plans).

For the estimation,  $I$ , is approximated by a linear function of the covariates described above plus an additive error term,  $u$ , to account for unobservable heterogeneity. Equation 2 defines the linear index and  $I^*$  is the value of the index: a positive value for  $I^*$  corresponds to the individual choosing to enroll in the DC plan (e.g. the DC plan has the higher expected utility):

$$I_i^* = X_i\beta + \delta_1 \text{ position}_i + \delta_2 \text{ education}_i + \delta_3 \text{ financial literacy}_i + \delta_4 \text{ SS Coverage}_i + \delta_5 \text{ hireyear}_i + \epsilon_i. \quad (2)$$

In the above equation,  $X_i$  is a vector of demographic characteristics, such as gender, marital

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<sup>12</sup>A home is another asset that could provide a stream of income similar to an annuity (e.g. through a reverse mortgage); however, the data does not contain a clean measure of homeownership.

status, and household income. If we assume that  $\epsilon_i$  is distributed standard normal, we can estimate the probability of choosing a DC plan using a probit model. Hence, we have the following specification:

$$Pr(DC_i = 1) = \Phi(X_i\beta + \delta_1 \text{ position}_i + \delta_2 \text{ education}_i + \delta_3 \text{ financial literacy}_i + \delta_4 \text{ SS Coverage}_i + \delta_5 \text{ hireyear}_i) \quad (3)$$

where  $\Phi$  is the standard normal cumulative distribution function. The results on the determinants of plan selection for those individuals offered a choice between plans are presented in Section 5.1.

As for the effect of plan type on retirement behavior, this paper conducts a reduced-form analysis relating individual characteristics and plan type to expected retirement age. The starting point for the analysis is that the change in pension wealth from postponing retirement an extra year is not the same across DB and DC plans. For example, think of an individual at age  $a$  computing the expected value of retiring at age  $a_R$ :

$$EV_a(a_R) = \sum_{t=a}^T \delta^{t-a} y_t + \sum_{t=a}^{a_R-1} \delta^{t-a} w_t + \sum_{t=a_R}^T \delta^{t-a} B_p(t) \quad (4)$$

where  $y_t$  is the stream of non-wage income,  $w_t$  is the stream of after-tax wages and  $B_p$  is the stream of benefits received from plan type  $p$  at retirement (age  $a_R$ ) until the individual dies (age  $T$ ).

The change in the expected value from postponing retirement one year is:

$$\frac{dEV_a(a_R)}{da_R} = \delta^{a_R-a} w_{a_R} - \delta^{a_R-a} B_p(a_R) + \sum_{t=a_R+1}^T \delta^{t-a} \frac{dB_p(t)}{da_R} \quad (5)$$

where  $\frac{dB_p}{da_R}$  is the change in the stream of benefits for plan  $p$  from postponing retirement.



For DC plans, this value is always positive. However, for DB plans it could be positive or negative depending on how the individual's retirement age relates to the plan's normal retirement age (NRA).

The difference in benefit accrual between the two plans was discussed previously in Section 2.2. To be more explicit, the annual benefit received in retirement for individual  $i$  in DB plan  $j$  has the following structure:

$$\text{Annual Benefit}_i = \text{Age Factor}_j * \text{Multiplier}_j * \text{Years of Service}_i * FAS_i \quad (6)$$

The *Multiplier<sub>j</sub>* term in Equation 6 is a factor that varies across DB plans (indexed by  $j$ ), but typically has a value between 1.0 and 2.0. *Years of Service<sub>i</sub>* is the number of years served by individual  $i$  upon retirement and *FAS<sub>i</sub>* is her final average salary, which is typically an average of the final three or five highest salaries (the number of years used in the calculation varies across DB plans). Of particular interest is the *Age Factor<sub>j</sub>*, which is designed to reduce the stream of annual benefits by some specific schedule if the individual retires before plan  $j$ 's NRA to reflect a longer life expectancy at retirement. The *Age Factor* equals one if the employee retires at (or after) the plan's NRA. The key feature for retirement incentives is that workers are not compensated for shortened life expectancies at retirement if they postpone retirement beyond the plan's NRA. In some instances, the *Age Factor* schedule is such that it is optimal to retire before the plan's NRA. In addition, DB plans often impose a maximum replacement rate for annual benefits, typically around 80 percent of *FAS*. This could result in additional years of service from postponing retirement not counting in the computation of annual benefits. Hence, postponing retirement past the plan's NRA leads to a reduction in pension wealth for DB plan participants. For DC plans, however, an additional year of service results in another year of employer contributions on a (typically) higher salary base as well as an additional

year of compounding for assets held in the account. At retirement, the DC participant could elect to annuitize the assets, which would actuarially adjust for her remaining life expectancy. Hence, DC plans do not impose incentives for retirement and can be considered age-neutral with respect to their effect on retirement age.

It is important to note that the difference in retirement age between DB and DC plans is related to the NRA of DB plans. For DB participants, their expected pension wealth has an inverted “U-shape” over retirement age and is typically maximized at the plans NRA: delaying retirement beyond the NRA leads to a reduction in expected benefits. However, for DC participants, the expected value of pension wealth is increasing in retirement age. Whether DB plans will induce an earlier retirement age, on average, relative to DC plans depends on the NRA of the DB plan. If the NRA is 55, then DB participants would likely retire from their careers before DC participants on average. However, if the NRA is 75, then the DB plan would have the opposite effect: DB participants would retire after DC participants on average.

The NRA varies across DB plans. Figure 1 displays the distribution of NRA for the DB plans offered to state public employees. The two most common ages are 60 and 65, followed by 62 and 55. The average NRA across the fifty U.S. States is 62.1. Figure 2 plots the distribution of NRA for those faculty members in the sample who are participating in a DB plan at public institutions. The most common NRA for participants in the sample is 65, followed by 60 and 62; only a small fraction of the sample are in a DB plan with a NRA of 55. The average NRA for these participants is 62.7. Given these results, we would expect the retirement age of faculty in DB plans to be below that of DC plan participants on average.<sup>13</sup> Figures 3 and 4 graph the unconditional distribution of expected retirement

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<sup>13</sup>This is because delaying retirement always increases expected pension wealth for DC participants, which is not the case of DB participants. However, whether the retirement age of DC participants is above or below DB participants depends on the distribution of preferences over career length because DC plans are neutral with respect to retirement age.

age by plan type. For DC participants, more individuals expect to retire after age 65 relative to DB participants, resulting in a higher average expected retirement age for DC participants.

## 4 Retirement Confidence Survey Data and Methodology

The *Retirement Confidence Survey of College and University Faculty* collects information on retirement expectations and saving behavior of faculty in higher education. It consists of a representative sample of all college and university faculty and includes 1,307 responses, surveyed by telephone between March and May of 2005. Some information on institutional characteristics, as well as demographic information, was also collected. The purpose of this survey was to better understand retirement expectations and saving behavior of faculty in higher education as well as to compare the findings to those collected in the 2005 *Retirement Confidence Survey*, which polls American workers employed in all sectors and industries.

Preliminary results compiled by the TIAA-CREF Institute found that faculty members are more likely to have started saving for retirement and more confident that they will have enough money in retirement relative to the general working population (see Table 2) (Yakoboski, 2005). Faculty are also more likely to be covered by an employer-sponsored pension plan relative to all working Americans: 59 percent of the working population report having an employer-sponsored pension plan compared with 85 percent of faculty respondents. While the findings in this analysis – the impact of plan type on retirement – are relevant to academic institutions as well as to non-academic employers, one needs to keep the differences between these two groups in mind.

This paper restricts its analysis to faculty participating in an employer-sponsored re-

tirement plan. Hence, faculty members who were either not offered a plan or were offered a plan but chose not to participate are not included in this analysis. To analyze the effect of plan type on expected retirement age as well as the determinants of plan choice, faculty are categorized by the menu of pension plans offered by the institution: 1) No Choice – faculty at institutions that only offer a DC, a DB, or a combined plan; and, 2) Choice – faculty at institutions in which a choice between a DB and a DC plan is offered. The categorization refers to whether the institution offers one primary plan to faculty, or whether it offers a choice between a DB and a DC plan for its primary plan. Because these are survey data, classification of faculty members into plan-offering categories could be problematic if individuals do not accurately recall the menu of plan options offered at the time they were hired. For faculty employed at public institutions, this paper uses the *Survey of Changes in Faculty Retirement Policies* collected by the AAUP in 2000 as well as correspondence with human resource managers at the state universities to determine which public universities offer a choice between plans.<sup>14</sup> For those faculty employed at a private university, the plan menu is constructed based on which plan the faculty member is participating in and their recollection of plan offerings. However, the problem of recall is less of a concern for faculty employed at private universities because they are rarely offered a choice between plans (see Table 1).

Table 3 shows the distribution of faculty by whether a choice between plans was offered: the majority of faculty members were not offered a choice (577 out of 991). Just under half of faculty members at public institutions were offered a choice (408 out of 882) and only a handful of faculty at private institutions report being offered a choice between plans (6 out of 109). The distribution of pension plans is given by institution type and choice in Table 4. The majority of faculty at public institutions (501 out of 882) participate in a DB plan

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<sup>14</sup>The AAUP data include plan offerings for 607 academic institutions.

in some capacity – either only a DB plan or both a DB and DC plan – while the majority of faculty in private universities participate in only a DC plan (85 out of 109).

Faculty members who indicate that they participate in both a DB and DC plan and who do not have a choice between plans are in one of the following situations: 1) the DB plan is the primary employer-sponsored plan and they are making additional contributions to a supplemental TDA plan, such as a 403(b); 2) they participate in a combined DB-DC plan sponsored by the institution; or, 3) the university had a DB plan as its primary plan when the faculty member was hired but has since closed the plan and now sponsors a DC plan. Because part of their retirement wealth is subject to the benefit rules of the DB plan, these individuals are separated from faculty in a DC-only plan. Faculty members who participate in both plans and who were offered a choice between plans are likely in the first scenario: they elected to enroll in the DB plan and also contribute to a supplemental TDA plan. Hence, these faculty members are classified as having chosen a DB plan as their primary plan; the determinants of making additional contributions to a TDA is also examined in this study.

The primary goal of this paper is to examine the effect of pension plan incentives on expected retirement age. Table 5 shows the unconditional expected retirement age by plan type and menu of plan offerings. The difference across plans is evident in the unconditional mean: faculty members in a DC-only plan expect to retire one and a half years later, on average, than those participating in a DB plan. The difference is greater for those faculty members who were offered a choice between plans (nearly two years), suggesting that preferences enhance plan incentives. The analysis in Section 5.3 will attempt to estimate the relative effect of plan incentives and preferences.

Table 6 lists descriptive statistics of faculty member characteristics by whether they were offered a choice between plans. The two groups are not significantly different in terms

of individual characteristics.<sup>15</sup> Because the two groups are very similar, the assumption made by this paper that the menu of plan offerings by the institution is not a primary determinant of a faculty-institution pairing seems reasonable.

The institutional characteristics do differ across the two groups (Table 7). A larger fraction of individuals who are offered a choice are employed by public institutions, which is expected given that nearly all institutions offering a choice are public (Ehrenberg, 2001). Individuals in institutions without a choice are more likely to work at four-year academic institutions, which is related to the public-private difference between the groups because two-year institutions are much less likely to be private (2 out of 238 faculty are employed at a two-year, private institution). Faculty who are not offered a choice between plans are also more likely to be covered by Social Security, which is also related to the public-private difference because exemptions from Social Security were only possible for public-sector employees.<sup>16</sup>

One possible concern for this analysis is that the terms of the two plans (DB versus DC) offered by institutions with a choice strictly favor one plan over the other, limiting the role for individual preferences in plan selection. In the *Survey of Changes in Faculty Retirement Policies*, those institutions that offer a choice between DB and DC plans report the percent of faculty enrolled in each plan. To evaluate the possible role for preference in the choice between plans, the percent of faculty enrolled in the DB plan is computed by state, with plan enrollment weighted by the number of faculty at each institution. Figure 5 shows the percent of faculty enrolled in the DB plan for those twenty states whose public universities offer a choice between pension plans.<sup>17</sup> Sixteen of the twenty states have DB

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<sup>15</sup>The one exception is that there is a greater fraction of individual with household income category of \$75K to \$150K among faculty who have a choice between plans.

<sup>16</sup>States whose employees do not participate in Social Security and who offer faculty a choice between pension plans include Illinois, Louisiana, Massachusetts, Ohio, and Texas.

<sup>17</sup>These states include: Arizona, Arkansas, Connecticut, Florida, Georgia, Illinois, Iowa, Louisiana, Maryland, Massachusetts, New York, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee,

enrollment between 20 and 80 percent, which suggests that the terms of one pension plan do not strictly dominate the other for most of these university systems. The most one-sided states are Arkansas (3.1 percent in DB), Iowa (8.8 percent in DB), Tennessee (13.4 percent in DB) and Texas (19.5 percent in DB). Because of the relative balance in enrollment percentages for most states, it is likely that career length preferences affect an individual's choice between plans. In addition, the findings of this study are robust to excluding the 35 faculty members from Iowa and Arkansas from the analysis.

## 5 Results

This section first examines determinants of plan selection for faculty members with a choice between pension plans. Similar to Clark and Pitts (1999), faculty members are assumed to choose the plan – DB or DC plan – that will give them the highest expected value. Second, this study attempts to quantify the effect of plan incentives on expected retirement age of faculty without a choice. Third, by comparing the expected retirement age of those faculty with a choice between plans to those without a choice, this analysis attempts to determine the relative role of career length preferences and plan incentives on expected retirement age.

For faculty without a choice, the effect of plan type on expected retirement behavior operates through differences in retirement incentives between the two plans. This assumes that faculty choose an employer based on total compensation, research support, and teaching load, and not on the type of retirement plan offered.<sup>18</sup> Hence, the distribution of

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Texas, Virginia, and Wyoming. Public universities in Alaska also offered a choice until 2006, but there are no individuals in the sample from Alaska.

<sup>18</sup>Pension plan type is treated as exogenous for these workers, which is plausible because of the thin labor market for faculty and the high weight placed on non-monetary aspects of the job. However, this assumption is tenuous for workers outside of academia. Because pension plan type can be considered exogenous for faculty, it is possible to isolate the effect of plan incentives.

faculty preferences regarding career length is assumed to be the same across plan types for this group, and thus any differences in expected retirement age uncovered between the plan types is attributed to plan incentives. However, the impact of plan type on expected retirement age for those with a choice is due to a combination of incentives *and* preferences because participants choose the pension plan that gives them the highest expected value, which takes into account their preferences regarding career length.

## 5.1 Determinants of Plan Choice

Examining the choice of plans by faculty could provide insight as to how workers outside of academia value DB plans relative to DC plans, which could serve to inform policymakers on how the transition from DB to DC plans has affected worker welfare and help guide policy debates on proposed reforms to Social Security. Of the 414 faculty members in this group, a total of 373 were used in this analysis due to missing values for one or more covariates. Table 8 lists the individual characteristics for individuals with a choice between plans by which plan they elected. The two groups are statistically different in terms of educational attainment and Social Security coverage. The probability of choosing a plan is analyzed as a function of gender, financial literacy and fiscal health, household income, Social Security coverage, educational attainment, and the decade and age of hire using the latent index model described in Section 3. Table 9 shows the marginal effects from three different probit models.

As previously mentioned, there are three groups of plan participants among workers who are offered a choice between plans: 1) those only in a DC plan; 2) those only in a DB plan; and 3) those in a DB plan who are also contributing to a TDA. Column 1 of Table 9 analyzes the probability of enrolling in a DC-only plan. Faculty members without a Ph.D. are less likely to enroll in a DC plan – those with a Master’s or Bachelor’s Degree are over



17 percentage points less likely to enroll in a DC plan and those with a professional degree are 16 percentage points less likely.<sup>19</sup> Current household income as well as measures of financial literacy and fiscal health do not significantly affect the probability of choosing to enroll in a DC plan.<sup>20</sup> Faculty hired at younger ages are less likely to enroll in a DC plan relative to those hired at age 40 or over, which could reflect different expectations about obtaining tenure, although the difference is not statistically significant. Faculty hired in the 1980s are most likely to enroll in a DC plan than faculty hired in other decades, which could be due to the expansion of tax-advantage saving vehicles during this time that increased worker exposure to DC plans.

The strongest determinant of choosing not to enroll in a DC plan is a lack of Social Security coverage: faculty without coverage are nearly 35 percentage points less likely to enroll in a DC plan than those with coverage. This suggests that these workers value having a life annuity as a part of their portfolio of retirement wealth and they seem to be diversifying the source of their retirement income.

Column 2 of Table 9 analyzes the determinants of choosing to enroll in only the DB plan relative to a DC-only or DB plus TDA plan to better understand the determinants of plan choice. Faculty who choose to enroll only in a DB plan seem to be less financially savvy and of lower income: those who have calculated the amount of savings they will need for retirement are 10 percentage points less likely to enroll only in a DB plan and those in the medium and highest household income bracket are nearly 13 and 19 percentage points less likely to participate in only a DB plan. Faculty with a professional degree are nearly 15 percentage points more likely to choose to only participate in a DB plan (relative to those with a Ph.D.) and those with a Master's degree are 8 percentage points more likely, but

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<sup>19</sup>Faculty with a professional degree consists of those with a J.D. or M.D.

<sup>20</sup>*Calculated Retirement Savings* is a binary variable for whether they have tried to calculate how much savings they will need for retirement and *No Debt Problems* is a binary variable for whether their level of debt is currently a minor or major problem.

this difference is not statistically significant. Social Security coverage is not a statistically significant factor that affects the decision to enroll only in a DB plan relative to those in a DC-only plan or those in a DB plus TDA plan.

Column 3 limits the sample to those faculty members who elected to enroll in a DB plan as their primary plan and analyzes determinants of contributing to a supplementary TDA plan, such as a 403(b). Individuals who are more financially savvy are more likely to contribute to a TDA plan: those who have attempted to calculate the amount of savings they will need for retirement are nearly 16 percentage points more likely to contribute to a TDA. Those individuals with higher household income are also more likely to contribute: relative to those with annual household earnings of less than \$75K in 2005, those earning between \$75K and \$150K are 19 percentage points more likely to contribute and those earning over \$150K are 30 percentage points more likely. Faculty members not covered by Social Security are 14 percentage points more likely to contribute to a supplemental TDA, which could be due to higher take-home pay. Individuals who are part of a married couple or partnership are less likely to make additional contributions, although the difference is not significant at conventional levels.

Overall, there appears to be a significant amount of unexplained heterogeneity in the decision of which pension plan to select. Gender, age when hired, and marital status are not significant determinants of plan choice in any of the specifications. The finding that those with a Ph.D. are most likely to enroll in a DC plan could reflect differences in mobility expectations or a higher preference for a long career. Individuals with the highest household income are most likely to participate in a DC plan, either through their primary employer-sponsored plan or through a supplemental TDA. Individuals who participate in only a DB plan appear to be the least financially savvy and are of the lowest household income.

The most interesting finding is that Social Security coverage is the primary determinant of plan choice: individuals without coverage are substantially more likely to enroll in a DB plan, which provides a similar stream of income in retirement as Social Security. This suggests that the transition from employer-sponsored DB plans to DC plans in the private sector has not imposed a significant utility cost on workers due to the widespread coverage of these workers by Social Security. However, reforms that remove or reduce the defined benefit aspect of Social Security could induce welfare loss as workers will have increased exposure to longevity risk and financial market risk and may be unable to diversify their portfolio of retirement wealth.

## 5.2 The Impact of Plan Type on Expected Retirement Age

For those faculty members not given a choice between plans, the type of plan the individual participates in is assumed to be exogenous. The section estimates the effect of individual and institutional characteristics – including plan type – on expected retirement age. The first column of Table 10 displays the estimates from an OLS regression of expected retirement age on plan type for faculty at institutions without a choice between plans.<sup>21</sup> Unconditionally, those in a DC plan expect to retire a year and a quarter later than those in a DB plan and the difference is significant at the one-percent level for the regression sample. After controlling for individual and employer-provided retiree health insurance, the difference drops to eight months and is statistically significant at the 10 percent level.

Financial literacy or savviness are significant determinants of retirement: individuals who have attempted to calculate the amount of savings they need for retirement expect to retire 10 months earlier and those who are in a good financial position, as measured by incidence of debt problems, expect to retire a year earlier. Educational attainment is

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<sup>21</sup>Of the 577 faculty participating in a pension plan who were not offering a choice, 160 were dropped for missing values for covariates

a significant determinant of expected retirement age: those with a Master's or Bachelor's degree expect to retire a year and four months earlier than those with a Ph.D., which could reflect a lower preference for a long career. Gender and marital status are also significant determinants of expected retirement age: women expect to retire nearly two years younger than men and members of a married couple or partnership expect to retire nearly a year and four months earlier than singles. The availability of health insurance for retirees lowers the expected retirement age by nearly five months, but the difference is not statistically significant. Current household income is not a significant determinant of expected retirement age. Tenured professors have the highest expected retirement age, but the difference relative to a Lecturer/Instructor or an Assistant Professor is not statistically significant.

These results indicate that the lack of retirement incentives inherent in DC plans prolong careers of faculty: faculty at institutions that only sponsor a DC plan expect to retire nearly 8 month later than those who at institutions with a DB plan. These results suggest another channel that human resource departments could use to induce earlier retirements: provide financial education to faculty members. Individuals who are more prepared for retirement have lower expected retirement ages on average.

The last column of Table 10 reports estimates from the OLS regression of expected retirement on individual characteristics and plan type for faculty members with a choice between plans. The unconditional difference in expected retirement age for the regression sample is one year and eight months and significant at the one-percent level. This large difference persists even after controlling for individual characteristics and provision of retiree health insurance by the employer: individuals who elect to enroll in a DC plan expect to retire fifteen months earlier than those who elect a DB plan. The difference remains significant at the one-percent level. Hence, individual preferences over career length enhance

the difference in retirement incentives inherent in the two plans.

Similar to faculty without a choice, financial literacy and fiscal health are primary determinants of expected retirement age: both are associated with a expected retirement age of over one year younger than those lacking financial sophistication or who burdened by debt. Individuals with a Master's or Bachelor's degree expect to retire nearly two years earlier than those with a Ph.D., a more sizable difference than that found among faculty without a choice. This finding is consistent with preferences enhancing differences in retirement incentives across plans because the results from Section 5.1 show that these individuals are more likely to enroll in DB plans relative to DC plans. Similar to the group without a choice, women expect to retire about a year earlier than men; couples expect to retire later than singles, but this difference is not significantly different. Interestingly, years of service has a sizable effect on expected retirement age for these individuals: those with less than ten years of service expect to retire over two and a half years later than those with 30 or more years of service. The effect is driven by those who chose to enroll in a DB plan and is likely due to the vesting requirements of these plans. However, it is unclear why the effect is only present among faculty who have a choice.

Overall, financial literacy and pension plan incentives are significantly related to expected retirement age. For those institutions with only a DC plan, financial education is a mechanism by which institutions could indirectly influence the retirement age of faculty: financial preparedness appears to lower expected retirement age. Employers could then target wage increases to retain those faculty with the highest productivity. Offering faculty a choice between plans appears to enhance the difference in retirement incentives across the two plans, which shows that faculty are taking into account these plan incentives when making their choice. The next section pools the two groups together to more clearly differentiate the role of incentives versus preferences over career length.

### 5.3 Directly Comparing Incentives to Preferences

By pooling the two groups, we can analyze the impact of plan type while controlling for whether the faculty member chose the plan in which they participate. In their analysis of the take-up of phased retirement at UNC, Allen, Clark, and McDermed (2004) find that faculty members who chose a DB pension plan were more likely to choose phased retirement, which could reflect the incentives inherent in the DB plan or reflect a greater preference for leisure. This paper attempts to differentiate the two effects.

Table 11 shows the OLS estimates of the effect of plan type, choice of plan, and individual characteristics on expected retirement age. In terms of plan type and choice, individuals are classified into four groups: 1) those in a DC plan without a choice; 2) those in a DB plan without a choice, 3) those who chose a DC plan; and, 4) those who chose a DB plan (excluded group). Faculty who participate in a DC plan have the highest expected retirement age – those who chose to enroll in a DC plan expect to retire over sixteen months after those who chose a DB plan. Faculty in a DC plan without a choice expect to retire fifteen months after those who chose to enroll in a DB plan. There is not significant difference between the expected retirement age of those in a DC by choice and those in a DC plan without choice. Comparing those faculty members without a choice, those in a DC plan expect to retire over eight months later than those in a DB plan and the difference is significant at the ten-percent level. Faculty who choose to enroll in a DB plan expect to retire nearly 7 months earlier than those in a DB plan without choice, but the difference is only marginally significant (p-value = .141). The remaining results are similar to those presented in Section 5.2. Indicators of financial literacy and fiscal health continue to be associated with earlier expected retirement ages. Women expect to retire nearly a year and a half before men and individuals with a Master’s or Bachelor’s degree expect to retire over a year and a half earlier than those with a Ph.D.

Hence, plan incentives affect expected retirement age, generating an eight-month wedge between plans; preferences of individuals over career length double the effect. The role of preferences appears a bit asymmetric: the effect of plan choice is slightly stronger for those who choose to enroll in a DB plan. This means that participants who choose a DB plan have a stronger preference for a shortened career than those who choose a DC plan have for a longer career. This finding is consistent with the DB benefit formulas actuarial adjustment for early retirement.

## 6 Concluding Remarks

This paper shows that the age-neutrality feature of DC plans with respect to pension accrual results in longer expected employment of DC participants relative to DB participants. Additionally, preferences over career length enhance the differences in retirement incentives between DB and DC plans: the greatest difference in expected retirement age is between faculty who choose to enroll in a DB plan and those who chose to enroll in a DC plan. These results were obtained by assuming that plan offerings are exogenous to employer-employee matches, which is sensible in academia due to the thin market and large weight placed on other non-monetary aspects of the job. This allows for a relatively clean separation of plan incentives from career-length preferences, which is not typically attainable using data from other labor markets. Hence, this analysis shows that preferences over career length play as large of a role as incentives when comparing retirement behaviors across the two plans.

When crafting human resource policies, employers need to be aware of the retirement incentives inherent in the pension plans they offer as well as the ability of preferences to amplify these differences. In addition, financial literacy appears to play an important role by both lowering expected retirement age and increasing the probability of contributing to supplemental DC plans. This suggests that helping faculty members use a DC plan could

offset the postponement of retirement due to the age-neutrality of DC plans.

As for policymakers, financial education will play a crucial role in preparing individuals for the investment responsibility inherent in the increasingly popular DC plan and the subsequent exposure to longevity risk. In addition, the plan choice of faculty members reveals a desire to diversify their sources of retirement income by including both DC and DB plans in their portfolio of retirement wealth. If we can generalize this result outside of academia, this implies that the widespread transition from DB to DC plans in the private sector likely caused little welfare loss because of the widespread coverage of these workers by Social Security, which provides an income stream similar to DB plans. However, reducing or eliminating the defined benefit aspect of Social Security could negatively affect worker welfare and needs to be taken into account when evaluating potential reforms.

It is important to keep in the mind the limitations of this analysis. In particular, this paper examines the pension plan choice and retirement expectations of college and university faculty, who are more educated and more financially literate than most U.S. workers (Yakoboski, 2005). The study also uses expected retirement age as the outcome of analysis, which could differ from actual retirement ages. Unlike the case study approach of Brown and Weisbenner (2007), the data used in this analysis do not contain specific features of each pension plan offered by universities and, therefore, this study cannot compare the relative merits of the plans or adequately address the role of default options in plan choice.



Table 1: Pension Plan Offerings by Institution Type

Institution Type	Count	DB Only	DC Only	Combination	Choice of DB or DC plan
All	607	15.3%	41.1%	7.6%	35.9%
Public	392	20.9%	12.7%	10.9%	55.2%
Private	215	5.1%	93.0%	1.4%	0.05%

Source: Pencavel (2005) and Ehrenberg (2003) using data collected by AAUP in 2000.

Table 2: Pension Plan Offerings by Institution Type

Confidence About Retirement Income Propects		
	Faculty	All Workers
Very Confident	35%	25%
Somewhat Confident	51%	40%
Not too Confident	11%	17%
Not at all Confident	3%	17%
Don't Know/Refused	≤.5%	1%
Retirement Savings		
	Faculty	All Workers
Have Started Saving for Retirement	95%	69%
Currently Saving for Retirement (Among those who have saved)	91%	91%
Tried to Calculate Savings Needed for Retirement	69%	42%

Source: Yakoboski (2006)

Table 3: Classification of Faculty by Institution Type and Plan Choice

Institution Type	Plan Offerings		Total
	No Choice	Choice	
Public	474	408	882
Private	103	6	109
Total	577	414	991

Table 4: Classification of Faculty by Institution Type, Plan Choice, and Plan Enrollment

Public	Plan Participation	No Choice	Choice	Total
	DC Only	205	176	381
	DB Only	114	106	220
	DB and DC	155*	126**	281
	Total	474	408	882
Private	Plan Participation	No Choice	Choice	Total
	DC Only	80	5	85
	DB Only	1	1	2
	DB and DC	22*	0	22
	Total	103	6	109

\* Participation in both DB and TDA, a combined plan, or DB plan closure

\*\* Participation in both DB and TDA

Table 5: Expected Retirement Age by Plan Type and Choice

Plan Type	No Choice	Choice	All	Observations
DC-Only Plan	66.24	66.19	66.22	434
DB Plan	64.92	64.30	64.65	482
All Plans	65.57	65.15	65.39	916
Observations	532	384	916	

Table 6: Descriptive Statistics of Faculty by Plan Choice

Characteristics	No Choice			Choice			Different at 5% Level?
	N	Mean	St.Dev.	N	Mean	St.Dev.	
Expected Retirement Age	532	65.57	4.30	384	65.15	4.13	No
Female	577	29.3%	0.455	414	31.9%	0.467	No
Married or with Partner	573	83.9%	0.367	412	84.2%	0.365	No
Age	577	54.46	9.29	414	54.48	7.95	No
White	577	88.6%	0.319	414	88.9%	0.315	No
BA or MA Degree	577	26.00%	0.439	414	29.7%	0.458	No
Professional Degree	577	14.38%	0.351	414	13.0%	0.337	No
Ph.D.	577	59.62%	0.491	414	57.2%	0.495	No
Years of Service	573	20.70	10.44	414	20.17	9.91	No
Age when hired	573	33.86	7.56	414	34.31	7.45	No
Instructor or Lecturer	577	13.9%	0.346	414	12.8%	0.335	No
Assistant Professor	577	10.9%	0.312	414	11.6%	0.321	No
Tenured Professor	577	75.2%	0.432	414	75.6%	0.430	No
Retirement Income Calculation	575	71.8%	0.450	413	70.9%	0.455	No
No Debt Problems	574	71.3%	0.453	413	75.5%	0.430	No
HH Income <\$75k	499	29.7%	0.456	377	24.1%	0.428	No
\$75K < HH Income <\$150k	499	57.3%	0.495	377	63.9%	0.481	Yes
HH Income over \$150k	499	13.0%	0.337	377	11.9%	0.325	No

Table 7: Characteristics of Institution by Plan Choice

Characteristics	No Choice			Choice			Different at 5% Level?
	N	Mean	St.Dev.	N	Mean	St.Dev.	
Public	577	82.1%	0.388	414	98.6%	0.383	Yes
Four-Year	577	78.3%	0.412	414	72.7%	0.412	Yes
Not Covered by Soc. Security	573	11.0%	0.313	409	22.2%	0.416	Yes
Retiree Health Insurance	513	54.0%	0.499	379	57.3%	0.499	No

Table 8: Descriptive Statistics of Faculty by Plan Selection

Characteristics	Chose DB Plan		Chose DC Plan	
	Mean	St.Dev.	Mean	St.Dev.
<b>Financial Position</b>				
Calculated Retirement Income	69.0%	0.464	74.8%	0.435
No Debt Problems	78.3%	0.407	79.3%	0.407
HH Income < \$75k	26.9%	0.444	20.1%	0.402
\$75K < HH Income < \$150k	63.0%	0.484	65.4%	0.477
HH Income over \$150k	10.2%	0.303	14.5%	0.353
<b>Education</b>				
Masters Degree or Less	35.2%*	0.351	22.0%*	0.416
Professional Degree	15.3%	0.491	10.1%	0.302
Ph.D.	49.5%*	10.44	67.9%*	0.468
<b>Employment</b>				
Hired before 1980	30.1%	0.460	27.0%	0.446
Hired 1980 to 1989	32.9%	0.471	38.3%	0.488
Hired 1990 or after	29.2%	0.456	23.9%	0.428
Instructor or Lecturer	14.4%	0.351	12.6%	0.333
Assistant Professor	12.0%	0.322	10.1%	0.302
Tenured Professor	73.6%	0.442	77.4%	0.420
Not Covered by Soc. Sec	33.6%*	0.474	10.1%*	0.302
<b>Demographics</b>				
Female	36.1%	.481	28.3%	0.452
Married or Living with Partner	81.5%	.389	86.2%	0.343
Hire Age	34.1	7.4	35.0	7.5
Hire Age: less than 28	19.9%	40.0%	14.5%	0.353
Hire Age: 28 to 34	36.6%	48.3%	37.7%	0.486
Hire Age: 35 to 39	25.9%	43.9%	25.2%	0.435
Hire Age: 40 or over	17.6%	43.9%	22.6%	0.420
Observations	216		159	

\* Statistically Different at 5% Level

Table 9: Determinants of Plan Selection

	Chose DC (only) 1	Chose DB (only) 2	Added TDA (of those who chose DB) 3
Calculated Retirement Income	0.038	-0.101	0.158
	0.062	0.056+	0.081*
No Debt Problems	0.100	-0.020	-0.071
	0.063	0.057	0.087
Income \$75K $\leq$ Income $\leq$ \$150K	0.050	-0.126	0.191
	0.071	0.063*	0.092*
Income over \$150K	0.101	-0.187	0.300
	0.108	0.057**	0.108**
<i>Excluded: Income less than \$75K</i>			
Masters Degree or less	-0.172	0.082	-0.020
	0.066**	0.063	0.092
Professional Degree	-0.163	0.145	-0.106
	0.074*	0.080+	0.107
<i>Excluded: PHD</i>			
Hired in 1960s or 1970s	0.000	0.026	-0.044
	0.092	0.079	0.120
Hired in 1980	0.121	-0.073	0.066
	0.073+	0.059	0.098
<i>Excluded: Hired in 1990s or 2000s</i>			
Instructor or Lecturer	0.150	-0.073	0.045
	0.098	0.071	0.129
Assistant Professor	0.065	-0.071	0.093
	0.101	0.073	0.126
<i>Excluded Tenured Professor</i>			
Not Covered by Soc. Security	-0.344	0.053	0.142
	0.052**	0.058	0.076+
Female	-0.034	0.036	-0.048
	0.062	0.054	0.081
Couple	0.102	0.031	-0.154
	0.074	0.064	0.098
Hire Age: Under 28	-0.155	0.039	0.069
	0.095	0.095	0.140
Hire Age: 28 to 34	-0.063	0.003	0.031
	0.082	0.072	0.117
Hire Age: 35 to 39	-0.076	-0.020	0.101
	0.079	0.069	0.110
<i>Excluded: Age 40 or older</i>			
Log-Likelihood	-226.5	-204.7	-139.4
Observations	373	373	214

dF/dX Listed Above; St. Errors listed Below

+ significant at 10%; \* significant at 5%; \*\* significant at 1%

Table 10: Determinants of Expected Retirement Age – By Choice

	No Choice	Choice
DC Plan (only)	0.670	1.283
	.391+	0.414**
Calculated Retirement Income	-0.788	-1.190
	.447+	0.477*
No Debt Problems	-0.986	-1.187
	.430*	0.490*
Income \$75K $\leq$ Income $\leq$ \$150K	-0.526	-0.322
	0.487	0.551
Income over \$150K	0.071	-0.202
	0.702	0.789
<i>Excluded: Income less than \$75K</i>		
Masters Degree or less	-0.136	-1.939
	.565*	0.532**
Professional Degree	0.020	-0.147
	0.570	0.618
<i>Excluded: PHD</i>		
Years of Service: Less than 10 years	-0.052	2.556
	0.832	0.932**
Years of Service: 10 to 19 years	-0.011	0.520
	0.637	0.713
Years of Service: 20 to 29 years	-0.930	-0.124
	0.613	0.688
<i>Excluded: 30 or more years</i>		
Instructor or Lecturer	-0.444	-0.081
	0.681	0.680
Assistant Professor	-0.779	-0.046
	0.738	0.795
<i>Excluded: Tenured Professor</i>		
Retiree Health Insurance	-0.406	-0.258
	0.395	0.416
Female	-0.183	-1.007
	.466**	0.466*
Couple	-0.135	0.793
	.599*	0.605
Age Controls	<i>Included</i>	<i>Included</i>
Constant	71.229	68.470
	.842*	0.954**
R-Squared	0.275	0.305
Observations	417	318

dF/dX Listed Above; St. Errors listed Below

+ significant at 10%; \* significant at 5%; \*\* significant at 1%

Table 11: Determinants of Expected Retirement Age – Pooled Sample

Chose DC Plan	1.388
	0.428**
DC Plan - No Choice	1.254
	0.391**
DB Plan - No Choice	0.555
	0.376
<i>Excluded: Chose DB Plan</i>	
Calculated Retirement Income	-0.987
	0.321**
No Debt Problems	-1.147
	0.319**
Income \$75K ≤ Income ≤ \$150K	-0.618
	0.361+
Income over \$150K	-0.235
	0.519
<i>Excluded: Income less than \$75K</i>	
Masters Degree or less	-1.560
	0.389**
Professional Degree	-0.021
	0.419
<i>Excluded: PHD</i>	
Years of Service: Less than 10 years	1.161
	0.613+
Years of Service: 10 to 19 years	0.189
	0.473
Years of Service: 20 to 29 years	-0.672
	0.456
<i>Excluded: 30 or more years</i>	
Instructor or Lecturer	-0.488
	0.478
Assistant Professor	-0.563
	0.538
<i>Excluded: Tenured Professor</i>	
Retiree Health Insurance	-0.317
	0.283
Female	-1.436
	0.332**
Couple	-0.252
	0.418
Age Controls	<i>Included</i>
Constant	69.786
	0.665**
R-Squared	0.263
Observations	735

dF/dX Listed Above; St. Errors listed Below

+ significant at 10%; \* significant at 5%; \*\* significant at 1%



Figure 1: Distribution of NRA for State-Sponsored DB Plans – *Dashed line denotes the mean NRA*

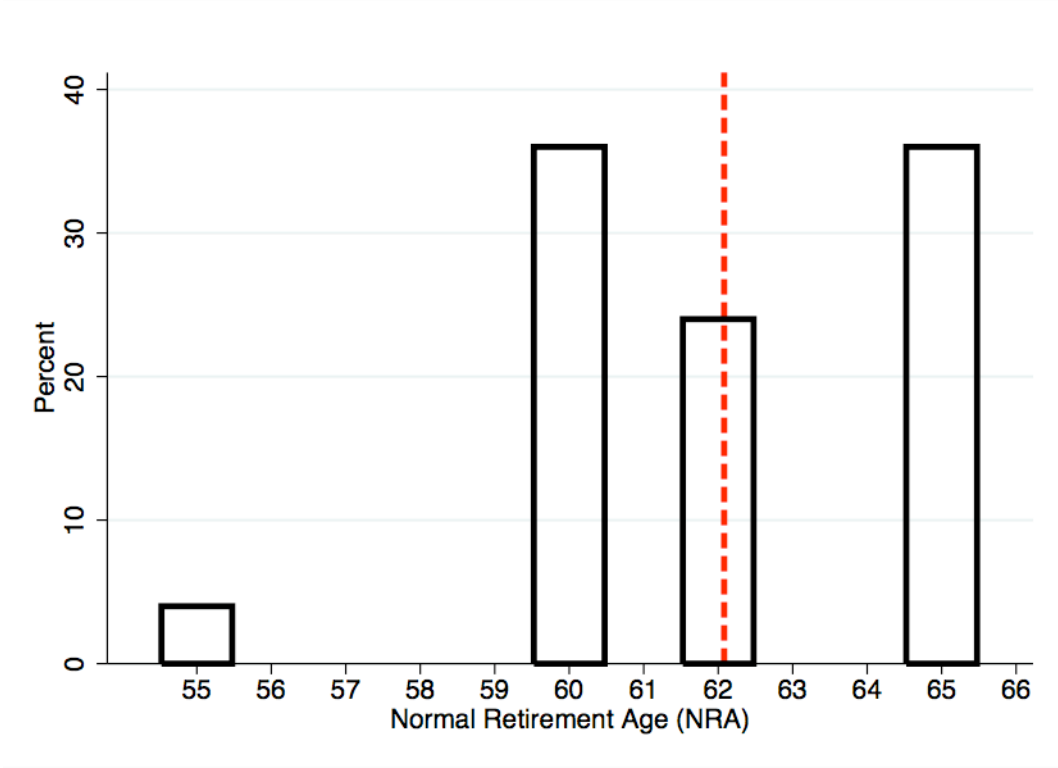


Figure 2: Distribution of NRA for Faculty Enrolled in a DB Plan at Public Universities –  
*Dashed line denotes the mean NRA*

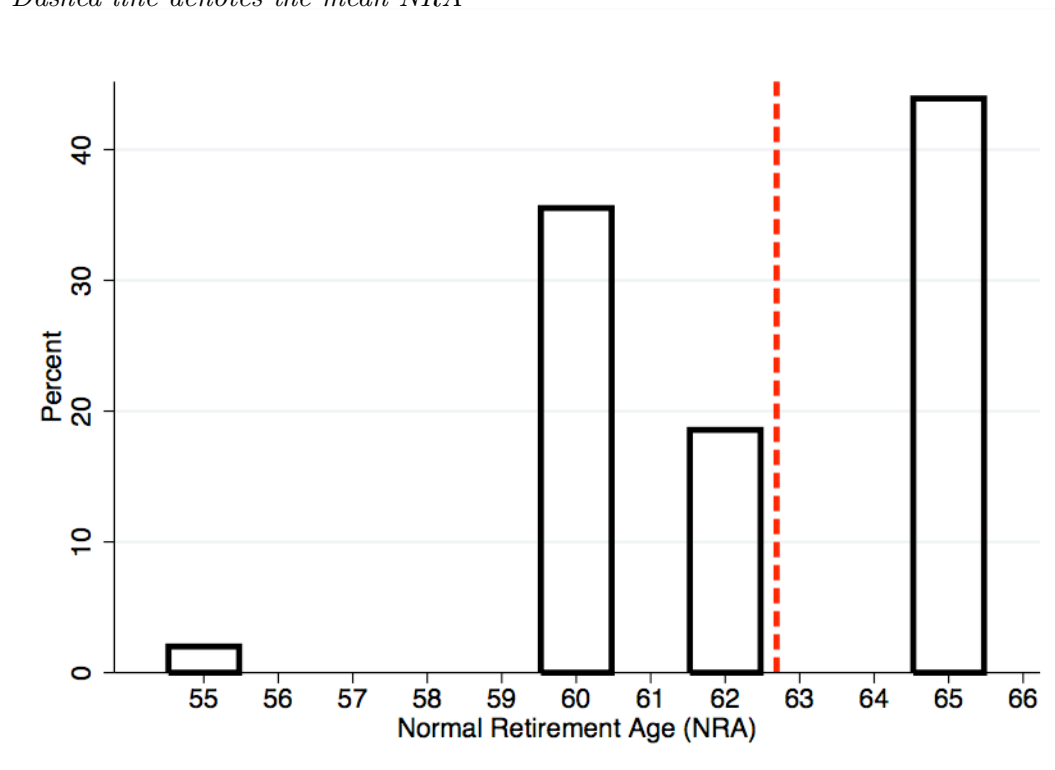


Figure 3: Distribution of Expected Retirement Age for DB Participants – *Dashed line denotes the mean value*

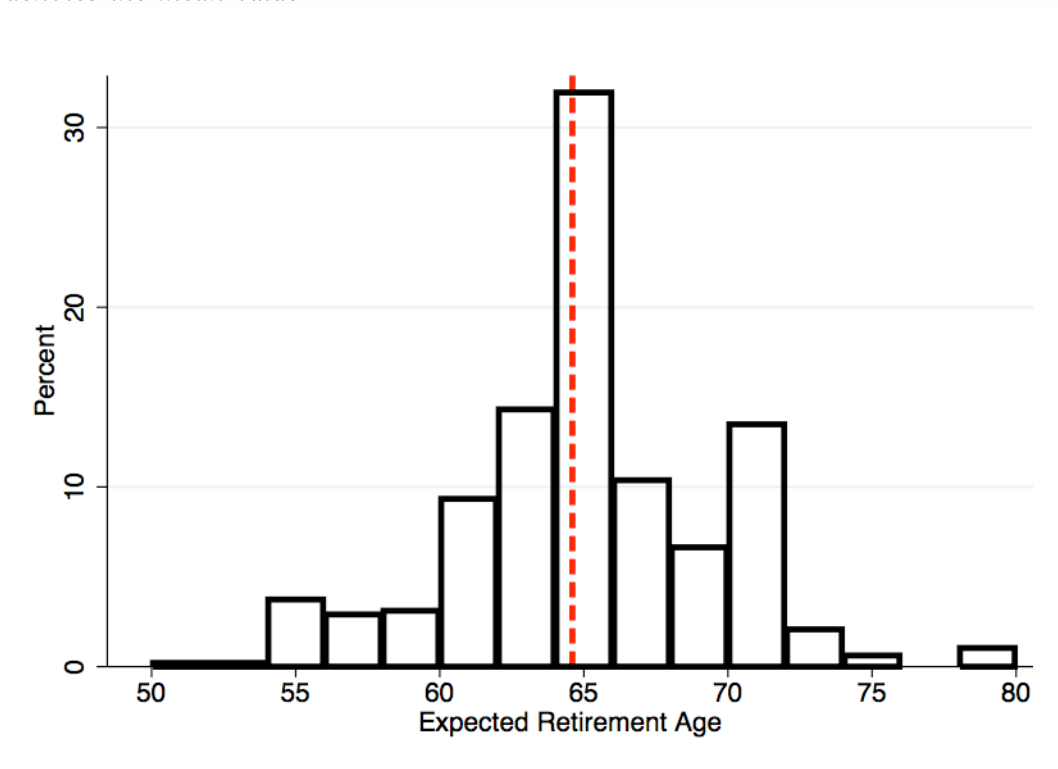


Figure 4: Distribution of Expected Retirement Age for DC Participants – *Dashed line denotes the mean value*

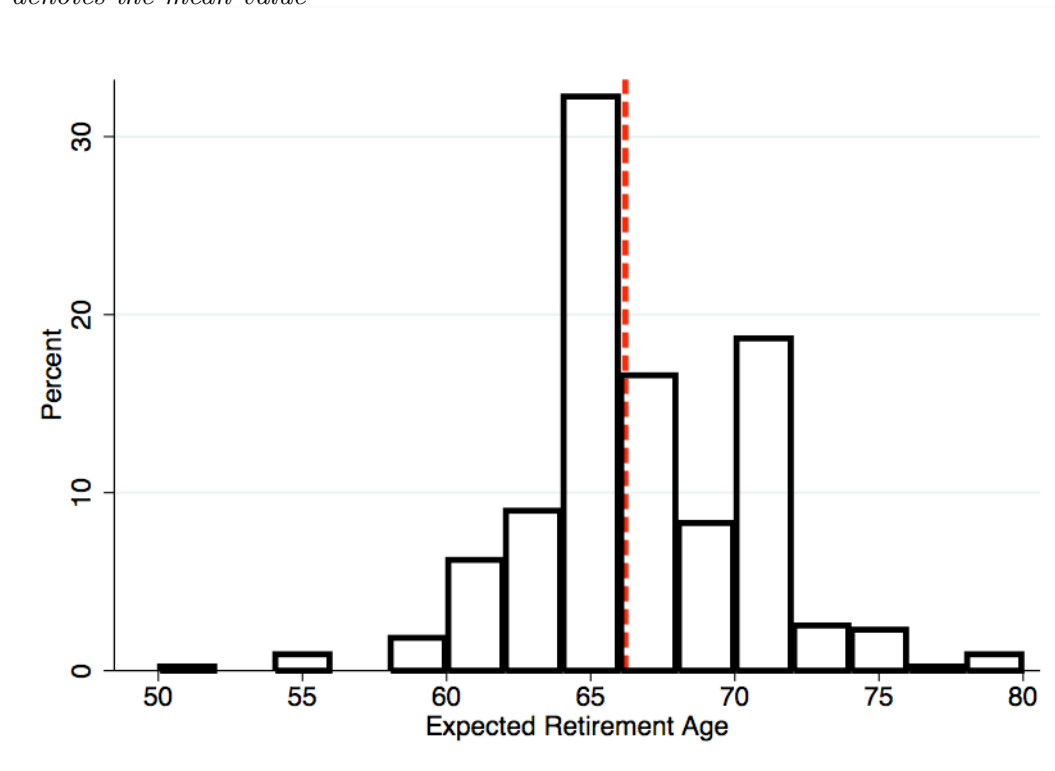
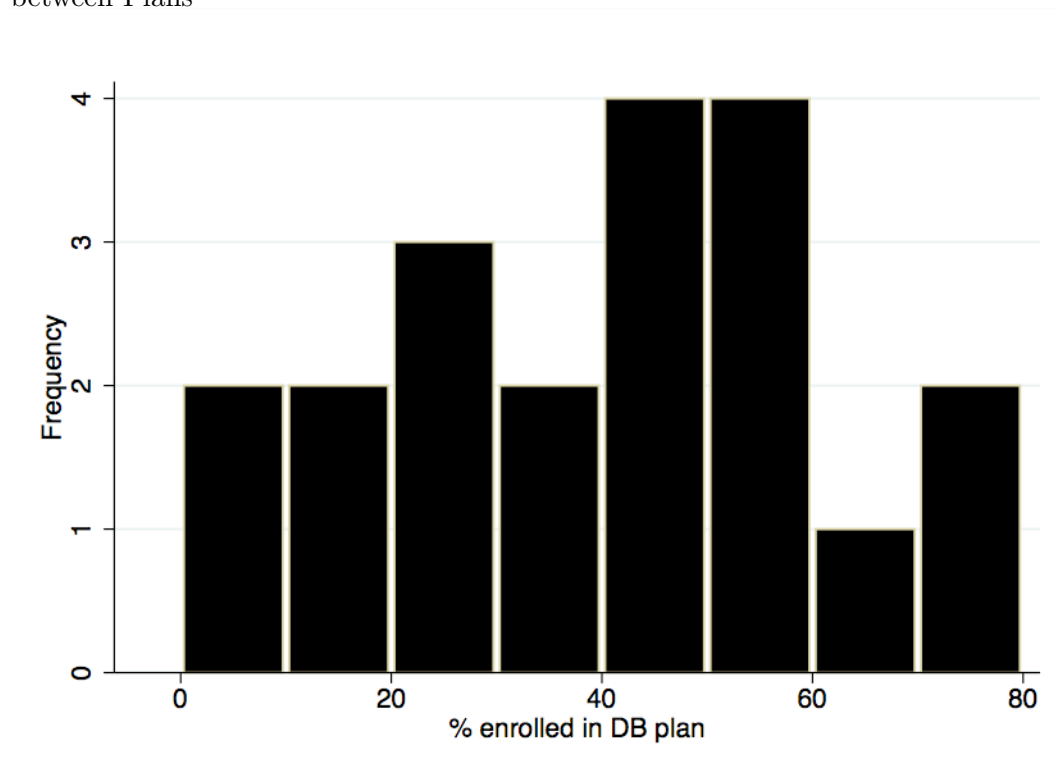


Figure 5: DB Plan Enrollment Percentages at Public University Systems with a Choice between Plans



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