THE IMPACT OF 401(K) PLANS ON RETIREMENT

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ABSTRACT

In 1993 38.9 million people were covered by a 401(k) plan, up from 7.1 million in 1983. The rapid growth of 401(k) and other defined contribution pension plans may alter retirement patterns of older workers. Previous research showed that the spread of defined benefit plans, with sharp age-related incentives first discouraging and later encouraging retirement, contributed to the early retirement trend of past decades. Defined contribution plans differ along several dimensions, especially in their smooth rate of pension wealth accrual. We use data from the Health and Retirement Study to show that retirement patterns have begun to change as defined contribution plans have spread. Our estimates indicate that the financial incentives in defined benefit pensions lead people to retire almost two years earlier on average, compared to people with defined contribution plans.

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Typical private pensions have changed dramatically in the last twenty-five years. The pension from a traditional defined benefit plan is computed as a function of a worker's salary, tenure, and age. In contrast, the pension from a 401(k) or other defined contribution plans depends strictly on contributions accumulated in an account. The number of people with a 401(k) plan jumped from 7.1 million in 1983 to 38.9 million in 1993. Among employees with pensions, the proportion with a DC plan rose from 40% in 1988 and 71% in 1993. The proportion covered by a defined benefit (DB) plan declined similarly, from 73% in 1983 to 50% in 1995.[1]

Earlier studies suggest that the spread of DB plans from the 1950s to 1970s contributed to the striking decline in American retirement ages. Provisions in DB plans governing vesting and length of service cause pension wealth to accrue discontinuously, sometimes sharply so. The resulting age-related incentives first encourage and later discourage staying in the job and have been found to influence retirement by perhaps as much or more than Social Security.[2]

Retirement ages have stabilized since the early 1980s, though the break from past trends has received little attention. The dramatic change in pension arrangements may have altered retirement patterns. Pension wealth in 401(k) and other DC plans accrues smoothly. If the design of DB pensions affects retirement, then the age-neutral accruals in DC plans should reduce DB-induced spikes in retirement ages. Other differences in portability, annuitization, and risk characteristics between DB and DC plans may also be important. Lastly, voluntary contributions are allowed in most DC plans, introducing a possible source of endogeneity when studying behavioral effects.

In this study we analyze the impact of 401(k) and other DC plans on retirement. Our approach is essentially quasi-experimental, comparing retirement responses to incentives in DB plans with retirement under neutral DC plans. In addition, we offer some extensions to the literature on private pensions. We show that the measures of pension accrual crucial for understanding DB pensions do not adequately describe DC plans. We also employ new data from the nationally representative, longitudinal Health

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[1] EBRI (1996), and authors' computations from self-reported pension data in the Survey of Consumer Finances.

[2] This was observed in data from a few large firms by Stock and Wise (1990a, 1990b) and Lumsdaine, Stock, and Wise (1992) and in a nationally representative survey from the early 1980s by Samwick (1998).

and Retirement Study, which began in 1992 and offers employer-provided descriptions of pension plans.[3]

Our estimates indicate that financial incentives in DB pensions lead people to retire almost two years earlier, on average, compared to people with DC plans and holding other characteristics constant. After controlling for the differences in incentives, pension type does not have an independent effect on retirement. Simulations based on these estimates suggest that changes in pension coverage since 1983 have raised the median retirement age by two to four months, and a further increase of two to five months can be expected as younger workers covered primarily by DC plans age in coming years. The uncertainty in the simulations arises from difficulties in pinpointing trends in coverage from sometimes conflicting self-reported pension data.

While our work extends previous research that treats pension type as exogenous, we recognize that workers may sort into firms endogenously, based on pension characteristics or on other characteristics correlated with pensions. Clark and McDermed (1990) argued that legislative changes explain the expansion of DC coverage. Nevertheless, while DC plans spread among firms of all types, the speed varied with firm size and industry. We have found that DC coverage in the Survey of Consumer Finances expanded much more among young workers, presumably with shorter tenure. We therefore include controls for job tenure, firm size, and industry, and these do not alter the empirical influence of pension characteristics. The reason is that we find relatively small differences in observable characteristics between workers with different pension types in the HRS. Workers with no pensions are very different, though, and we exclude them from our analysis.

The rest of this paper is organized as follows. In Section I, we outline how differences between DB and DC pensions may influence retirement, and in Section II we document the growth in 401(k) plans. In Section III we describe the data and show raw statistics on pensions and retirement. We present the estimation results in Section IV and summarize our findings in Section V.

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[3] Coile and Gruber (2000) used the HRS to analyze Social Security incentives, and in some of their results they added together Social Security and private pension incentives. They modeled DC pensions in the original way developed in the DB pension literature.

I. PENSIONS AND RETIREMENT

Retirement ages fell over most of this century, though life expectancy and health of older workers improved dramatically.[4] The spread of DB pensions, which generate strong incentives to retire at older ages, may have contributed to the early retirement trend. Since the early 1980s, though, retirement ages have stabilized. While little evidence has been offered to explain the change in retirement behavior, the shift to DC pensions may play a role.

A. The impact of pensions on retirement

We show here how pension design can affect retirement. Later we discuss the potential endogeneity of pension design.

The retirement decision. A pension is a form of compensation deferred until a worker reaches a certain age or tenure and leaves his or her job. Each period a worker decides whether to stay in the job or leave (retire).[5] He or she weighs the utility of retiring from the job now or of staying and deciding next period whether to retire. The value of this decision V_t can be written as

$$V_t = V(R_t) \tag{1}$$

where R_t equals one if the decision is to retire and zero if the decision is to stay in the job. Suppose that the value of staying in the job this period is

$$V(0) = u(W_t) + \beta E_t [V_{t+1}] \tag{2}$$

the sum of utility from the wage W_t received this period and the discounted value of facing the retirement decision next period.[6] Suppose that the value of retiring is

$$V(1) = u_R(P_t, \Omega) \tag{3}$$

which depends on pension wealth P_t and on an outside option worth Ω. The outside option could be leisure or another job and is assumed to be fixed for ease of analysis.

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[4] Costa (1998) reported that labor force participation rates fell from 58% to less than 20% between 1930 and 1990 among men aged 65+ and from 82% to 67% between 1940 and 1990 among men aged 55-64. Quinn (1998) showed that retirement rates have leveled off over the last 15 years.

[5] This framework may apply to quits at any age, if leaving a job is irreversible. Similarly, older workers may choose to take another job rather than retiring completely. These extensions to the basic framework do not alter the qualitative impact of pensions.

[6] The discount rate lies between zero and one and reflects the rate of time preference and mortality risk, which is assumed fixed for simplicity.

A key factor is the evolution of pension benefits as the date of retirement changes. The way in which pension wealth accrues varies with pension type and a worker's tenure.

- Delaying retirement may substantially raise long-term benefits, so pension wealth accrual is large at some future date, though small today. That raises V_{t+1}, V_{t+2}, ..., encouraging later retirement. This pattern corresponds to incentives in DB plans at younger ages.
- Delaying retirement may not alter future pension benefits. Then, the foregone income makes pension wealth accrual negative, encouraging sooner retirement. This pattern generally arises in DB plans after eligibility for full benefits.[7]
- Future pension benefits may increase steadily when retirement is delayed. Then, the incentive to retire depends on the rate of pension wealth accrual. This pattern occurs in DC plans.

DB pension wealth accrual. If a person retires at age t, DB pension wealth can be computed as

$$P_t^{DB} = E\left[\sum_{s=t}^{120} \frac{1}{(1+\theta)^{s-t}} \delta_{s|t}\, p\,(q, t)\right] \qquad (4)$$

Pension wealth equals the expected discounted value of pension benefit flows p received each period after the pension commences at age $q \geq t$.[8,9] Benefits are discounted to time t by the age-conditional probability of survival δ and by the time discount rate θ.

Equation (4) indicates the dependence of pension wealth on the retirement date t, and Figure 1 shows DB pension wealth accrual, $\left[\frac{1}{1+\theta} P_t\right] - P_{t-1}$ in a typical plan as the retirement age t changes.[10] Two or three key dates can cause sharp changes in P_t^{DB}. When the plan is vested, which currently takes up to seven years, a worker becomes

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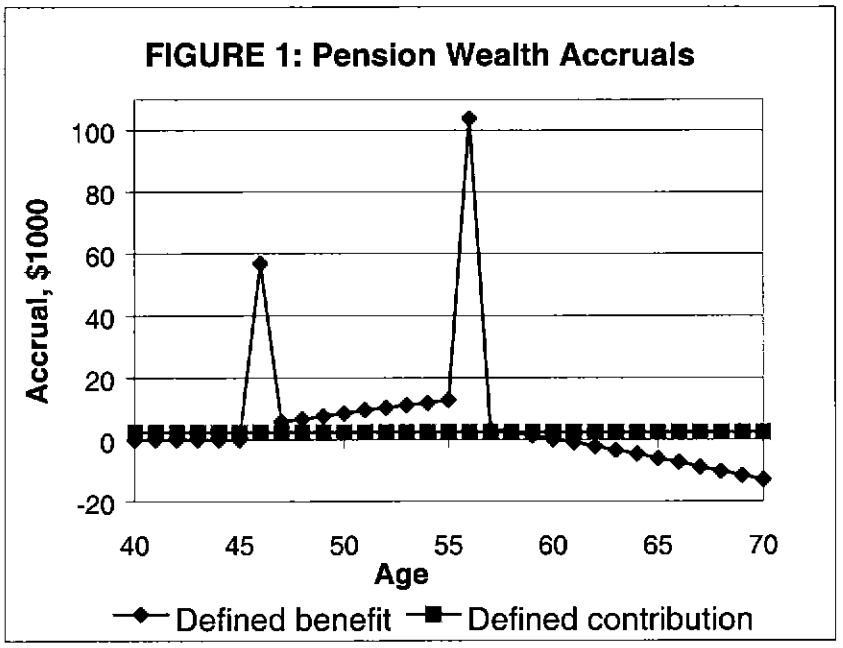
[7] The spikes in pension accrual in typical DB plans were originally documented in a series of papers by Kotlikoff and Wise (1985, 1987, 1989) and Stock and Wise (1990a, 1990b).

[8] A person who quits may not be eligible to receive benefits immediately. However, there is little need to model the choice of when to begin receiving benefits after quitting and becoming eligible, since private pensions do not reward delays in claiming as Social Security does.

[9] A terminal age of 120 was chosen for computational purposes.

[10] The pension accruals in Figure 1 are computed from sample plans from the HRS that were slightly modified to protect anonymity. The DB plan is typical for someone with relatively long tenure. Present value calculations assume a 3% real discount rate and average mortality probabilities by gender, following the literature.

eligible to receive a pension some time in the future. Pension wealth is zero until that point. Pension wealth then accrues gradually, depending on how each year's salary affects benefits and on whether the plan is inflation-protected early on (most are not). Pension wealth accrual spikes again if the plan offers an early retirement date (ERD), when a worker can leave the job and start to receive reduced benefits, or at the normal retirement date (NRD), when a worker qualifies for full benefits. The penalty for receiving early benefits is often not very steep, so accruals remain positive but smaller after the ERD. Accruals turn negative following the NRD because current benefits are foregone and future benefits are no longer raised.[11]



It is clear that one-period pension accrual does not capture the full value of postponing retirement. Stock and Wise (1990a) developed an "option value" measure that reflects the increment to utility from postponing retirement and gaining access to future accruals. Coile and Gruber (2000) introduced a simpler measure for the "peak difference" of pension wealth accrual $\left[\frac{1}{(1+\theta)^{m-(t-1)}} P_m\right] - P_{t-1}$, where real pension wealth

[11] Pension accruals do not spike as sharply as they once did. 1986 legislation reduced maximum vesting periods from 10-15 years to 5-7 years, and it required firms to continue giving service credits to workers after they pass the NRD.

reaches its maximum P_m in future year m. They showed that the peak value measure isolates the key incentives influencing retirement.

DC pension wealth accrual. DC plans function very differently. DC pension wealth is measured simply as the market value of current assets.[12] The gain to DC pension wealth each period is the return on the initial balance plus this year's contributions from the employee and employer.

An additional year of work always raises pension wealth, even if contributions are zero, so the peak-value measure of DB pension accrual is not meaningful. This is apparent in the pension accruals shown in Figure 1 from a typical DC plan. There are, nonetheless, two key dates in DC pension wealth accrual. First, some DC plans have vesting dates of up to five years. Second, 401(k) funds can be withdrawn without a penalty beginning at age 59 ½, which may induce some workers to retire.

Only a portion of DC pension accruals constitute an incentive to delay retirement. Employer contributions will cease at retirement, and access to a tax-deferred savings vehicle may cease.[13] In contrast, existing assets will generate returns regardless of retirement. Also, voluntary contributions may be assumed to replace other personal saving and could thus depend on retirement intentions. Therefore, we try omitting potentially endogenous voluntary contributions from measures of DC pension accrual when we estimate the impact of pensions on retirement.

B. Summary of key differences

DC pension wealth accrues smoothly. DB pension accruals swing sharply as workers age. If DB pensions influence the timing of retirement, then the growth in DC plans will alter retirement patterns. We hypothesize that retirement hazards will generally smooth out and retirement will be delayed, though we test for a new liquidity-induced jump around age 59 ½.

Voluntary contributions are a component of DC pension wealth. These may be endogenous with retirement plans. In our empirical work we examine whether voluntary contributions affect estimates of the influence of DC pension wealth.

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[12] It should also include the present value of future tax relief, arising because asset returns are not taxed until withdrawal. We will follow the literature in omitting this component, which requires assumptions about future marginal tax rates and the timing of withdrawals.

DC pensions have shorter vesting periods. Taking a new job has grown more attractive to older workers, since new jobs are now more likely to offer a DC pension instead of a DB pension. DC pensions generally have shorter vesting periods; 30-35% vest immediately and another 20% vest in four years or less, according to Mitchell (1999), while virtually all DB pensions take five years to vest. Quick vesting in DC plans raises effective compensation for people who expect to retire fully a few years later. For this reason, and because their response to pensions and other factors appears quite different, we distinguish in the empirical analysis between people who leave their pensioned job for another job and those who retire fully.

DC plans are typically not annuitized. A DB plan with actuarially equivalent present value is worth more than a DC plan to risk-averse people who lack a strong bequest motive. Less than 20% of DC plans offer the option to annuitize after retirement, so assets might be exhausted before death.[14] DC plans may therefore discourage early retirement. On the other hand, a DC plan is worth more to people with a bequest motive. To capture differences like these, we allow distinct effects on retirement of different types pension wealth. However, we lack sufficient information on annuitization options in DC plans in order to identify the direct impact on retirement.

The risk characteristics of DB and DC pension accruals differ. The DB rate of return depends on earnings growth before retirement and on inflation after retirement. The DC rate of return depends on portfolio choices and yields. Differences between expected and realized rates of return may alter retirement plans. For example, people who invested their 401(k) assets in equities may have earned unexpectedly high returns and could retire early. Again, allowing different effects of pension types may capture this distinction, and we also try including a control for people who invest their DC plans mostly in stocks.

C. What determines pension plan design?

Lazear (1986) summarized a broad theory of deferred compensation. DB pensions help solve contracting problems between workers and firms. Firms want to reduce mobility because hiring is costly or because new workers need firm-specific training. Workers cannot commit to stay with the firm, but both a rising wage profile and

[13] The extent of tax relief from IRAs depends on household income and contribution limits.

back-weighted pension accruals can be viewed as components of an implicit long-term contract that induces workers to stay. Later on, though, rising wages may exceed the marginal productivity of older workers, and employers have an incentive to fire older workers, which undermines the implicit contract. DB pension provisions help encourage retirement at an appropriate age.

While intuitively appealing, this explanation offers little insight about DC pensions. Government regulation has played a key role in this regard. Legal changes, described in the next section, have reduced the flexibility of firms to use pensions to provide optimal long-term incentives and have made DC plans more appealing.

We recognize that pension plan design may be endogenous, nonetheless. Differences in the value of firm-specific training, for example, could influence pensions, and workers may sort into firms with different pensions in a way that is correlated with their own productivity, retirement preferences, etc. However, we do not believe it is feasible to estimate the determinants of pension design. A single empirical paper, by Filer and Honig (1996), allowed for endogenous DB pension design. The authors estimated a joint model of a plan's DB early retirement date and a person's own retirement age. They failed to find convincing exclusion restrictions for the early retirement date, however.[15]

Nevertheless, we will try to address concerns about endogenous sorting. We show that older workers with different pensions types are relatively similar. We also control for firm size, industry, and especially tenure, suggested by earlier research as key determinants of pension type; none of these variables influence the estimated effect of pension characteristics on retirement.

II. THE HISTORY OF PENSION PLANS

A. The regulation of pensions

Laws passed early in the twentieth century, and again in 1940, spurred the growth in DB pensions. Numerous legal changes since 1974, however, have made DB plans less

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[14] Brown, Mitchell, Poterba, and Warshawsky (1999).

[15] They used macroeconomic variables (unemployment, inflation) at the hiring date to identify the impact of the pension retirement age on retirement. These variables did not have a statistically significant impact on the pension, however, so the estimation was essentially identified from nonlinear functional form.

appealing, while making DC plans simpler. For example, the 1974 Employee Retirement Income Security Act (ERISA) established a maximum vesting period of 10-15 years. Vesting had been unregulated, and the ERISA standards were met previously by only 19% of plans.[16] ERISA also initiated a trend of increasingly strict funding standards and reporting requirements.

401(k) plans were written into the tax code in 1978 and clarifying regulations issued in 1981. 401(k) plans are now the most common of several types of DC pensions.[17] Employees can direct part of their pre-tax pay into a 401(k) account, and employers often match the contribution up to a fixed amount.[18] While contributions to a 401(k) are voluntary, they are often mandatory in other types of DC plans. Accumulated funds are taxed upon withdrawal, and they may be withdrawn when a worker leaves the firm. Funds withdrawn before age 59 ½ and not rolled over into a qualified account incur an additional 10% tax penalty.[19]

The regulatory changes that began in 1974 had several effects. First, many of the changes had the intent of increasing workers' claims to future benefits after leaving a job. This reduced the capacity of employers to use DB pensions to design optimal long-term incentives. Second, legal changes increased the regulatory burden of administering DB pensions. Third, several laws from 1975 onwards increased flexibility and tax preferences in DC plans, although non-discrimination rules grew stricter. Lastly, the Tax Reform Act of 1986 sharply restricted tax deductibility on contributions to Individual Retirement Accounts, increasing the appeal of 401(k) plans.

Clark and McDermed (1990) concluded that these legislative changes caused the shifts in pension type. They showed that DC coverage was flat before 1974 and grew steadily afterward among firms of all sizes and industries, though at differing rates. For example, 1985 statistics show that the primary pension was DC for 30% of people who worked in small firms and 14% who worked in large firms, when the pension had been established between 1964-73. When the primary pension had been established between

[16] Ippolito (1988).
[17] Other DC plans include money purchase plans, profit sharing plans, target benefit plans, simplified employee pensions, and employee stock ownership plans.
[18] Employees can generally contribute up to the minimum of 25% of pay or $10,500 in the year 2000. The sum of employee and employer contributions cannot exceed the minimum of 25% of pay or $30,000.

1980-85, it was DC for 57% of people in small firms and 45% in large firms.[20] Similarly, our analysis of the Survey of Consumer Finances shows that DC coverage has risen in all occupations.

Other researchers analyzed joint trends in pension coverage. Using data for 1980-86, Kruse (1995) found that firms generally offered DC plans alongside existing DB plans, rather than terminating DB plans. Using later data from 1985-92, Papke (1999) found some replacement of both DB plans and other types of DC plans by 401(k) plans. While these last results raise concern about endogenous pension changes, our sample consists primarily of older workers who have worked for the same employer for many years. Potentially endogenous changes in pension plans are more likely to involve younger workers who change jobs more frequently. Nevertheless, in the empirical analysis we control for firm size, industry, and especially tenure, in order to capture different trends in the evolution of pension plans.

B. The impact of 401(k) plans on saving

Earlier researchers focused exclusively on the potential impact of 401(k) plans on personal saving. It is important to note for our purposes that, whether or not 401(k) contributions raise saving, the differences in pension design can alter retirement patterns.

The controversy has arisen because conventional theory suggests an ambiguous effect of tax-preferred IRAs and 401(k) on personal saving. The weight of empirical evidence suggests, nevertheless, that a substantial portion of 401(k) contributions represents new saving. Poterba, Venti, and Wise (1995, 1998) showed that workers in firms offering 401(k) plans accumulated more financial assets over time than workers in firms not offering 401(k) plans. Engen, Gale, and Scholz (1994, 1996), however, presented other results suggesting that 401(k) savers look like people who would save in any case. More recently, Webb (2000) has used the new Health and Retirement Study to study the question. Among older workers with DB plans in 1992, those who were also eligible for 401(k) plans accumulated significantly more between 1992 and 1998, especially if they started with high assets.

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[19] Some firms allow employees to borrow against their 401(k) balances. Mitchell (1999) found that about half of medium and large firms offering 401(k) plans allowed this option.

[20] Tables 7-5 and 7-6; small firms have 100-999 employees, and large firms have 1000 or more.

These findings have led researchers to propose less conventional explanations for a positive savings effect from 401(k)s. Thaler (1994) discussed psychologically-based behavioral saving models. Laibson, Repetto, and Tobacman (1998) modeled an agent with a hyperbolic discount rate. The tax penalty on early withdrawal helps commit the agent to a long-term saving plan. Behavioral explanations also underlie evidence from Bayer, Bernheim, and Scholz (1996) that workplace education programs raise 401(k) contributions; and evidence from Madrian and Shea (2000) that the employer's choice of default 401(k) contributions affects the savings response.

III. DATA

A. The Health and Retirement Study

The Health and Retirement Study (HRS) is a detailed longitudinal survey of over 7,600 households with household heads born between 1931 and 1941. The HRS began in 1992 and re-surveys people every two years, with data now available from the first four waves.[21] The HRS reports unprecedented detail about household and job characteristics as people age. For people who said they had a pension and gave permission, the HRS contacted employers to get information about the pension. The HRS also asked for permission to obtain Social Security earnings records. The pension and Social Security data is available only on a restricted basis, together with a program to compute private pension wealth at all ages. We have written a similar program to calculate Social Security wealth.[22]

Gustman and Steinmeier (1999) studied the quality of the pension data. In the first wave, 65% of workers who reported a pension in their current job were matched to their pension data.[23] Match failures generally arose either because the person refused permission to the HRS to contact their employer, or because the employer did not respond to HRS queries. The authors found that some observable variables significantly

[21] Data released from the third and fourth waves are still preliminary.

[22] We use earnings records and current rules to compute the present value of Social Security benefits. However, we have not made additional assumptions to compute dependent and survivor benefits, which are taken by spouses when these exceed their own retirement benefits.

[23] Since the match rate for pensions from earlier jobs was only 35%, we are not using that data.

affect the probability of a match, but they have relatively little explanatory power.[24] Matches are significantly more likely among people with more education, in firms with 100 or more employees, in non-manufacturing firms, and with more valuable self-reported pensions; and matches are less likely among people with over $1 million in assets and over $100,000 in annual earnings. In our judgment we lack sufficient information to impute pension data or control for selection due to match failure, so we omit people without matched pension data.

For people who say they have a pension, employer data is used to determine whether they have only DB plans, only DC plans, or else both types or combined plans. We classify people as having a DB plan if their employer offers one, since participation is rarely voluntary. We classify them as having a DC plan if their employer offers one and they participate in it. The reason we focus on participation rather than eligibility is that the HRS did not contact employers of people who said they did not participate in any pension, so we cannot determine their eligibility.[25] This might bias the results if, for example, people who intend to retire later do not contribute to their 401(k); we do address some concerns about endogenous participation by estimating a specification that omits voluntary DC contributions of participants.

Employers report the parameters that determine DB pension wealth, such as the vesting and retirement ages and the relationship between salary, tenure, and benefits. DC plan balances are not reported by employers, so DC pension wealth is inferred from the current voluntary contribution rate reported by individuals and matching contributions reported by employers. Gustman and Steinmeier found that people often did a poor job of describing their pensions, but that they provide important information about DC plan balances. A comparison of DC balances reported by individuals with balances inferred from employer reports revealed discrepancies – mean individual-reported balances were on average lower when there were voluntary contributions, but not otherwise. Gustman

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[24] The authors estimated the likelihood of getting pension data from the current employer. The probit had a pseudo R-squared of 0.1164.

[25] Thus, we observe some eligible non-participants, but not others. Using a different dataset, Poterba, Venti, and Wise (1995) estimated the exogenous effect of 401(k) eligibility on saving, rather than the endogenous effect of 401(k) participation. We could do something similar if we limited the sample to people with a DB plan and compare those who are additionally eligible or not for a DC plan; Webb (2000) analyzes saving in this way. However, that does not help us much in analyzing retirement, which our results show are driven by the presence or absence of a DB, not a DC, plan.

and Steinmeier attributed this to a tendency for rising voluntary contributions over time; nevertheless, they recommended using the data inferred from employer reports because of wide discrepancies in individually reported pension wealth.[26]

B. Characteristics of workers and pensions

Table 1 compares the characteristics of workers with different types of pensions in the first wave in 1992. We focus on 2508 full-time employees aged 53 and over in 1992 who have a DB plan or who have a DC plan in which they participate.[27] Among them, 62% have only DB plans, 20% have only DC plans, and 18% have both types or a combination plan.[28]

People with different types of pensions are quite similar, except in three dimensions. First, people with only a DC plan have much shorter job tenure, with an average of 11 years, compared to 18-19 for the others. This reflects in part the recent spread of DC plans in new jobs. Second, pension wealth differs systematically across plans. People with combined plans have the highest pension wealth, with a median of $318,145 if they retire at age 65. This is actually higher than the sum of the median stand-alone DB plan, worth $192,006, and the median stand-alone DC plan, worth $99,105. Third, 55% of individuals with stand-alone DB plans are employed in professional or related services or public administration, compared with 29-33% of those with DC or combined plans. Controlling for these differences in tenure, pension wealth, and industry, however, does not affect the estimated effect of pension incentives on retirement.

In spite of the sharp differences in pension wealth, people with different pensions are otherwise quite similar. Median non-pension financial assets lie in the range of $18-21,100 across pension types, and median earnings lie in the range of $26-31,000. Education and occupation differ, but not by a great deal. The proportion that attended

[26] Alternatively, Gustman and Steinmeier proposed a correction to the employer-reported plan values, based on a regression of the ratio of self-reported to employer-reported values on the log of the employer-reported value and its square.

[27] This sample is much larger than in earlier studies on private pensions. Most researchers used data on one or a few firms, while Samwick (1998) had a sample of 520 employees from the 1983 SCF. Full-time hours are defined as 30 or more per week. We exclude people aged 51 and 52 since few retire or reach key swings in pension accrual.

college is 53% among people with DB plans only, 47% among people with DC plans, and 55% among people with combination plans. Differences in education do not correspond directly to occupation. People with DB or DC plans only are similarly distributed across white collar (professional and managerial), pink collar (clerical and sales), and blue collar jobs. People with combined plans are more likely to be in pink collar, rather than white or blue collar, jobs.

Another 1241 people reported having a pension but were not matched to their pension data. They are somewhat less educated and more likely to be in blue collar jobs. 1714 people reported having no pension. They are even less skilled and are substantially poorer. We omit both groups from the analysis because we do not feel confident explaining who has a pension or pension data.

As expected, DC pension accruals are very smooth. In Table 2 the median of pension accruals for men is consistently around $5-6,000, regardless of retirement age, or around $3,000 when voluntary contributions are excluded. Women with DC plans have lower levels of voluntary and mandatory contributions.

In contrast, the median DB pension accrual is highest between ages 54 and 55, when the early retirement date is reached in many plans. Many plans reach their peak value between ages 60 and 65. The median accrual turns rapidly negative after age 62, when many plans begin to pass their normal retirement date. DB accruals are more dispersed than DC accruals, as shown in Table 3. Women with DB plans experience positive pension accrual at later ages because of shorter job tenure. Patterns of accrual in the DB and DC components of combined plans resemble those of stand-alone plans.

Table 4 shows hazard rates of quits between 1992 and 1998. 39% of the people in our sample leave their 1992 job by 1998, when they reach ages 57-67. Workers with a DB or combined plans quit at higher rates than workers with only a DC plan. At ages 55-59, 4.1% with a DB plan and 4.5% with a combined plan leave their job each year, on average, compared to 2.0% with a DC plan. At ages 60-62 the statistics were 11.9% with a DB plan, 8.9% with a combined plan, and 6.3% with a DC plan. This key difference emerges in the estimation results below.

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[28] The proportions with DB and combined plans differ from Gustman and Steinmeier because of our focus on DC participation, rather than eligibility, as described earlier.

IV. ESTIMATING THE IMPACT OF PENSIONS ON RETIREMENT

Descriptive statistics confirm that both pension wealth accrual paths and retirement patterns vary with pension type. This section reports estimates of the influence of different pension types on retirement.

A. Estimation strategy

Our dependent variable is a binary indicator for whether a full-time employee leaves a pensioned job voluntarily, excluding departures due to layoffs or plant closure. We identify the precise age at which a worker quits and pool observations on workers in each year between 1992 and 1998.[29] We focus initially on people who retire fully and then consider people who quit and take a new job. We estimate probits with Huber-White standard errors and use the HRS-provided person level analysis weights to make the estimates nationally representative.

We use the peak difference measure of pension accrual (peak minus current pension wealth, or zero if the person has passed the peak), introduced by Coile and Gruber (2000). We allow separate effects of the peak difference of pension wealth of DB plans and of the DB component of combined plans. Similarly, we allow separate effects of pension wealth of DB and DC and the DB and DC components of combined plans, and we normalize these financial variables by earnings.[30] We experiment with indicators for being at or older than the peak value, since the peak-value measure takes a value of zero after accruals turn negative, and also with indicators for being at the early and normal DB retirement dates. We include an indicator for employers who match employee contributions to DC plans, since that functions as an incentive to delay retirement. Lastly, we include an indicator for employers who offer temporary early retirement "window plans".

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[29] We use survey responses to identify the age when retirement occurred and match it to pension accrual at that age. In contrast, Gustman and Steinmeier (1999) tracked changes in employment status from wave to wave and use pension accrual applicable at that wave; these may not strictly coincide.

[30] Samwick (1998) scaled pension accruals by earnings in order to compare statistics on retirement incentives across workers. The "option-value" measure of pension accrual which he used in the estimation implicitly weighs pension income and earnings. Earnings do not significantly affect retirement when included separately in our estimation.

We control for a variety of other influences on retirement. These include Social Security wealth and peak difference; measures of current and post-retirement health insurance coverage; and non-pension financial assets and home ownership, to capture wealth effects. We control for employer size, industry, tenure, occupation, and education. In addition, we include a control for people who say they never want to retire or have no retirement plans, and dummies for recent hospitalizations, gender, marital status, race, and age.

B. Estimation results

Table 5 reports marginal effects from probit estimates for several specifications. The dependent variable is whether a person leaves his or her 1992 job and retires, so a positive coefficient indicates a higher probability. The basic specification 5.1 follows the literature by including pension wealth and a measure of pension accrual. Our preferred specification in 5.2 adds dummies for being at or past the age of peak pension wealth and the pension's normal retirement date.

Briefly, the control variables have the same qualitative impact on retirement found in a long line of previous research. The retirement hazard rises with age, especially after 60. Higher financial assets are associated with significantly earlier retirement, so that doubling financial wealth (which has a mean of $37,182) raises the hazard by about a half percentage point. People with zero financial assets tend to retire earlier as well, possibly reflecting liquidity constraints among people with pensions. When an employer provides health insurance for workers but not retirees, a worker is about a percentage point less likely to quit. People with more education are less likely to quit, as are married men, while married women are more likely. Some of these variables fall short of statistical significance, but the estimates should grow more precise as the sample ages. It is important to note that industry, job tenure, and firm size do not significantly affect retirement, though they are related to pension type.

We find that both private and public pension accruals influence retirement. In our preferred specification in 5.2, peak difference is significant at 5% for people with DB plans and with combined plans. The difference in the estimates across pension type is not statistically significant. Having the mean value of DB peak difference reduces the

retirement hazard by 0.7 percentage points for ages 55-59, or a 15% reduction compared to the observed hazard at that age.

The peak difference measure is not economically meaningful after pension wealth peaks. Therefore, we added dummy variables in 5.2 to capture the disincentive effect of declining pension wealth, and these improve the fit of the estimation. The dummy variable for at or older than peak value is close to significant for DB people, though highly insignificant for combined people. This is not surprising as relatively few people with combined plans have reached peak value in this sample.[31]

We also experimented with controls for being at the DB pension's early or normal retirement date. The results indicate that institutional factors, along with financial incentives, sometimes affect retirement. We found no spike in retirement at the early retirement date (ERD) when people can first receive benefits. The ERD generally comes at an early age, often 55, when we observe few retirements. On the other hand, being at the normal retirement date (NRD) significantly raises quits among DB people; it lowers quits among combined people, though not significantly. Different reactions to the NRD by pension type arise in part because the NRD occurs earlier in some stand-alone DB plans and thus is more likely to have been reached in this sample. The NRD is 60 or younger in 35% of stand-alone DB plans, compared to 21% of combined plans. One reason is the greater proportion of stand-alone DB plans in professional services and public administration; these plans have an earlier average NRD. Nevertheless, controlling for industry did not affect the estimation results. Taken together, these findings suggest that institutional factors and social norms involving the NRD play a role for people with stand-alone DB plans, which tend to have an earlier NRD.

To continue, we allowed the effect of pension wealth to vary by pension type. We find a significant and positive, though relatively small, effect of DB wealth on DB people and of DC wealth on combined people. The coefficients on the other pension wealth variables have similar magnitudes but are not statistically significant. Samwick (1998) and Coile and Gruber (2000) also found weak effects of pension wealth.

Other pension characteristics do not have a major impact. Notably, the dummies for pension type are not significant, so the impact of different pension plans is captured in

[31] The median age of peak value is 63 for DB people and 64 for combined people, at a discount rate of 3%.

the differences in accrual and wealth patterns. We found no evidence of a spike in retirement for DC people at ages 59 and 60, when withdrawals no longer suffer tax penalties. People who invested their DC plan partly or mostly in stocks retired sooner, but these effects fall short of statistical significance. Indicators for employers matching employee contributions to DC plans or offering early retirement "window plans" are not statistically significant.

As with private pensions, Social Security incentives significantly affect retirement. Social Security peak difference reduces the retirement hazard by as much as 1.2 percentage points at younger ages, evaluated at the mean for each age; the impact is similar to peak difference in combined plans and greater than in DB plans.[32] We allowed the effect of Social Security accruals to vary by private pension type, but the responses are very similar – this suggests that people with DC plans react in the same way as people with DB plans when faced with DB-type incentives.

In sum, the estimates demonstrate that differences in pension accrual patterns alter retirement, as we hypothesized. Sharp DB pension accruals induce earlier retirement, compared to smooth DC accruals. The next section discusses some additional specifications, and the final section discusses aggregate effects of the spread of DC pensions on retirement.

C. Additional specifications

This section reviews additional results shown in Tables 5 and 6. We try using a different discount rate, excluding voluntary DC contributions, estimating the impact of pensions on people taking a new job, and separating the sample by gender.

In 5.3 we experiment with a discount rate of 5%, rather than 3%, in case people behave relatively impatiently. A higher discount rate reduces the present value of future pension accruals and hence the age of peak value. Since we observe low retirement hazards at younger ages, using a higher discount rate reduces the magnitude and significance of the peak difference variables, and it increases those of the variables measuring being at or past peak present value.

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[32] Coile and Gruber (2000) found a stronger response to Social Security than to private pensions in the HRS, since their estimated effect of peak difference fell when they added private pensions along with

A concern is that endogenous voluntary DC contributions explain retirement patterns of people with DC pensions. The HRS data does not distinguish between voluntary and compulsory contributions, however. We tried subtracting all employee contributions when plan rules allow for voluntary contributions. When this measure of voluntary DC contributions is omitted from the pension variables in 6.1, the impact of DC pension wealth declines slightly and loses significance (though it was also insignificant in 5.2). DB variables continue to have the same effect, whether or not someone has voluntary contributions in a DC plan. These results show that later retirement by people with DC plans is not explained by endogenous voluntary contributions; as before, we see that DB pension accruals induce their earlier retirement.

73% of quits in this sample result in retirement. In 6.2, the dependent variable is defined as a job change instead of retirement and retirees are omitted. The pension variables are insignificant for this sample, suggesting that a fuller understanding of job changes must await an investigation of the new jobs taken by those who quit.[33]

Lastly, retirement patterns differ somewhat for men in 6.3 and women in 6.4. The influence of peak difference is of a similar magnitude by gender, but pension wealth has smaller effects for women. Women have a stronger reaction to the DB normal retirement date, which accounts for its significance in the regressions in Table 5. As discussed earlier, these differences seem to arise because DB plans in some {ectors (especially professional services and public administration) have an earlier average NRD which is more likely to have been reached, and women are more likely to work in those sectors. Lastly, simply having a DB plan leads women to retire earlier. Women are clearly affected by many differences in career paths, only some of which are captured by differences in pension wealth.[34]

D. The aggregate impact of the spread of 401(k) plans

Forecasts of labor force participation for our sample, based on our preferred specification in 5.2, are shown in Figure 2. The forecast assigns everyone the same

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Social Security. The results from the HRS contrast with Samwick (1998), who found a stronger response to private pensions than to Social Security in the mid-1980s.

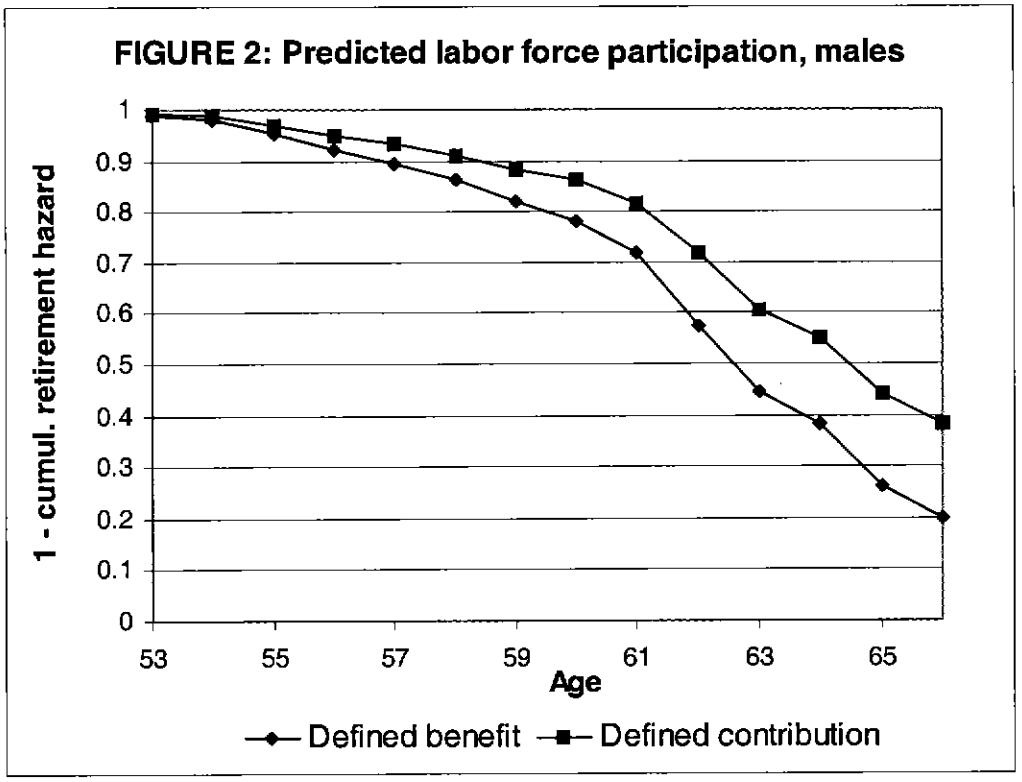
[33] The HRS has not collected pension data from new employers after the first wave.

[34] This subject is beginning to receive closer attention from researchers using the HRS. For example, Coile (1999) has found differential responses by husbands and wives to spouses' pension incentives.

characteristics except for their pensions and then compares retirement hazards resulting from a typical DB plan and a typical DC plan. Thus, differences in the retirement hazard arise entirely because of differences in pensions.[35]

The forecasts of retirement hazards are low (under 5% per year) for all pension types until age 60. Retirement hazards then diverge, and labor force participation falls faster for people with DB plans who begin to experience negative accruals. The difference in retirement hazards by pension type exceeds 5 percentage points at ages 62 and up. The resulting difference in cumulative labor force participation is substantial. Median retirement ages are 63 years, 6 months for people with DB plans and 65 years, 5 months for people with DC plans, a difference of 23 months.

FIGURE 2: Predicted labor force participation, males



We are also interested in evaluating the aggregate impact of the spread of 401(k)s and other DC plans. The Survey of Consumer Finances has collected data on pension status for repeated cross-sections of the population every three years since 1983. We

[35] The primary source of differences is in pension accrual paths. Total pension wealth is also allowed to differ, on the assumption that a change in pension type typically involves a change in pension wealth; pension wealth has only a small effect on the hazards, however.

compare self-reported pension coverage of workers aged 33-37 and aged 53-57 in both 1983 and 1995. By 1995 workers of all ages were more likely to report having a DC plan and less likely to report a DB plan, while young workers in 1995 were even more likely to report DC rather than DB plans. Among workers aged 53-57 in 1983, 41% said they had a DB plan, 22% a DC plan, 12% both, and 25% none; among workers aged 53-57 in 1995, the statistics are 23%, 30%, 13%, and 34%; and among workers aged 33-37 in 1995, the statistics are 14%, 35%, 7%, and 46%, respectively. Therefore, major changes in pension coverage already occurred between 1983 and 1995, and further changes can be projected as young cohorts with even lower DB coverage approach retirement.

A difficulty arises in pinpointing the magnitude of these trends, however, because of the inaccuracy of self-reported pension type. While the level of self-reported coverage for ages 53-57 is very similar in the SCF and HRS, the distribution of workers across plan types is different in the self-reported SCF data and employer-reported HRS data. Our comparison of HRS self- and employer-reported data indicates that much of the difference between the HRS employer-reported data and the SCF can be attributed to a tendency of workers to mis-classify DB pensions as DC or combined, a reporting bias also found by Gustman and Steinmeier. The resulting uncertainty about true changes in pension coverage led us to consider a range of estimates of past and projected changes.

Another potential source of uncertainty arises because our estimation did not include workers without a pension. Our analysis suggests that there has been a small decline in overall pension coverage from 1983-1995. It follows that our estimates are not significantly affected by assumptions regarding trends in coverage.

Depending on the assumptions, DB coverage among those approaching retirement in 1995 might have fallen 7-19 percentage points since 1983, with DC coverage rising 1-12 points. Our simulations suggest that these changes have resulted in an increase of two to four months in the median retirement age between 1983 and 1995, holding all else constant. Future DB coverage for the cohort aged 33-37 in 1995 might be 9-29 percentage points lower than for the cohort aged 53-57, while future DC coverage might be 9-27 points higher. Thus, when the current young cohort approaches retirement, they will have substantially lower DB and higher DC pension coverage, while the proportion

with both DB and DC plans should remain fairly constant. Our simulations suggest that this will raise the median retirement age by two to five months.

These forecasts follow directly from the estimates discussed above. Having a DB or a combined plan reduces the median retirement age by about 23 months. Thus, if DB and combined plan coverage is projected to fall by about 20 percentage points, that points to an increase in the median retirement of about 4 ½ months.

V. CONCLUSIONS

Earlier researchers focused exclusively on the impact of 401(k) plans on personal saving. We have found substantial changes in retirement patterns among workers in the new Health and Retirement Study, resulting from the spread of 401(k) and other DC plans. These arise because of major differences in the accrual of pension wealth. Pension wealth in DC plans accrues smoothly, while pension wealth in traditional DB plans spikes sharply at some points and turns negative at older ages. After controlling carefully for these differences in financial incentives, we show that pension type does not have an independent effect on retirement.

While we expected to find smoother retirement rates for workers with DC plans compared to workers with DB plans, we could not predict *a priori* whether that would lead to earlier or later retirement, on average. Our results show that workers with DC plans are retiring significantly later. Retirement patterns are similar until around age 60, when a significant proportion of workers with DB plans begin to experience negative accruals. For the next several years, their retirement hazards are 5-6 percentage points higher, on average, than they are for people with DC plans. While we are concerned about endogenous selection into jobs with different pensions, we have found that older workers with different types of pensions have similar observable characteristics, and controlling for variables that may relate to selection does not alter the estimation results.

Thus, the spread of DC pensions helps explain why the average retirement age has stabilized since the early 1980s. It may also lead to later retirement in years to come, as younger workers who are more likely to have 401(k) and other DC pensions approach retirement.

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TABLE 1
Characteristics of workers, 1992

	(1) DB only	(2) DC only	(3) Combined, DB and DC	(1)-(3)	(4) DC-eligible nonparticipants	(5) Has pension, no data	(1)-(5)	(6) No pension
N	1561	494	453	2508	55	1241	3804	1714
mean birthyear	1937	1936	1936	1936	1936	1936	1936	1936
< high school	0.11	0.14	0.08	0.11	0.09	0.18	0.13	0.27
some college	0.53	0.47	0.55	0.52	0.50	0.42	0.49	0.30
female	0.43	0.43	0.38	0.42	0.46	0.44	0.43	0.51
married	0.75	0.76	0.74	0.75	0.82	0.75	0.75	0.67
poor health	0.08	0.06	0.06	0.07	0.01	0.08	0.07	0.10
white collar	0.43	0.44	0.41	0.43	0.41	0.32	0.39	0.21
pink	0.23	0.25	0.35	0.24	0.29	0.27	0.25	0.26
blue	0.34	0.31	0.24	0.33	0.30	0.41	0.36	0.53
industry								
agric,mining, construction	0.04	0.06	0.04	0.04	0.06	0.08	0.05	0.10
manuf, trsprt	0.31	0.29	0.45	0.34	0.18	0.39	0.35	0.24
prof services, public admin	0.55	0.33	0.29	0.46	0.55	0.26	0.39	0.23
trade, non-prof services	0.10	0.32	0.22	0.16	0.21	0.27	0.21	0.43
median financial assets	18,000	20,500	21,100	20,000	14,250	17,000	18,500	4,000
owns home	0.89	0.86	0.89	0.88	0.78	0.85	0.87	0.72
median earnings	30,000	26,000	31,000	30,000	25,500	25,000	28,000	15,000
mean job tenure	19	11	18	18	8	13	16	4
Pension wealth at age 65								
25% quartile	89,108	44,600	151,972	-	-	-	-	-
median	192,006	99,105	318,145	-	-	-	-	-
75% quartile	365,569	208,847	622,694	-	-	-	-	-

Data from wave 1 of the Health and Retirement Study. The sample consists of people aged 53+ who work at least 30 hours per week in their main job and are not self-employed. People are classified DB if their employer offers a DB plan; DC if their employer offers and they participate in a DC plan; and combined if both. The category "DC-eligible non-participants" consists of a small number who told the HRS they have a pension but have zero DC assets and no DB pension. Financial assets exclude 401(k) assets.

TABLE 2
Median of pension wealth accruals, as the retirement age changes

Retirement age:	DB only Total	DC only Total	DC only Excluding voluntary contributions	Combination Total	Combination DB component	Combination DC component
Men						
53	5,355	4,925	2,740	12,709	6,127	4,917
54	8,891	5,019	2,719	18,811	13,618	5,330
55	5,403	5,110	2,801	13,166	7,087	5,330
56	5,060	5,565	3,191	13,140	6,725	5,254
57	4,724	5,477	3,432	13,311	6,396	5,191
58	4,612	5,017	3,601	12,198	5,960	5,271
59	4,466	5,637	3,659	11,617	5,916	5,401
60	2,919	5,776	3,895	9,544	3,095	5,545
61	2,652	5,866	3,967	8,362	2,903	5,402
62	395	5,772	3,940	5,999	290	5,456
63	-515	5,730	3,885	5,255	-543	5,295
64	-1,215	5,778	3,820	4,889	-1,284	5,099
65	-2,841	5,342	3,647	-1,724	-3,127	4,853
66	-3,593	5,137	3,474	-3,411	-4,187	4,477
Women						
53	5,808	2,606	1,468	7,512	4,920	2,509
54	6,401	2,615	1,562	10,021	6,706	2,776
55	5,436	2,552	1,648	9,085	5,251	2,935
56	5,588	2,608	1,736	9,733	9,528	3,008
57	5,790	2,819	1,855	9,818	5,444	3,158
58	5,499	2,910	1,925	9,682	5,387	3,231
59	5,056	2,902	1,995	10,165	6,049	2,890
60	3,849	3,045	2,077	7,580	4,031	2,978
61	3,462	3,102	2,156	7,168	4,046	3,088
62	2,291	3,209	2,223	5,872	2,255	3,110
63	1,757	3,295	2,286	5,792	2,261	3,248
64	1,471	3,326	2,319	5,690	1,840	3,274
65	0	3,326	2,292	3,643	452	3,301
66	-579	3,329	2,282	3,127	0	3,306

Data from the Health and Retirement Study, wave 1. The sample is full-time employees aged 53+ with pension data. See Table 1 notes.

TABLE 3
More statistics on pension wealth accrual

Quartile values	DB 25%	DB 75%	DC 25%	DC 75%	Combination 25%	Combination 75%
Retirement age:						
Men						
53	2,053	12,856	2,720	9,328	7,559	20,767
54	2,140	19,500	2,639	9,094	9,577	51,406
55	2,244	12,043	2,702	9,068	7,129	22,986
56	1,829	10,953	2,881	9,812	6,455	22,688
57	1,480	10,342	2,836	9,390	6,672	22,907
58	887	9,884	2,765	9,685	6,264	23,062
59	300	10,253	2,830	9,414	6,123	24,808
60	-405	6,277	2,820	9,675	4,377	17,685
61	-1,244	6,179	2,986	9,791	3,032	16,741
62	-2,516	3,686	3,004	9,764	2,535	14,503
63	-3,853	2,956	2,934	9,813	1,292	13,169
64	-5,276	2,618	2,888	9,740	322	12,010
65	-7,539	257	2,749	9,261	-1,724	6,940
66	-9,234	0	2,646	8,786	-3,411	5,208
Women						
53	2,206	12,854	1,478	4,874	4,655	17,121
54	2,282	16,164	1,422	4,806	7,094	18,383
55	2,355	10,774	1,465	5,065	5,796	15,896
56	2,334	11,223	1,487	5,240	5,741	16,689
57	2,504	11,144	1,565	5,735	5,808	17,777
58	2,332	10,415	1,666	5,589	6,130	16,661
59	1,869	10,546	1546	5,853	6,090	17,418
60	1,330	7,292	1,625	5,856	4,088	12,868
61	902	6,904	1,719	5,905	4,444	12,754
62	284	4,855	1,767	6,000	3,525	10,647
63	-163	4,196	1,785	6202	3,697	10.839
64	-1,011	4,102	1,852	6,049	3,058	10,795
65	-2,497	1,378	1,832	6,207	1,533	7,429
66	-3,742	875	1,835	5,597	938	6,524

See Table 2 notes.

TABLE 4
Annual job quit hazard rates, 1992-1998

	(1) DB only	(2) DC only	(3) Combined, DB and DC	(1)-(3)	(4) DC-eligible nonpar-ticipants	(5) Has pension, no data	(1)-(5)	(6) No pension
Men								
53	5%	0%	3%	3%	0%	1%	3%	15%
54	2	3	3	3	13	4	3	7
55	6	1	9	6	0	8	6	9
56	9	3	9	7	0	6	7	8
57	7	3	5	5	0	5	5	8
58	7	12	9	8	15	6	8	7
59	10	5	12	8	5	6	8	9
60	7	4	9	9	0	13	9	8
61	12	14	12	11	17	6	11	5
62	27	17	20	24	0	24	24	18
63	22	29	22	22	0	20	22	13
64	21	2	11	15	0	14	15	9
65	22	25	55	25	0	22	25	18
66	19	0	26	13	0	9	13	8
Total	40	35	41	39	23	37	39	40
Women								
53	4%	0%	2%	4%	0%	4%	4%	7%
54	5	3	1	4	0	5	4	10
55	6	3	8	7	13	4	7	10
56	6	5	6	5	12	4	5	10
57	5	2	5	5	8	5	5	7
58	8	7	9	7	16	6	7	6
59	8	4	5	6	0	6	6	9
60	11	10	12	10	12	9	6	9
61	12	7	8	10	0	10	10	9
62	19	16	19	19	36	18	19	11
63	22	16	9	18	8	19	18	16
64	17	9	29	18	0	22	18	7
65	26	19	16	30	0	42	30	10
66	18	25	55	29	0	40	29	8
Total	41	30	36	38	56	38	40	38

See Table 2 notes. Quit rates are the percentage who are working at one birthday and have quit by the next birthday. The sample excludes people who lose their job involuntarily due to layoff or plant closure.

TABLE 5-A
Regression results:
Coefficient estimates on pension variables

Dependent variable: does one leave one's job	5.1	5.2	5.3 5% discount rate
Pension variables:			
has a: DB plan	0.0145	0.0103	0.0115
	(0.0117)	(0.0121)	(0.0114)
combined plan	0.0189	0.0222	0.0137
	(0.0211)	(0.0222)	(0.0211)
peak value / earnings: DB plan	-0.0085**	-0.0068**	-0.0065**
	(0.0034)	(0.0034)	(0.0028)
DB portion of combined plan	-0.0152*	-0.0162**	-0.0105
	(0.0078)	(0.0082)	(0.0092)
at or older than peak value: DB plan	-	0.0138	0.0273**
		(0.0101)	(0.0131)
combined plan	-	0.0055	-0.0080
		(0.0203)	(0.0148)
at normal retirement date: DB plan	-	0.0220**	0.0237**
		(0.0129)	(0.0130)
combined plan	-	-0.0217	-0.0200
		(0.0123)	(0.0134)
pension wealth / earnings:	0.00292**	0.00253**	0.00309**
DB plan	(0.00096)	(0.00099)	(0.00094)
DB (combined plan)	0.00175	0.00156	0.00427
	(0.00268)	(0.00306)	(0.00363)
DC plan	0.00077	0.00074	0.00089
	(0.00207)	(0.00207)	(0.00144)
DC (combined plan)	0.00237*	0.00211	0.00213*
	(0.00148)	(0.00150)	(0.00126)
DC, employer matches own contributions	0.0056	0.0058	0.0047
	(0.0076)	(0.0076)	(0.0074)
early-out incentive offered	0.0116	0.0124	0.0126
	(0.0108)	(0.0110)	(0.0110)

TABLE 5-B
Regression results:
Coefficient estimates on pension variables

Dependent variable: does one leave one's job	5.1	5.2	5.3 5% discount rate
Other financial variables:			
Social Security peak value/ earnings:			
private pension is DB only	-0.0144**	-0.0141**	-0.0144**
	(0.0048)	(0.0048)	(0.0048)
private pension is DC only	-0.0120**	-0.0208**	-0.0171*
	(0.0088)	(0.0089)	(0.0087)
private pension is combined	-0.0151*	-0.0157*	-0.0179**
	(0.0087)	(0.0088)	(0.0089)
Social Security wealth / earnings	-0.00014	-0.00016	-0.00043
	(0.00112)	(0.00114)	(0.00118)
log financial assets	0.0051**	0.0051**	0.0049**
	(0.0014)	(0.0014)	(0.0014)
financial assets = 0	0.0760**	0.0748**	0.0705**
	(0.0377)	(0.0374)	(0.0367)
not a homeowner	-0.0022	-0.0013	-0.0007
	(0.0062)	(0.0063)	(0.0064)
Log likelihood per observation	-0.1993	-0.1988	-0.1984
Number of observations	7810	7810	7810

Tables 5 and 6 report marginal effects from probit estimates, computed at sample means. The dependent variable is an indicator for leaving one's job from one birthday to the next, 1992-1998. The sample consists of full-time employees aged 53+ in pensioned jobs in the 1992 Health and Retirement Study, who did not subsequently leave because of layoff or plant closure. The estimates use person level analysis weights. Standard errors are in parentheses; significance at the 90% (*) and 95% (**) levels are indicated.

TABLE 5-C
Regression results:
Coefficient estimates on other variables

Dependent variable: does one leave one's job	5.2
Other independent variables:	
industry: agriculture, mining, construction	-0.0100 (0.0095)
manufacturing, transport	-0.0029 (0.0055)
professional services	-0.0036 (0.0081)
firm size: 100-500 employees	0.0072 (0.0097)
>500 employees	0.0042 (0.0054)
tenure: joined employer 1974-85	-0.0020 (0.0050)
joined employer 1986+	-0.0067 (0.0067)
occupation: admin, professional, technical	-0.0044 (0.0070)
sales, clerical	0.0022 (0.0072)
has pay & promotion responsibility	0.0066 (0.0063)
has no retirement plans	-0.0251** (0.0045)
health insurance: provided by employer	-0.0104 (0.0071)
employer plan provided to retirees	0.0093* (0.0050)
privately purchased	0.0036 (0.0069)
from Medicare or VA	0.0797 (0.0719)
from Medicaid or other public source	0.0165* (0.0111)
hospitalized: once in last year	-0.0027 (0.0066)
twice or more in last year	0.0086 (0.0140)
education: high-school diploma at least	-0.0031 (0.0080)
more than 12 years schooling	-0.0170** (0.0058)
demographic characteristics: female	0.0002 (0.0105)
married	-0.0136 (0.0100)
married female	0.0203* (0.0136)
black	-0.0010 (0.0066)
hispanic	0.0018 (0.0118)
age: 54	-0.0089 (0.0139)
55	0.0336* (0.0214)
56	0.0369** (0.0218)
57	0.0189 (0.0185)
58	0.0315* (0.0216)
59	0.0433** (0.0236)
60	0.0321* (0.0219)
61	0.0756** (0.0304)
62	0.1771** (0.0474)
63	0.2179** (0.0579)
64	0.1182** (0.0506)
65	0.2623** (0.0766)
66	0.1652** (0.0765)

TABLE 6-A
Regression results:
Coefficient estimates on pension variables

Dependent variable: does one leave one's job	6.1 excludes voluntary	6.2 LHS var: takes a	6.3 men	6.4 women
Pension variables:	DC contr.	new job		
has a: DB plan	0.0116	0.0056	0.0084	0.0351*
	(0.0123)	(0.0093)	(0.0169)	(0.0160)
combined plan, only voluntary	0.0591	-	-	-
contributions in DC plan	(0.0471)			
combined plan	0.0228	-0.0041	0.0040	0.0567
	(0.0262)	(0.0130)	(0.0244)	(0.0568)
peak value / earnings: DB plan	-0.0065*	-0.0006	-0.0074	-0.0072*
	(0.0035)	(0.0022)	(0.0052)	(0.0043)
DB portion of combined plan,	-0.0178	-	-	-
voluntary contributions in DC plan	(0.0124)			
DB portion of combined plan	-0.0135	-0.0005	-0.0135**	-0.0160
	(0.0096)	(0.0047)	(0.0094)	(0.0139)
at or older than peak value: DB plan	0.0152*	-0.0103	0.0112	0.0015
	(0.0102)	(0.0059)	(0.0117)	(0.0127)
combined plan,	0.0137	-	-	-
voluntary contributions in DC plan	(0.0292)			
combined plan	0.0018	0.0033	-0.0016	0.0126
	(0.0310)	(0.0165)	(0.0194)	(0.0464)
at normal retirement date: DB plan	0.0212*	0.0020	0.0154	0.0273*
	(0.0127)	(0.0114)	(0.0160)	(0.0186)
combined plan,	-0.0352**	-	-	-
voluntary contributions in DC plan	(0.0044)			
combined plan	-0.0007	-	-0.0304*	0.0051
	(0.0297)		(0.0074)	(0.0365)
pension wealth / earnings:	0.00282**	-0.00086	0.00321**	0.00084
DB plan	(0.00100)	(0.00100)	(0.00129)	(0.00151)
DB (combined plan),	0.00112	0.00144	0.00364	-0.00140
voluntary contributions in DC plan	(0.00407)	(0.00255)	(0.00372)	(0.00508)
DB (combined plan)	0.00209	-	-	-
	(0.00470)			
DC plan	0.00141	-0.00062	0.00040	0.00219
	(0.00311)	(0.00181)	(0.00265)	(0.00270)
DC (combined plan)	0.00153	0.00053	0.00269	0.00095
	(0.00463)	(0.00951)	(0.00190)	(0.00218)
DC, employer matches own contributions	0.0083	0.0113*	-0.0004	0.0195*
	(0.0081)	(0.0070)	(0.0089)	(0.0131)
early-out incentive offered	0.0135	0.0115	-0.0008	0.0326**
	(0.0113)	(0.0095)	(0.0111)	(0.0211)

TABLE 6-B
Regression results:
Coefficient estimates on pension variables

Dependent variable: does one leave one's job	6.1	6.2	6.3	6.4
	excludes	LHS var:	men	women
Other financial variables:	voluntary DC contr.	takes a new job		
Social Security peak value/ earnings:				
private pension is DB only	-0.0147**	0.0008	-0.0380**	-0.0161**
	(0.0049)	(0.0021)	(0.0161)	(0.0045)
private pension is DC only	-0.0223**	-0.0002	-0.0221	-0.0131
	(0.0097)	(0.0050)	(0.0204)	(0.0094)
private pension is combined only	-0.0204**	-0.0026	-0.0108	-0.0166*
	(0.0090)	(0.0055)	(0.0264)	(0.0102)
Social Security wealth / earnings	-0.00018	-0.00088	0.00034	0.00076
	(0.00117)	(0.00082)	(0.00192)	(0.00110)
log financial assets	0.0034**	0.0001	0.0039**	0.0052**
	(0.0013)	(0.0011)	(0.0018)	(0.0018)
financial assets = 0	0.0449**	-0.0008	0.0622*	0.0772**
	(0.0293)	(0.0046)	(0.0446)	(0.0579)
not a homeowner	-0.0015	-0.0085*	-0.0199**	0.0243**
	(0.0064)	(0.0045)	(0.0081)	(0.0082)
Log likelihood per observation	-0.1987	-0.1129	-0.2003	-0.1854
Number of observations	7666	7295	4394	3416