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**DID 401(k) PLANS REPLACE OTHER
EMPLOYER PROVIDED PENSIONS?**

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ABSTRACT

This paper reports the findings from a new survey of firms that provide 401(k) plans for their employees. Our results suggest that few 401(k) plans replaced pre-existing defined benefit pension plans, although a substantial fraction replaced previous defined contribution thrift and profit sharing plans. Our survey results also provide new evidence on patterns of 401(k) participation. We find significant persistence in firm-level participation rates from one year to the next, which supports the view that 401(k) participants are not making marginal decisions of whether or not to contribute to the plan in a given month, or even year, but rather make long-term commitments to participate in these plans.

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The rapid growth of 401(k) plans is one of the most striking trends in retirement saving during the last decade. These plans allow employees to defer income, to take advantage of generous employer matching provisions on some contributions, and to accumulate assets at the pre-tax rate of return. Strong employee demand for 401(k) plans is undoubtedly part of the explanation for their expansion during the 1980s. So too are various changes in the tax and regulatory treatment of defined-benefit (DB) pension plans that were enacted in the 1981, 1984, and especially 1986 tax reform bills. These changes reduced employers' willingness to provide DB plans for their employees and contributed to the growth of defined-contribution (DC) pension plans, including 401(k)s.

A growing body of evidence suggests that 401(k) contributors do not offset their contributions by reducing their accumulation of other financial assets (see Poterba, Venti, and Wise (1992, 1993)). This does not necessarily mean that 401(k) contributions represent net additions to private saving, however, since they could be offset by reduced contributions to other pension plans. In particular, if 401(k) plans have replaced other types of private pension arrangements, then their net effect on private saving may be smaller than the contribution flow to these plans would otherwise suggest.

To investigate the degree of substitution between 401(k) plans and other, employer-provided retirement saving arrangements, and to obtain firm-level information on these plans more generally, we surveyed a stratified random sample of firms with 401(k) plans in 1987. We asked 401(k) plan administrators about the origins of their plan, in particular whether it replaced another pension plan for

covered employees. We also inquired about various detailed provisions of the plan, including participation rates, employer matching rules, loan and hardship withdrawal provisions, and whether the plan had been affected by anti-discrimination rules.

This paper, which summarizes the results from our survey, is divided into six sections. Section one summarizes aggregate trends in contributions to 401(k) plans and other employer-provided pension plans, and describes the changing institutional environment in which firms select defined-benefit and defined-contribution pension plans. Section two explains our sample survey design, and presents summary statistics on the set of 401(k) plans in our sample. Section three reports our findings on the interaction between 401(k) plans and other retirement plans. We find that 401(k) plans do not appear to have displaced previous defined benefit plans for many workers, but that these plans did in many cases replace pre-existing defined contribution thrift and profit sharing plans.

The next two sections summarize the characteristics of 401(k) plans in our sample. Section four describes the pattern of participation rates and employer matching rates over time, and explores the links between these plan attributes. The fifth section explains the structure of anti-discrimination rules, their changes over time, and summarizes their effects on the 401(k) plans in our sample. There is a brief conclusion.

1. Trends in Defined Benefit and Defined Contribution Pension Plans

The 1980s witnessed a substantial change in the relative flows of contributions to defined benefit (DB) and defined contribution (DC) pension plans. This was the result of at least two coincident developments. First, Bernheim and Shoven (1989) argue that high investment returns on existing defined benefit plans reduced required contributions to DB plans in the mid-1980s. A second factor, explored in Chang (1991), Kruse (1991), and Silverman (1993), was the changing regulatory and tax environment in the 1980s.

The changing regulatory treatment of defined benefit and defined contribution pension plans began with the Employee Retirement and Income Security Act of 1974 (ERISA).¹ ERISA imposed minimum plan standards for participation, vesting, and retirement, as well as requirements for funding past service liability. It also established the Pension Benefit Guaranty Corporation (PBGC) to insure pension benefits to employees in DB plans, and financed this insurance program with taxes on existing plans. ERISA placed a lower regulatory burden on defined contribution plans, which were only subject to the minimum plan standards that also affected DB plans.

Legislation since ERISA has raised PBGC premia, required faster funding of liabilities, and penalized employers for claiming excess assets of terminated defined-benefit plans. The Tax Equity and Fiscal Responsibility Act of 1982

¹Clark (1987) and Beller and Lawrence (1992) discuss these issues in more detail.

imposed faster vesting schedules for lower-paid employees in so-called "top heavy" plans. The Tax Reform Act of 1986 imposed an excise tax of 10% on excess pension plan assets that revert to an employer upon termination of a pension plan. Subsequent legislation raised this tax to 20%, effective in 1990, and to 50% if the employer does not transfer a portion of the excess assets to a replacement plan, or increase benefits under the terminating plan.

The 1987 Omnibus Budget Reconciliation Act increased the basic PBGC premium from \$8.50 to \$16.00 per participant, and added a variable premium that depends on the plan's degree of underfunding. It also limited the tax deduction for plan contributions to 150% of the plan's termination liability; this had the effect of reducing employer contributions to defined benefit plans (see Chang (1993)). The net effect of these tax and regulatory changes has been a marked increase in the administrative cost, and a decrease in the benefits to employers, from establishing defined-benefit pension plans.

Table 1.1 reports the number of defined contribution and defined benefit pension plans, the number of participants in these plans, and the level of contributions to these plans, during the period since 1975. The table shows that the number of defined contribution plans nearly doubled between 1975 and 1982, and then rose by fifty percent again between 1982 and 1989. The number of defined benefit plans increased during the 1975-1982 period, but the increase was slower than that for defined contribution plans. Between 1982 and 1989, however, the number of DB plans actually declined. The second column in Table

1.1 shows the total number of participants in DB and DC plans, which includes both working and retired participants. The number of participants in DB plans peaked in 1984 and has declined slightly in subsequent years. The number of active participants, current employees participating in DB plans, peaked in 1981, and has declined by several million since then. In contrast, the number of DC plan participants increased throughout the 1980s, although not as quickly as the number of DC plans. This reflects the growth of relatively small DC plans, particularly 401(k) plans, in recent years.

The last column in Table 1.1 tracks contributions to defined contribution and defined benefit pension plans. The disparity between the contribution series is even more dramatic than that between the number of participants or the number of plans. DC plan contributions increased from \$23.5 billion in 1980 to \$80.1 billion in 1988, with \$46.1 billion of the 1989 total accounted for by 401(k) contributions. Contributions to DB plans, however, peaked at \$48.4 billion in 1982, and then declined to only \$24.9 billion by 1989. The rapid growth in contributions to DC plans is largely due to the growth of 401(k) plans. Without them, contributions to DC plans would have been only \$34 billion in 1989.

There are at least two reasons why 401(k) plans may have grown faster than other DC plans during the 1980s. First, 401(k)s offered tax advantages relative to the profit-sharing and thrift plans that they often replaced. The opportunity for employees to defer tax on a substantial share of his or her salary was, and continues to be, an important attraction of these plans. Second, 401(k)s are more

flexible than many other pension arrangements. Since each eligible employee can determine the amount of saving he does through the 401(k) plan, these plans are likely to be more attractive at firms with heterogeneous work forces. Finally, from the firm's perspective, 401(k) plans may cost less for a given level of employer contribution to the median employee.² With other defined contribution plans, the employer must contribute on behalf of all eligible workers. Even though participation in 401(k) plans is high, however, not all eligible employees participate in these plans. For a given level of employer contribution per participating employee, therefore, the firm's total cost will be lower with a 401(k) than with other DC plans.

2. Sample Survey Design

It is not possible to study the substitution between 401(k) plans, defined benefit pension plans, and other defined contribution pension plans using the household-level data sets that underlie prior research on 401(k)s and household saving. Household data sets such as the Survey of Income and Program Participation and the Current Population Survey do not collect sufficiently detailed information on the respondent's pension arrangements. In addition, neither of

²The median employee may be critical in determining how the firm's wage payments adjust to the level of employer contribution. Provided there is some trade-off between wages and pension benefits from the worker's perspective, the net cost of an employer pension contribution is smaller than the amount of this contribution.

these data sets contains any information on the pension arrangements at the respondent's firm before the 401(k) option became available.³

To remedy these data deficiencies, we prepared a new survey instrument and mailed it to a subset of U.S. corporations. Our questionnaire draws heavily on a General Accounting Office survey in 1987 (see GAO (1988a,1988b)), but includes additional questions on the origins of the 401(k) plan at the survey firm, whether it had replaced a previous DB or DC plan, and the degree of overlap between 401(k) and other pension coverage for the firm's employees. We also queried firms about both the current structure of their 401(k) plan and historical attributes of their plan. This enables us to chart patterns in 401(k) participation and contributions conditioning on a firm effect.

We obtained addresses for 401(k) plan administrators from IRS Form 5500 data filings for 1987, the most recent year for which public use data were available when we mailed our questionnaires. Given the skewed size distribution of 401(k) plans, the characteristics of the average plan may be quite different from the plan that is available to the average worker. To achieve some representativeness with respect to workers, we adopted a sampling scheme that assigned a higher sampling probability to larger plans.

³The Health and Retirement Survey, which will become available for public use in the near future, includes more detailed data on pension arrangements. It will therefore be possible to study some of these substitution issues using that data set.

Table 2.1 shows the number of 401(k) plans in the Form 5500 data base. We disaggregate plans by their number of participants, and show the selection probability we used to identify survey recipients as well as our response rate to date. We mailed 786 questionnaires. After a dismal first-round response of only 33 surveys, we designed a shorter follow-up survey, which we mailed to 100 non-respondents. This was followed with a telephone call to explore the status of the survey and, if necessary, provide an opportunity for the 401(k) administrator to report information by telephone. This second-stage survey yielded another ten usable responses. Much of our analysis is therefore based on data from 43 firms.⁴

Our survey response rate is disappointing, and raises important questions about the representativeness of the firms in our sample and the generality of our results. Our response rate is apparently similar, however, to typical response rates to mail surveys conducted by the Department of Labor. In light of the small sample size, the results below should be viewed with caution.

Table 2.2 reports summary characteristics for the 401(k) plans that have responded to our survey. The overwhelming majority of these plans involve both a salary reduction component and a company match rate. This arrangement characterizes more than two thirds of the plans and participants in our sample.

⁴Four surveys were returned because the 401(k) plan no longer existed, for example because the parent firm had ceased operations. We also received six responses indicating that the firms did not participate in surveys.

Table 2.2 also provides information on the distribution of company matching rates for 401(k)s. While 10% of the responding plans do not match employee contributions, these plans are smaller than average, and account for only two percent of the participants in our survey. Ten percent of the responding plans, representing nearly one third of the participants, match employee contributions dollar for dollar. Nearly ninety percent of the participants in the responding 401(k) plans face match rates of at least 25 cents per dollar contributed.

These results on match rates are comparable to those in other surveys of 401(k) plans. The General Accounting Office (1988a) found that 51% of firms with 401(k) plans match employee contributions, and that conditional on matching, more than two thirds provided at least a 25% matching contribution. A separate survey by the Massachusetts Mutual Insurance Company (1991) found that 20% of plans had match rates of 100% or more, while 29% had no employer matching. Hewitt Associates (1991) survey found that 84% of 401(k) plans provide some level of employer matching funds.

3. 401(k) Plans and Other Pension Arrangements

One battery of questions on our survey inquired about how and why the 401(k) plan was established. We asked if the 401(k) plan was a new plan, or if it replaced another pension plan. Table 3.1 summarizes the survey responses. 45%

of the responding firms, representing 37% of the 401(k) participants in our survey, indicated that another pension plan was converted to the 401(k).⁵

Two percent of the responding firms (one firm) reported that defined benefit pension plans were terminated and replaced with a 401(k). Many more firms reported that they converted previous thrift plans or profit sharing plans to 401(k)s. Our findings also suggest that at least half of the 401(k) plans did not replace previous plans. These results do not support the view that 401(k) contributions are simply a relabelling of contributions that were previously directed to other pension plans.

The motivation for converting thrift and profit sharing plans to 401(k)s, as noted above, was that contributions to the former were made on an after-tax basis, while 401(k) contributions were made before employee taxes. In addition, until the Tax Reform Act of 1986 tightened the limits on both 401(k) contributions and withdrawals, 401(k)s offered a highly liquid and tax-favored means to accumulate assets. The limit on 401(k) contributions was \$30,000 per year until 1986, and with federal marginal tax rates of 50% on high-income individuals, the incentive to defer income and accumulate savings at the pre-tax rate of return were substantial.

⁵This estimate is based on the 33 responses to our initial "long form" questionnaire. We have confirmed the survey responses for most of our sample firms by examining their 5500 filings. We find clear evidence for some firms that one or several defined contribution plans were either terminated or ceased receiving contributions when the 401(k) plan was established.

The survey responses indicate that 401(k)s are typically supplemental plans, added to pre-existing defined benefit (63%) or defined contribution (19%) plans. A direct test of whether 401(k) plans have replaced all other pension coverage is provided by our question on the fraction of 401(k) eligible workers who are also covered by other pension arrangements at the firm. In 1990, 82% of the participants in 401(k) plans were also covered by another defined benefit plan at the same firm, and 30% were also covered by another DC plan. These responses are not exclusive: 401(k) eligibles could be covered by both. The 401(k) was the only retirement plan for covered workers at 19% of the plans, representing 10% of the participants.

The survey findings on the extent of sole pension coverage by 401(k) plans can be compared with information based on published tabulations from the IRS Form 5500 filings. For 1989, the most recent year for which the data are available, the Department of Labor (1993) reports that 14% of the assets of 401(k) plans with at least 100 employees were held in plans that were the only employer-sponsored pension plan for employees.⁶ This suggests that, at most, a small fraction of current 401(k) plans could possibly have displaced all other pension arrangements at providing firms.

There is some indication that the pattern of pension plan coverage for 401(k) participants has been changing. Between 1986 and 1990, the share of 401(k)

⁶401(k) plans with at least 100 participants accounted for \$41.5 billion of the \$46.1 billion of 401(k) contributions in 1989.

participants covered by another DB plan fell from 88% to 82%, and the share covered by another DC plan fell from 32% to 30%.⁷ The fraction of 401(k) plans that represented the only pension coverage for participants rose during this period, but this increase was concentrated among smaller plans.

The disparity between the results in the first and second columns of Table 3.1 suggests important differences between the roles played by 401(k) plans at large and small firms. Small firms are more likely to rely on 401(k)s as their primary retirement vehicle. The diffusion of 401(k)s across firms during the 1980s began with large firms; recent adopters are, on average, smaller than those with established plans.

The differences between large and small firms are apparent even in our small sample. The 401(k) was the only retirement plan for 14% of the workers at firms that started their 401(k) plans in 1986 or later, compared with only 7% of the workers at firms with plans that started before 1986. While 18% of the plans that began before 1986 are primary retirement plans, 40% of the post-1986 plans are primary plans.

The foregoing results suggest that only a small minority of firms replaced defined benefit pension plans with 401(k) plans. Only one of our sample respondents, but a relatively large firm, indicated that this was the origin of the 401(k) plan. There is more evidence, although it applies at less than half of the

⁷With our current sample size, we cannot reject the null hypothesis that the percent of 401(k) eligibles covered by other plans was the same in 1986 and 1990.

firms with 401(k)s, that these plans replaced previous defined contribution thrift plans. Estimating the size of the thrift plan contribution flow that was redirected to 401(k)s requires more detailed information on these plans than our survey collected.

4. 401(k) Plan Characteristics and Participation Rates

One of the central questions about 401(k) plans, as well as other types of tax-deferred retirement saving programs, is the sensitivity of plan contributions to tax and other incentives. One strategy for analyzing this question is to compare the participation rates in 401(k)s with different employer match rates. While the match rate may be endogenous, it is not clear why one would expect a high match rate as opposed to a high employer contribution at firms where large pools of workers want to participate in a 401(k).⁸ In this case, the correlation between match rates and participation rates may reflect firm decisions rather than employee decisions regarding the amount to save through the 401(k).

One unique feature of our data set is the presence of repeated observations on employee participation rates, as well as some aspects of the 401(k) plan such as the match rate. This permits us to study the persistence of participation and contribution rates, as well as the intertemporal stability of employer match rates.

⁸Further analysis of participation decisions, recognizing the potential endogeneity of the match rate, would require a more extensive data set with information on firm and worker characteristics, possibly from a time period before the growth of 401(k)s.

Table 4.1 summarizes the joint distribution of the employer match rate in 1986 and 1990. We present these data in a transition matrix, showing the pattern of matching rates in both 1986 and 1990. The table shows that there is very strong persistence in the match rates that firms apply to employee contributions. 86% of the firms responding to our survey applied the same match rate in 1986 and 1990, and the relatively small number that did not changed relatively little. With one exception, the set of firms with zero match rates in both years, this fraction is relatively insensitive to the choice between plan- and participant-weighting, as the similarity between the upper and lower panels of the table suggests.

Table 4.2 uses a format similar to Table 4.1 to report information on employee participation rates in 401(k) plans in both 1986 and 1990. This table again suggests important stability. We divide firms into four participation rate groups, and 78% of the plans are in the same group in 1986 and 1990. Larger plans are more likely than smaller firms to exhibit high participation rates, but they exhibit the same degree of stability as smaller firms. The lower panel of Table 4.2, which weights participation rates by plan size, shows that 90% of the 401(k) participants in 1990 were in plans with participation rates of 75% or more. In contrast, only 65% of the plans have participation rates this high. The distribution of participation rates provides a check on the representativeness of our sample. Weighting firms by their number of participants, the average participation rate is approximately 76%. Tabulations from the 1991 Current Population Survey

reported in Poterba, Venti, and Wise (1993) suggest an average participation rate of 71%. Papke (1992) also findings similar participation rates in tabulations of the 1989 IRS Form 5500 filings.

The strong persistence of participation rates across firms suggests, but does not prove, that employees do not alter their 401(k) status with any frequency. Unfortunately, data on firm-level participation rates are not ideal for measuring the persistence of contributor behavior. One difficulty is that an individual can be a plan participant in a given year without making a contribution in that year. A second, and more difficult, problem, is that it is possible that firm participation rates are stable even though individual participation decisions are not. For example, a firm could display a 60% participation rate in two consecutive years if 40% of the workers participated in the first but not the second year, a separate 40% of the workers participated in the second year but not the first, and only 20% of workers participated in both years. Evidence against this possibility is presented in Kusko, Poterba, and Wilcox (1993). That study analyzes individual contribution data from one large 401(k) plan, and finds that contribution decisions are extremely persistent from one year to the next. This supports the view that deciding to contribute to a 401(k) plan is a form of self-control (see Shefrin and Thaler (1988)) and that these contributions are effectively removed from the household's disposable income.

The information we have collected can be used to study how participation decisions are affected by employer match rates. An OLS regression of plan

participation rates in 1986 and 1990 on employer match rates and an indicator variable for 1990 yields:

$$\text{PART} = \begin{array}{r} .602 \\ (.058) \end{array} + \begin{array}{r} .187 * \text{MATCH} \\ (.070) \end{array} - \begin{array}{r} .008 * \text{DUM90} \\ (.055) \end{array}$$

The R^2 for this equation is .124. A ten percentage point increase in the employer match rate is predicted to raise the participation rate by almost two percentage points. The point estimate for the 1986 cross section is somewhat smaller (1.6 percentage points, with a standard error of 1.3 points). We have also replaced the level of the match rate with a sequence of indicator variables corresponding to match rates of zero, .01-.25, .26-.50, etc. The estimates from such an equation show that moving from a match rate of zero to one between .01 and .25 is associated with an increase in the participation rate of 15%. While higher match rate categories have higher participation rates still, we cannot reject the null hypothesis that participation rates at all match rates above zero are the same.

Previous research on the association between match rates and 401(k) participation and contribution decisions has generated mixed results. Papke (1992) analyzes plan-level data from IRS Form 5500 filings, and finds that the effect of changes in the match rate on the contribution rate is dependent on the level of the match rate. At low levels of match, increases in the match rate appear to raise the share of salary contributed, although at high match rates, there appears to be a negative effect. Andrews (1992) studies data from the May 1988 Current Population Survey, which includes information on whether an individual contributes

to a 401(k), what fraction of salary is contributed, and whether or not the plan includes a corporate match. The CPS does not include information on the level of the match rate. Andrews finds a positive relationship between participation and the presence of a match, but a negative relationship between the contribution rate and the match rate.

Our survey data includes two observations for most firms, so we can difference the match rates and participation rates for the firms, allowing for unobserved plan effects. The resulting estimate is .139 (.116), suggesting that the effect of employer matching on the participation decision is not just the result of inter-plan heterogeneity.⁹ This finding of a positive, but statistically weak, effect of changes in match rates on changes in participation contrasts with the evidence for a single 401(k) plan in Kusko, Poterba, and Wilcox (1993). The study finds relatively little behavioral response to changes in employer match rates.

Table 4.3 explores another aspect of 401(k) plan structure: where participants invest their assets. Most plans allow participants at least three investment options, including a stock fund, a bond fund, and a money-market fund. The table shows that 401(k) investors hold roughly half of their total assets in equities, with about 40% of the equity portfolio in company stock. The most common investment vehicles are GICs, guaranteed investment contracts, followed

⁹Our data set includes information on the employer match rate as well as the maximum percentage of salary that is eligible for matching. The cross-section data show that firms that match at a higher rate cap the share of salary they will match at a lower level.

by common stock funds. The estimated portfolio shares are probably measured with some error, given our small sample size. They can be compared VanDerhei's (1992) tabulations of aggregate 401(k) portfolio shares, based on 1989 Form 5500 data. Those tabulations show that common stock accounts for 21% of the asset value in 401(k) accounts, while GICs account for 41% of asset holdings. Part of difference between these results may be due to a shift away from GICs as the prospective returns on these investment vehicles has declined.

One of the central differences between 401(k) plans and traditional defined benefit pension plans, is that investment decisions are made by individual plan participants rather than professional money managers. In more than half of the plans in our sample, participants have full control over the investment of both the employee and employer component of 401(k) contributions. In virtually all of the remaining plans, employees can self-direct their own contributions.

Table 4.4 provides information on another important aspect of 401(k) plan structure: the availability of hardship withdrawals and loans. A recent survey of 401(k) participants by John Hancock Financial Services (1993) suggests that many at least consider the possibility of using 401(k) assets for pre-retirement expenses. While 98% of their sample respondents indicated that they planned to use their 401(k) as a retirement saving vehicle, 27% suggested that they might use the funds for educational expenses, 27% for medical expenses, and 12% for home purchase. Table 4.3 shows that 87% of the 401(k) participants in our survey participate in 401(k)s that allow loans, and that 91% of the plans allow hardship

withdrawal of employee contributions. A smaller share of the plans, 61%, allow employees to make hardship withdrawals of employer contributions.

Table 4.4 also reports information on the types of hardship that qualify for withdrawals at various plans. Virtually all of the plans consider medical expenses, home purchase, and family education as acceptable justifications for withdrawal. Many fewer plans consider divorce and layoff in this category. There is some evidence that smaller plans are more generous in their definition of hardship withdrawals. One question about 401(k)s that may become increasingly important in the future is whether the current 401(k) contributors will withdraw their funds before retirement, or instead allow the funds to build and to support them in old age. Since the build-up of assets in these plans is a recent phenomenon, resolving this issue must await further experience with 401(k)s.

5. Antidiscrimination Rules and 401(k) Plans

One of the important advantages of 401(k) plans over traditional defined contribution pension plans is that they permit different employees to contribute different amounts to the plan. To avoid the possibility that tax-deferred saving plans with employer matching could be used to channel additional compensation to selected groups of employees, with tax subsidy, Congress has enacted a set of nondiscrimination tests that 401(k) plans must satisfy. These regulations restrict the share of each year's contributions to 401(k) plans that can be made by "highly

compensated employees." Analogous rules apply to defined benefit plans and other types of retirement and benefit programs.

Until 1986, the average percentage of salary deferred by the highest-paid 1/3 of the participant group could not exceed the greater of: (i) 150% of the average deferral percentage (ADP) for other eligible employees, or (ii) the lesser of 250% of average deferral percentage for other employees, and the other-employee ADP plus three percent. This was known as the "1/3, 2/3 test." The Tax Reform Act of 1986 (TRA86) limited the tax deferral benefits that highly-compensated employees could receive. First, it reduced the maximum elective pre-tax contribution limit from \$30,000 to \$7,000. Second, TRA86 changed the structure of anti-discrimination provisions and added specific 401(k) nondiscrimination tests to the general rules prohibiting discrimination in contributions and benefits.

TRA86 also introduced what became known as "the ADP test." The test required that the averaged deferral percentage (ADP) deferred by highly compensated employees could not be more than (i) 125% of the ADP for all other eligible employees, or (ii) the lesser of twice the ADP for all other employees, or the ADP for all other employees plus two percentage points.¹⁰ For example, if the ADP of the highly compensated group is 6%, and the ADP for the non-highly-compensated group is 4%, the plan would pass the test because it satisfies the

¹⁰TRA86 defined highly compensated employees as those who were more than five percent owners, officers who earn more than \$45,000 per year, employees who earn more than \$75,000, and employees who earn more than \$50,000 and are in the top 20% of paid employees.

second set of criteria. If the ADP for the highly compensated group were 6.5%, the plan would fail. Even though under criteria (ii) 6.5% is less than twice 4%, it is more than two percentage points higher than the ADP for non-highly-compensated workers. TRA86 also added a second test, the actual contribution percentage (ACP) test, which applies a similar set of restrictions to the combined employee after-tax and employer contributions to the plan.

If a 401(k) plan fails to satisfy either or both of the ADP or ACP tests, the firm can either make additional contributions on behalf of lower-paid employees, so-called "helper contributions," or restrict contributions by highly-compensated employees. Helper contributions include qualified, non-elective employer contributions (QNCs) and qualified matching contributions (QMACs). As a result of these contributions, the stated match rate in some 401(k) plans is a lower bound on the effective match rate for participants outside the highly compensated group.

Table 5.1 provides information on how the antidiscrimination rules affect 401(k) plans in our sample. The first question we asked was whether the plan was forced to limit or return contributions by high-wage employees. Only 15% of the plans responded affirmatively, and only 3% of the participants were at these firms. Three percent of the plans reported making additional contributions for low-wage employees.

Parallel evidence on the importance of ADP testing is found in the Massachusetts Mutual Life Insurance (1991) survey of 401(k) plans. This survey found that 81% of plans passed the ADP test without any correction such as

helper contributions. The most important difference between plans that passed, and those that did not initially pass, the ADP test was the participation rate of non-highly-compensated employees: 70% at firms that passed, 57% at firms that required correction. The evidence from the current study, and that from the Massachusetts Mutual (1991) survey, contrasts with the findings of an earlier Buck Consultants (1989) survey, and the Hewitt Associates (1991) survey. The former found that for the 1988 plan year, only 60% of the surveyed plans passed the ADP test without corrective action, and the Hewitt (1991) survey found that 60% of plans needed some adjustment to pass the nondiscrimination test. While the differences between surveys could reflect changes in the overall difficulty of complying with ADP rules through time, this does not appear to be a sufficient explanation for the differences. This issue requires further investigation.

The relative infrequency with which these constraints bind does not imply that high- and low-wage employees are contributing equal shares of their compensation. Table 5.1 shows the actual deferral percentages for workers categorized in the high and low wage groups. The participant weighted-average ADP for the high-wage group is 6.8% in 1990, compared with 5.8% for the low-wage group. The ratio of these ADPs is very close to the 125% constraint value described above. One important issue that our results raise is whether the positive "externalities" received by highly compensated employees when their lower-income counterparts contribute to a 401(k) plan are a key factor in the drive by employers to encourage widespread participation in 401(k) plans.

6. Conclusion

This paper reports the preliminary findings from a new survey of firms that provide 401(k) plans for their employees. Our results do not support the view that 401(k) plans replaced pre-existing defined benefit pension plans at firms that adopted 401(k)s in the mid-1980s. None of the firms in our data sample reported substituting a 401(k) plan for a defined benefit plan. Several firms, however, reported replacing previous thrift or profit sharing plans with the 401(k) plan, presumably because 401(k)s provided more attractive opportunities for employees to defer taxable income.

Our survey results also provide new evidence on patterns of 401(k) participation. We collected data on 401(k) participation rates in 1986 and 1990, and found very little variation in these rates across this four year period. This pattern of stability confirms other findings, based on data for individual contributors to 401(k) plans, that suggest that 401(k) participants are not making marginal decisions of whether or not to contribute to the plan in a given month, or even year, but rather make long-term commitments. We explore the link between corporate matching rates and 401(k) participation rates, and find evidence of a statistically significant, but substantively small, positive relationship. The predicted effect of a 50% employer match rate is only a 10% increase in participation, which suggests that other factors, such as employer encouragement or a desire to take advantage of tax-deferral schemes, must explain the high overall participation rate in 401(k) plans.

References

- Andrews, Emily S., 1992, "The Growth and Distribution of 401(k) Plans," in J. Turner and D. Beller, eds., Trends in Pensions 1992 (Washington: U.S. Department of Labor).
- Beller, Daniel J. and Helen H. Lawrence, 1992, "Trends in Private Pension Plan Coverage," in John A. Turner and Daniel J. Beller, Trends in Pensions 1992 (Washington: U.S. Government Printing Office, 1992).
- Bernheim, B. Douglas, and John B. Shoven, 1988, "Pension Funding and Saving," in Z. Bodie, J. Shoven, and D. Wise, eds., Pensions in the U.S. Economy (Chicago: University of Chicago Press).
- Buck Consultants, 1989, Current 401(k) Plan Practices: A Survey Report (Secaucus, NJ: Buck Consultants).
- Chang, Angela, 1991, "Explanations for the Trend Away from Defined Benefit Pension Plans," Congressional Research Service Report 91-647 EPW.
- Chang, Angela, 1993, "Sensitivity of Pension Contributions to Taxes," mimeo, MIT Economics Department.
- Clark, Robert L., 1987, "Increased Use of Defined Contribution Plans," unpublished report to the U.S. Department of Labor.
- Hewitt Associates, 1991, 401(k) Plan Design and Administration: 1991 (Lincoln, IL: Hewitt Associates).
- John Hancock Financial Services, 1993, Insights into Participant Behavior: Defined Contribution Plan Survey (Boston: John Hancock).

- Kruse, Douglas L., 1991, "Pension Substitution in the 1980s: Why the Shift Toward Defined-Contribution Pension Plans?," NBER Working Paper.
- Kusko, Andrea L., James M. Poterba, and David W. Wilcox, 1993, "Tax Preferred Saving Vehicles and Personal Saving: New Evidence from the Behavior of 12,000 Participants in a 401(k) Plan," mimeo, Federal Reserve Board of Governors.
- Massachusetts Mutual Life Insurance Company, 1991, 401(k) Survey Report (Springfield, Mass.: Massachusetts Mutual Life Insurance).
- Papke, Leslie, 1992, "Participation in and Contributions to 401(k) Plans: Evidence from Plan Data," NBER Working Paper 4199.
- Petersen, Mitchell, 1992, "Cashflow Variability and a Firm's Pension Choice: A Role for Operating Leverage?," mimeo, Graduate School of Business, University of Chicago.
- Poterba, James M., Steven F. Venti, and David Wise, 1992, "401(k) Plans and Tax-Deferred Saving," forthcoming in D. Wise, ed., Further Topics in the Economics of Aging (Chicago: University of Chicago Press).
- Poterba, James M., Steven F. Venti, and David Wise, 1993, "Do 401(k) Contributions Crowd Out Other Personal Saving?" NBER Working Paper 4391.
- Shefrin, Steven and Richard Thaler, 1988, "The Behavioral Life Cycle Hypothesis," Economic Inquiry 26: 609-643.

Silverman, Celia, 1993, "Pension Evolution in a Changing Economy," EBRI Issue Brief 141 (Washington: Employee Benefit Research Institute).

U.S. Department of Labor, 1993, Private Pension Plan Bulletin (Washington: U.S. Department of Labor, Office of Research and Economic Analysis).

U.S. General Accounting Office, 1988a, 401(k) Plans: Incidence, Provisions, and Benefits (Washington: General Accounting Office).

U.S. General Accounting Office, 1988b, 401(k) Plans: Participation and Deferral Rates by Plan Features and Other Information (Washington: General Accounting Office).

VanDerhei, Jack, 1992, "New Evidence that Employees Choose Conservative Investments for their Retirement Funds," Employee Benefit Notes 13 (February), 1-3.

Table 1.1: Trends in Pension Plans, Participants, and Contributions

Year	Plans	Participants	Contributions
Defined Contribution Plans (of which 401(k) Plans)			
1975	207.7	11.5	12.8
1976	246.0	13.5	14.2
1977	281.0	15.2	15.9
1978	314.6	16.3	18.4
1979	331.4	18.3	20.7
1980	340.8	19.9	23.5
1981	378.3	21.7	28.4
1982	419.5	24.6	31.1
1983	426.6 (1.7)	29.1 (4.4)	36.1
1984	435.4 (17.3)	32.9 (7.5)	43.4 (16.3)
1985	462.0 (29.9)	35.0 (10.3)	53.2 (24.3)
1986	545.0 (37.4)	36.7 (11.6)	58.3 (29.2)
1987	570.0 (45.1)	38.3 (13.1)	62.3 (33.2)
1988	584.0 (68.1)	37.0 (15.5)	64.9 (39.4)
1989	599.0 (83.3)	36.5 (17.3)	80.1 (46.1)
Defined Benefit Plans			
1975	103.3	33.0	24.2
1976	114.0	34.2	28.5
1977	121.7	35.0	31.2
1978	128.4	36.1	27.6
1979	139.5	36.8	40.6
1980	148.1	38.0	42.6
1981	167.3	38.9	47.0
1982	175.0	38.6	48.4
1983	175.1	40.0	46.3
1984	168.0	41.0	47.2
1985	170.2	39.7	42.0
1986	172.6	40.0	33.2
1987	163.1	40.0	29.8
1988	146.0	40.7	26.3
1989	132.5	40.0	24.9

Note: The number of plans is measured in thousands, participants in millions, and contributions in billions of dollars. Data are drawn from U.S. Department of Labor (1993).

Table 2.1: Sample Survey Design

Plan Size (Participants)	Plans on 1987 Form 5500 Tape	Surveys Distributed	Usable Responses
0 - 500	7380	275 (4%)	6
500 - 5000	2660	266 (10%)	13
> 5000	405	245 (60%)	24
TOTAL	10445	786	43

Source: Authors' tabulations from survey responses.

Table 2.2: Summary Statistics and 401(k) Plan Characteristics

	Simple Average	Participant-Weighted Average
Features of 401(k) Plan:		
* Salary Reduction Plan	84%	83%
* Thrift Plan	79	75
* Profit Sharing Plan	14	39
* Section 125 Flexible Spending Account	7	2
Contribution Structure:		
* Employer Contributions Only	0	0
* Salary Reduction Only	9	1
* Salary Reduction & Company Match	70	69
* Salary Reduction & Company Discretionary	2	0*
* Salary Reduction, Company Match, & Company Discretionary	19	30
Company Match Rate (1990)		
0	10	2
.01 - .25	10	9
.26 - .50	41	37
.51 - .75	23	19
.76 - .99	0	0
1.00	10	30
Other (> 1.0)	5	4

Source: Authors' tabulation of survey results. * denotes actual value of 0.46, which was rounded to 0.

Table 3.1: 401(k) Plan Initiation Decisions

	Simple Average	Participant-Weighted Average
Date When 401(k) Plan Started		
Before 1981	14%	19%
1981-1983	16	30
1984-1986	51	42
Since 1986	19	15
New Plans^a	55	63
Type of Plan Converted:^a		
* Thrift/Saving	53	49
* Profit Sharing	40	50
* Other	7	1
Why Was Plan Started?		
* Supplement Primary DC Plan	19	14
* Supplement Primary DB Plan	63	66
* Replace Primary DC Plan	9	6
* Replace Primary DB Plan	2	17
* Optional Tax-Deferred Saving Plan	58	59
Is the 401(k) the Primary Retirement Plan?	26	6
Percent of 401(k) Eligibles Also Covered by:		
Defined-Benefit Plan	85	88
* 1986	73	82
* 1990		
Defined Contribution Plan		
* 1986	37	32
* 1990	36	30
Percent of 401(k) Eligibles for Whom the 401(k) is the ONLY Retirement Plan		
* 1986	5	4
* 1990	19	10

Source: Authors' tabulations from survey responses. Superscript a denotes questions that were not asked on the second-round survey, so tabulations are based on 33 rather than 43 responses.

Table 4.1: Distribution of Employer Match Rates, 1986 and 1990

Panel A: Distribution of Plans

1990 Match Rate

1986 Match Rate	0	.01-.25	.26-.50	.51-.75	.76-.99	>.99
0	12%	0	0	0	0	0
.01 - .25	0	9	0	0	0	0
.26 - .50	0	0	38	15	0	0
.51 - .75	0	0	0	12	0	0
.76 - .99	0	0	0	0	0	0
> .99	0	0	0	0	0	15

Panel B: Distribution of Plan Participants

1990 Match Rate

1986 Match Rate	0	.01-.25	.26-.50	.51-.75	.76-.99	>.99
0	2%	0	0	0	0	0
.01 - .25	0	4	0	0	0	0
.26 - .50	0	0	36	13	0	0
.51 - .75	0	0	0	8	0	0
.76 - .99	0	0	0	0	0	0
> .99	0	0	0	0	0	37

Source: Authors' tabulations from survey responses.

Table 4.2: Distribution of Employee Participation Rates, 1986 and 1990

Panel A: Distribution of Plans

1986 Participation Rate	1990 Participation Rate			
	< .25	.26 - .50	.51 - .75	> .75
< .26	4%	0	0	0
.26 - .50	0	9	4	0
.51 - .75	0	0	17	17
> .75	0	0	0	48

Panel B: Distribution of Participants

1986 Participation Rate	1990 Participation Rate			
	< .25	.26 - .50	.51 - .75	> .75
< .26	0	0	0	0
.26 - .50	0	2%	0	0
.51 - .75	0	0	8	39
> .75	0	0	0	51

Source: Authors' tabulations from survey responses.

Table 4.3: Financial Assets in 401(k) Plans, 1990

	Simple Average	Participant-Weighted Average
Equity Mutual Funds	19%	30%
Company Stock	24	22
Guaranteed Investment Contracts	36	29
Money Market Funds	7	4
Bonds (Government & Other)	7	7
Other	7	8

Source: Authors' tabulation of results from initial "long form" survey, based on a total of 33 responses.

Table 4.4: Loans and Hardship Withdrawal Provisions

	Simple Average	Participant-Weighted Average
Plans with Loan Provisions	70%	87%
Hardship Withdrawal Provisions:		
* Employee Contributions?	92	91
* Employer Contributions?	61	69
Definitions of Hardship Withdrawal:		
* Major Medical Expenses	93	95
* Family Education	93	100*
* House Purchase/Renovation	97	100*
* Layoff	14	3
* Divorce	10	2
* "Immediate Unplanned Financial Need"	34	29
Number of Outstanding Loans/Participant	0.32	0.14
Hardship Withdrawal Claims/Participant	0.11	0.04

Source: Authors' tabulation of results from initial "long form" survey, based on a total of 33 responses.

Table 5.1: Antidiscrimination Rules and 401(k) Plans

	Percent of Plans	Percent of Participants
Plans That Returned High-Wage Employee Contributions in 1990	15%	3%
Plans that Made Additional Contributions for Low-Wage Workers in 1990	3	0
Percent of Employees in Lower Paid Group		
* 1986	76	51
* 1990	76	55
Percent of Employees in High Paid Group		
* 1986	24	49
* 1990	21	45
ADP (Actual Deferral Percentages):		
* Low Wage Group, 1986	4.0	4.1
* Low Wage Group, 1990	5.0 ^a	5.8 ^a
* High Wage Group, 1986	5.1	5.6
* High Wage Group, 1990	6.0 ^a	6.8 ^a
* All Workers, 1986	4.5	4.5
* All Workers, 1990	5.6 ^a	7.4 ^a
Salary Breakpoint for 1/3, 2/3 Test	\$38,800	\$47,100

Source: Authors' tabulation of survey results. Results marked with superscript "a" are based on a total of 43 responses to both the first- and second-round surveys; others are based on 33 responses to the first-round survey only.