DEFINED CONTRIBUTION PLANS: THE ROLE OF INCOME, AGE, AND MATCH RATES

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The growth of defined contribution plans has sparked debate concerning their effectiveness as a vehicle for retirement saving. Using data from the May 1993 Employee Benefits Supplement to the Current Population Survey, this paper examines whether DC plans have expanded overall pension coverage and whether their effects on retirement saving are the same across different age and income groups. Not surprisingly, I find that contributions to and early withdrawals from DC plans are strongly affected by income and age. The paper then discusses whether employer match rates are useful tools for stimulating participation and contributions in these plans. However, it turns out that the effectiveness of employer match rates is also highly dependent on the income of the individual subject to the match rate.

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Since the end of World War II, company sponsored pension plans have been a significant source of retirement saving for more and more United States workers. At first, these plans were almost all defined benefit (DB) plans. However, since the IRS clarified the section of the Employee Retirement Income Security Act (ERISA) dealing with defined contribution (DC) plans in 1981, the popularity of DC plans has risen dramatically. Also since 1981, the percentage of the workforce covered by traditional defined benefit (DB) plans has declined and the growth in overall pension coverage rates has stalled. Furthermore, some Latin American and Southeast Asian countries have replaced their social security systems with schemes that resemble DC plans, and a few brave U.S. politicians have hinted at exploring such a possibility for the United States.

DC pension plans include: salary reduction plans - such as 401(k) or thrift plans, simplified employee pensions, employee stock ownership plans (ESOPs), and profit sharing plans. The most popular are salary reduction plans, which are funded primarily by employee contributions, but many also have employer matching provisions. DC plans rarely include employer contributions that are independent of employee contributions; those that do are generally ESOPs or profit sharing plans. In addition, employees direct how their contributions will be invested among the options provided by the employer. Upon withdrawal, presumably at retirement, the employee receives accumulated funds, but the employer does not make any guarantee of the amount.

By contrast, in DB plans employers make a promise to pay lifetime annuities to workers starting at retirement. The size of the obligation usually depends upon a formula that accounts for the employee's final salary, years of service, and age at retirement. Over the worker's career, employers must use actuarial techniques to estimate the accumulating pension liability, fully or at least partially fund that liability as it accrues, and manage the

fund's assets. After a few companies with underfunded DB pension plans went bankrupt in the 1960s and 1970s, Congress passed ERISA in 1974. This act made pension plans subject to intense regulatory scrutiny and established the Pension Benefit Guarantee Corporation (PBGC) to act as insurance for employees whose benefits were threatened by bankrupt companies.

This paper examines the general effects on retirement saving caused by a shift to DC plans from DB plans, and how effective employer matching contributions are as a means to increase the effectiveness of DC plans. If we accept that individuals will be entirely responsible for their own retirement, then we need to address the transfer of risks from employers to individuals of saving for retirement.[2] Section 2 addresses the availability of defined contribution plans. Specifically, what is their effect on overall pension coverage rates? Next we discuss whether these plans are effective in encouraging people to save for retirement. Section 4 examines the possible effects employer match rates might have for increasing DC plan participation and contributions. Section 5 explores how well participants protect their retirement assets by looking at investment patterns of DC assets and early distributions from DC plans. We then conclude.

I present evidence that although DC plans are less expensive to administer than DB plans, overall pension coverage rates continue to fall. I also show that relative to high income households, those with lower- to middle-class incomes are less likely to make significant contributions to DC plans and more likely to withdraw their savings before retirement. In addition, aggregate investment data suggests that many participants are not allocating their investments in a way which is consistent with long-term growth objectives.

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[2] Mariger(1995) shows that annuity payments promised by defined benefit plans may not be as certain as "promised", since the funding status of DB pensions is never known with certainty. However, since pension defaults are still relatively rare and are partially backed by the PBGC, I believe this characterization is valid.

On a more positive note, this paper presents evidence that employer match rates significantly affect participation in and contributions to DC plans.

Substitution Effects: Defined Contribution Plans Crowd Out Defined Benefit Plans

Asset growth in DC plans has been outstripping that of defined benefit plans. Table 1 shows the assets of the largest 1000 pension plans, as surveyed by *Pensions and Investments*. Since 1988, the annual growth rate of assets in DC plans has averaged 14%, versus only 8% for DB plans. This differential is even more pronounced when actual contributions are considered separately from investment income. According to Sanford Bernstein, cash contributions to DC plans over the last 10 years have equaled $175 billion, while DB plans have experienced negative new cash flow of $350 billion.[3]

Although several studies have examined the reasons for the popularity of defined contribution plans, two schools of thought dominate the findings. The first is the supply side argument; the costs associated with regulatory compliance for DB plans make DC plans less expensive for employers to run. The second argument focuses on demand; changes in the demographics and preferences of the workforce have caused firms to respond by offering DC plans. Thus, in the first case firms have decided not to supply DB plans because DC plans are less expensive, and in the second case firms have responded to worker demands for DC plans.

Clark and McDermed (1990) show that much of the decline in DB plans is due to the burden of compliance with funding requirements and the cost of PBGC insurance. Schiebner and Shoven (1994) attribute some of the decline to the negative effects of tax reform in 1982, 1986, and 1993 on firms' ability to meet plan funding requirements. Meanwhile, other

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[3] Gale (1994) shows that the pension funding provisions of the Tax Reform Act of 1986 may be to blame for some of the recent decline.

studies have shown that outright switching from DB plans to DC plans accounts for only some of the decline of DB plans and that much of the rise in DC plans comes from companies with DB plans that start supplemental DC plans (Kruse 1991 and Papke, Petersen, Poterba 1993).

The other side of the coin is that today more workers are employed by smaller, non-union firms and expect to change jobs a number of times; therefore, they prefer firms that offer DC plans (Gustman and Steinmeier 1989 and Kruse 1991). Bloom and Freeman (1992) link the decline in pension coverage not only to the decline in union participation, but also to the falling real incomes of young, less educated workers. Ippolito (1993) takes a more positive view of the switch to DC plans and theorizes that firms use 401(k) plans to attract more productive workers. Mariger (1995) shows that given some assumptions, defined contribution plans strictly dominate DB plans for a younger, more mobile workforce.

Since defined contribution plans appearently have lower administrative costs than DB plans and offer other advantages for today's workforce, one would expect an increase in overall pension coverage. We have seen some switching from DB plans to DC plans, and the same cost savings which make DC plans preferable should also make them attractive to companies that otherwise would have offered no plan. In fact DC plans can impose very minimal costs on employers. Their main advantage is that they are fully funded by definition and require no employer contributions. In addition, investment management can be contracted out to a mutual fund company. Non-discrimination tests added in 1987 have introduced some extra bureaucratic costs, but it seems that they could be handled by most companies' accounting departments or passed along to benefit consulting firms. Also, investment management and consulting fees can be charged to participants.

Chart 1 details the recent trends in pension coverage for private nonfarm wage and salary workers. Despite of the growth of DC plans, overall pension coverage has declined

since 1983. Even and MacPherson (1994) use Current Population Survey (CPS) data for 1979 and 1988 to show that changes in workforce composition and industry employment could have resulted in a much larger decline in pension coverage had 401(k) plans not been introduced. Since 1988 however, data from Sanford Bernstein shows that while there has been a net gain of 35,000 DC plans, but those only offset a net decrease of 35,000 DB plans. This implies that although the rise in coverage by DC plans has helped to offset the decline in DB plan coverage, it has not been enough to overcome the effects on DB coverage of the 1980s downsizing by most large firms.

In addition, the decline in covered workers and the stagnant number of plans hardly point to a widespread expansion of pension coverage due to the lower costs associated with DC plans. One explanation offered is that the non-discrimination tests and lower contribution limits reduced the number of DC plans started after 1988. This trend also would be expected if a firm's decision to offer a pension plan is not totally driven by the cost of any particular plan. Some firms, such as retail outlet stores and temporary firms, may not offer a plan regardless of the cost. Other companies, which would have provided DB plans if they were the only option, offer the relatively cheaper DC plans instead. In other words, the marginal increase in pension coverage due to the expansion of DC plans may continue to be insufficient to cause overall pension coverage to rise.

Nonetheless, there is no doubt that defined contribution plans will continue to become more desirable among designers of employee pensions, and will receive support as an alternative to the current U.S. social security system. Therefore, there is enormous interest in whether such tax deferred vehicles increase personal and national savings. Taken together, the findings of several studies show a small preponderance of the evidence that the incentives provided by DC plans (and IRAs) increase savings levels. Venti and Wise (1993) and Poterba, Venti, and Wise (1993) show evidence that private savings is increased by tax-

deferred savings options such as 401(k) plans. On the other hand, Engen, Gale, and Shultz (1994) find that contributions to 401(k) plans represent shifts of assets from other forms of saving. A less explored line of research and public policy interest concerns the differential effect that these plans have on the savings decisions among different income and age groups.

The Effectiveness of DC Plans in Stimulating Savings

The savings decision. Defined benefit plans can be considered involuntary saving, since their funding and administrative costs could be paid as wages immediately, rather than as a retirement annuity.[4] In contrast, the popular defined contribution plans have an explicit salary reduction feature that gives the withholding decision to the employee. Also, all employees must be fully vested in a DB plan after a maximum of seven years of service, but the optional nature of DC plans allows many people to postpone saving for retirement.[5] Those most likely to do so are low- and middle-income workers who are the most liquidity constrained and who are the least likely to have other savings for retirement.

The liquidity problems of low- and middle income workers are compounded by a combination of factors: fewer opportunities to participate, lower participation given opportunity, lower contributions given participation and more frequent use of early withdrawal options. Table 2 shows that workers in the two highest income classifications are five times more likely to be offered a DC pension plan than people in the lowest income category. When such plans are offered, high income individuals are three and one-half times more likely to participate. Column 4 shows that when participation is assumed, the amount

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[4] This characterization assumes that workers do not explicitly choose a job that offers a defined benefit pension in order to defer income and taxes.

[5] ERISA mandates that all employees be vested in their pension benefits either fully after five years, or partially after three years and fully after seven years. Even while employees are not vested the employers must contribute to their DB plans with the assumption that the employee will eventually vest and be entitled to benefits.

of salary contributed is more than ten times higher for the highest income categories, even given the non-discrimination regulations. Contributions as a percent of salary generally increase with income as well.[6]

The distribution of benefits from DC plans, contrasts with the distribution of retirement income derived from defined benefit plans. Sponsorship rates are roughly similar for both types of plans, but estimates of the present value of the accumulated benefits from DB plans appear to be more evenly distributed among low- and high-income workers. Using the 1983 Survey of Consumer Finances, I estimated the replacement value of income provided by DB pension plans. For a household headed by someone who has a DB plan, 45 to 55 years old, and a household income of $15-30,000 (1983$) the expected accumulated pension benefit at age 65 is 1.5 times current annual income. For similar aged households with incomes above $60,000 per year, the value is only 0.9 times average annual income.

The Value of Employer Matching Contributions

Lack of participation and low levels of contributions to salary reduction plans have fueled much debate on how to increase participation, as well as increased regulation of the contributions by high income individuals.[7] One common program designed to increase participation and contributions involves an employer matching contribution. Under one of these programs, the employer contributes a given percentage of every dollar that an employee contributes to their own plan. This results in a large initial return on investment to

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[6] Although the lowest income category shows a rather high contribution rate, that category contains a large portion of individuals who are married, working part-time, and have high contribution rates. While this is an interesting phenomenon, the average contribution rate for this group drops to 5.18% if part-time workers are excluded from the sample.

[7] Papke(1992) provides a good background on the evolution of non-discrimination tests and contribution limits. The connection between the increased regulation of DC plans and the slowdown in their rate of formation during the 1990s would be a good avenue for further research.

supplement the tax advantages of DC plans, presumably creating a larger incentive to participate or increase contributions.

Surprisingly, research on this topic has been inconclusive. Andrews (1992) finds that employer match rates have a positive effect on participation, but negativly affect contributions. Papke (1992) presents a model and empirical evidence showing that match rates positively affect both participation and contribution levels, but that beyond a rate of 35%, the effect on contributions dies out. Finally, Kusco, Poterba, and Wilcox (1994) find that widely varying match rates at one medium sized manufacturing firm had little effect on the contributions or the participation rate of individuals in that firm over the four year sample period.

One explanation for the apparently small effects is that participants have a target savings level for their DC plan. To the extent that employer matching contributions help them meet those goals, they reduce their own contributions accordingly. Along these lines, I would argue further that a match rate would also have less effect on non-participants who would be induced to become participants by a higher match rate. This is true because current participants could be seen as revealing a higher preference for saving by their decision to contribute at present level of the match rate. Therefore, they would conceivably have higher savings targets than the new participants or 'converts', who attach lower utility to savings, regardless of the returns.

Other explainations address the relationship between saving and income levels. Perhaps the tax advantages of DC plans provide the primary incentive for their use and the employer match is a secondary consideration for many participants. Thus, people in higher tax brackets benefit more than people in low tax brackets. Alternatively, since savings is viewed as liquidity constrained, the savings decisions of low-income workers are often independent of the match rate. Likewise, low- income workers approaching retirement may

save less because more and more government old age programs may be means tested, hence saving would jeopardize their eligibility (Hubbard, Skinner, and Zeldes 1995).

Under all of these income driven hypotheses, one would expect the match rate to have a greater effect on contributions by high income workers and little or no effect on those with low incomes. Table 3 compares the mean contribution rate across individual earnings groups by whether the employer offers a match rate. In the low earnings groups (below $20,000), there is no significant difference in the mean level of contributions, regardless of a match rate. However, in groups earning above $20,000, individuals who benefit from employer matching contributions put significantly more pay into DC plans than those without the match rate. Therefore, the low level of economic significance of the match rate in previous studies may be partially explained by the rate's limited effects for a large number of lower and lower-middle class workers.

The relationships between match rate, income, age, and other demographic factors can be tested further using regression analysis with interaction terms. The 1993 CPS Employee Benefits Supplement includes the actual match rates on individual contributions as well as other individual- and household-specific determinants of savings. I use a logit model to estimate the effect of match rate on participation and a one-limit tobit model to estimate contribution rate. Both regressions use the same set of independent variables, estimated as follows:

$$(0,\text{CONTRIB}) = \text{INTERCEPT} + \beta_1\text{*MATCH} + \beta_2\text{*MATCH}^2 + \beta_3\text{*MATCH*INCOME} + \beta_4\text{*MATCH*AGE} + \beta_5\text{*INCOME} + \beta_6\text{*SOLEPLN} + \beta_7\text{*INCOME}^2 + \beta_8\text{*AGE} + \beta_9\text{*AGE}^2 + \beta_{10}\text{*AGE*INC} + \beta_{11}\text{*SP\_INC} + \beta_{12}\text{*COLLEGE} + \beta_{13}\text{*HS} + \beta_{14}\text{*MARRIED} + \beta_{15}\text{*NUMKIDS} + \beta_{16}\text{*SMALFIRM} + \beta_{17}\text{*UNIONMEM} + \beta_{18}\text{*SCALE}.$$

The one-limit tobit analysis corrects for the existence of large numbers of people who contribute nothing. As pointed out by Kusco, Poterba, and Wilcox (1994), it also would be

prudent to correct for nonlinearities that arise because relatively large fractions of people contribute the exact percentage of salary subject to the employer match, or the maximum allowable contribution as determined by the firm's non-discrimination tests and the IRS. Unfortunately, the dataset contains no information on the level at which the employer matching contribution ends or whether a participant was affected by plan specific non-discrimination tests. Only two percent of the CPS sample appear to be affected by the IRS maximum allowable contributions, thus there is not a large bias from them. However, as a result of not controlling for these artificial upper bounds on contributions, the estimated coefficients will understate the true effects of the independent variables.

The variables other than those related to the match rate in the model control for the many other factors which may influence individuals' decisions to participate and their level of contributions. From the analysis in section 2 we expect the coefficients on INCOME (in thousands), SP_INC (spouse's income, in thousands), and AGE to have positive effects on savings. We also expect the squares of income and age to be positive because higher incomes can afford to save more and older people presumably are still working because they are still concerned with saving for retirement. SOLEPLN is equal to 1 if the DC plan is the worker's primary retirement savings vehicle and 0 otherwise. The AGEINC variable tests for interaction effects between AGE and INCOME, since income and saving rates tend to rise as a worker gets closer to retirement. Education is generally considered to be positively correlated with saving behavior; therefore, COLL and HS are dummy variables for the level of education completed. MARRIED is a dummy variable whose coefficient is expected to be positive as well. NUMKIDS is the number of household members under 18, here the coefficient is expected to be negative.[8]

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[8] Many regressions of this type include dummy variables for industry. I contend that given the individual variables already included, such as income, age, and family size, the industry should have little additional effect on savings decisions.

Table 4 shows that the coefficient on match rate is positive, as is the coefficient on the interaction between match rate and income, while the coefficients on match rate squared and the interaction between match rate and age are negative. These four variables each show a high degree of statistical significance, and only the negative effect of the interaction term, MATCHAGE, is unexpected. Using the logit model evaluated at sample means for income and age, an increase in the match rate from 0% to 50% would result in a 7.1% increase in the probability of participation. The corresponding increase in percentage of salary contributed estimated by the tobit model is 0.61% (50 * 0.037% + 50^2 * .0002% + 50 * 35 * 0.0002% - 50 * 40 * 0.0006%), which amounts to a 12% increase in the average contribution of 5.28%.[9]

The combined effect of these match rate variables is consistent with previous studies, and including the interaction of match rate with income and age produces a slightly larger effect. As shown in chart 2, the effect of match rate on participation is positive until it exceeds 120%, which is true only for 2% of the sample. Likewise, the effect of match rate on contributions is positive until the rate exceeds 70%, double the level predicted by the most optimistic previous study. In addition, the strong significance of the interaction between match rate and income, combined with the non-parametric test in table 3, stresses the point that employer matching contributions alone are unlikely to promote widespread use of salary reduction plans by low income workers.

The regression results also suggest two other aspects of saving behavior that might be important when designing DC plans. The coefficient on SOLEPLAN is neither strongly positive nor significant. This suggests that people whose DC plans are supplemental plans save as much in them as people whose DC plan is their best option for retirement saving.

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[9] The coefficient of match rate squared is sensitive to the inclusion or exclusion of 27 observations, which report match rates in excess of 250%. Results are reported for the regressions that excluded these observations on the basis of those match rates being more than three inter-quartile ranges above the third quartile.

Secondly, the coefficients on AGEINC, $INCOME^2$, and AGE^2 are negative, which is unusual considering the rather strong correlations among savings, income, and age. As mentioned, the one-limit tobit may underestimate these coefficients; perhaps their sign would reverse if I could accurately model a two-limit tobit. Still, these variables could be capturing the effects of contribution limits and non-discrimination tests on a significant number of older and relatively high-income workers.

Maintaining the Retirement Nest Egg

The investment decision. DC plans also give many employees a reasonable amount of discretion over how they invest their savings. This may seem "democratic" at first, but the press has frequently documented how "poorly" people invest their defined contribution assets.[10] One fear is that people invest too conservatively, hence their money will not grow fast enough to consistently outpace inflation and provide for a comfortable retirement. The second concern is that the accounts are not properly diversified.

Table 5 compares the asset mix of defined benefit and defined contribution plans in the largest 1,000 pension funds. DB plans hold about 85% of their assets in equities and fixed income securities, which are more likely to provide the capital appreciation necessary to consistently outpace inflation. The largest category of investments in DC plans has traditionally been guaranteed investment contracts (GICs). GICs pay a fixed interest rate while protecting principal and liquidity, but they do not provide substantial opportunities for real capital gains.

In addition, almost half of the equity held in DC plans is in the form of the workers own company stock. Company stock is prominent mostly because of the existence of ESOPs,

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[10] Gottschalk, Earl, "On Your Own." *Wall Street Journal*, December 9, 1994. Quinn, Jane Bryant, "Is Your 401(k) O.K.?" *Newsweek*, September 19, 1994. Wayne, Leslie, "Pension changes Raising Concerns." *New York Times*, August 29, 1994.

but many other plans also provide company stock as an optional investment.[11] However, allocating retirement assets to company stock results in a large concentration of risk because the stock's value, the worker's job prospects, and salary are all determined to a large extent by the performance of the company. Thus, investment of DC plan assets in company stock fails the diversification requirements of modern portfolio theory.

Although cautious, DC plan participants recently have begun to show an appetite for more risk. The proportion of GIC contracts in the average portfolio has declined steadily from 35.7% in 1989 to 24.8% in 1994 and the proportion held in cash has declined as well. Meanwhile, the proportion of fixed income investments has risen from 12% to 15% and non-company stock has increased from 19% to 24%. Whether these gains are temporary results of the bull markets in stocks and bonds during 1992-93 or if the wider acceptance and availability of mutual funds will make them permanent remains to be seen. Unfortunately, the proportion of company stock has remained relatively constant throughout the period.

Furthermore, one might expect that people with the safety of a defined benefit plan would opt to take more risk in their supplemental defined contribution plan than people whose DC plan is their primary plan. However, further analysis indicates the that this is not true. Table 6 shows that among people who have both types of plans, the asset mix is very similar to that for all defined contribution plans. Although the conservative nature of these DC plan investors might seem somewhat surprising, many people believe that retirement assets should be invested safely. In addition, the time horizon of DC plan investors will also affect how they invest, and the next section provides some insight into that question.

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[11]ESOPs are a good way for companies to tap their employees loyalty as a way to gain capital, particularly small companies (Kruse 1991). In addition, all defined contribution plans are exempt from the ten percent restriction on related party investments that govern DB plans under ERISA.

Early withdrawals. Two big disadvantages of DB plans is that workers can lose a significant portion of their benefits if they change jobs often and they have no access to these funds before retirement. Meanwhile, most DC plans can be transferred to a new employer or rolled into an IRA when participants switch jobs, and most have loan or early withdrawal features that provide pre-retirement access to the account. However, easier access appears to result in many DC participants using the money in their plan for reasons other than retirement, hindering the accumulation of retirement assets.

The frequency with which early distributions are spent rather than rolled over into other tax-qualified saving vehicles is highly correlated with income and age. Table 7 shows that less than 20% of participants under 35 roll over some portion of their early distributions, while more than 65% use some of the money for current consumption, such as vehicles or vacations. Similarly, less than 20% of those with incomes below $30,000, use their distribution for other tax qualified saving, while more than 65% spend some portion of the distribution.

Still, it is promising to note that the roll over amount increases with age and income, consistent with both the above liquidity argument and the life-cycle pattern to savings behavior. Those participants over age 55 roll over almost 50% of distributions, while spending only 29%. Likewise, upper income participants are more apt to save their early distributions. Also, people between the ages of 25 and 45 and those with incomes above $20,000 use a large portion of their distributions for investments, such as buying a house, which are somewhat consistent with planning for retirement.

Using early distributions from DC plans for purposes other than retirement saving may indicate that some people have a shorter time horizon for the funds than the designers of these vehicles wish. Table 8 shows the use of early distributions by people whose defined contribution plan supplements a defined benefit plan versus those whose DC plan is their

primary retirement savings plan. The results suggest that the former are more likely to save for shorter-term goals, such as purchasing houses and other consumer durables. These results also help explain the conservative investment strategy followed by many DC plan participants, since someone saving to buy a house is more concerned with immediate principal preservation than someone saving for retirement.

Conclusion

Defined contribution pension plans may provide advantages in that they offer firms an additional, less regulated way to provide employees with easy access to a tax-deferred retirement savings vehicle. Also, economic theory predicts that people may be inclined to save more in DC plans than they otherwise would because of their tax-advantages. Furthermore, given the funding problems apparent in the social security system and some private DB plans, the fact that DC plans are fully funded by definition is an important consideration for employers and policy makers.

However, defined contribution plans appear to be used less often by lower- and middle-income workers, meaning that a significant number of them may be faced with less retirement income than if they had participated in a defined benefit pension. Employer match rates are somewhat effective in increasing contributions, but have less effect on low- and middle-income workers and appear to be only a secondary consideration for many participants in DC plans. Compounding this problem, many people withdraw funds from their DC retirement plans early to use for other purposes. In addition, many people are not investing their DC plan assets in equities and bonds, thus they will not realize the capital gains that are a major source of income for defined benefit plans.

Therefore, the evidence is mixed on which plans are better for which workers. Hence, policy makers may consider making it easier for employers to offer either type of plan, rather

than continue to increase the costs of running a pension plan. Sponsorship of DC plans was rising much more quickly before the onset of non-discrimination tests and other regulatory concerns, such as the provision of investment education, increased the paperwork burden of those plans. Similarly, some regulations on defined benefit plans could be addressed to remove obstacles to their creation and administration, without endangering their soundness, and perhaps even enhancing it.

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Table 1

Growth of Pension Plan Assets, 1988–94

By Type of Plan

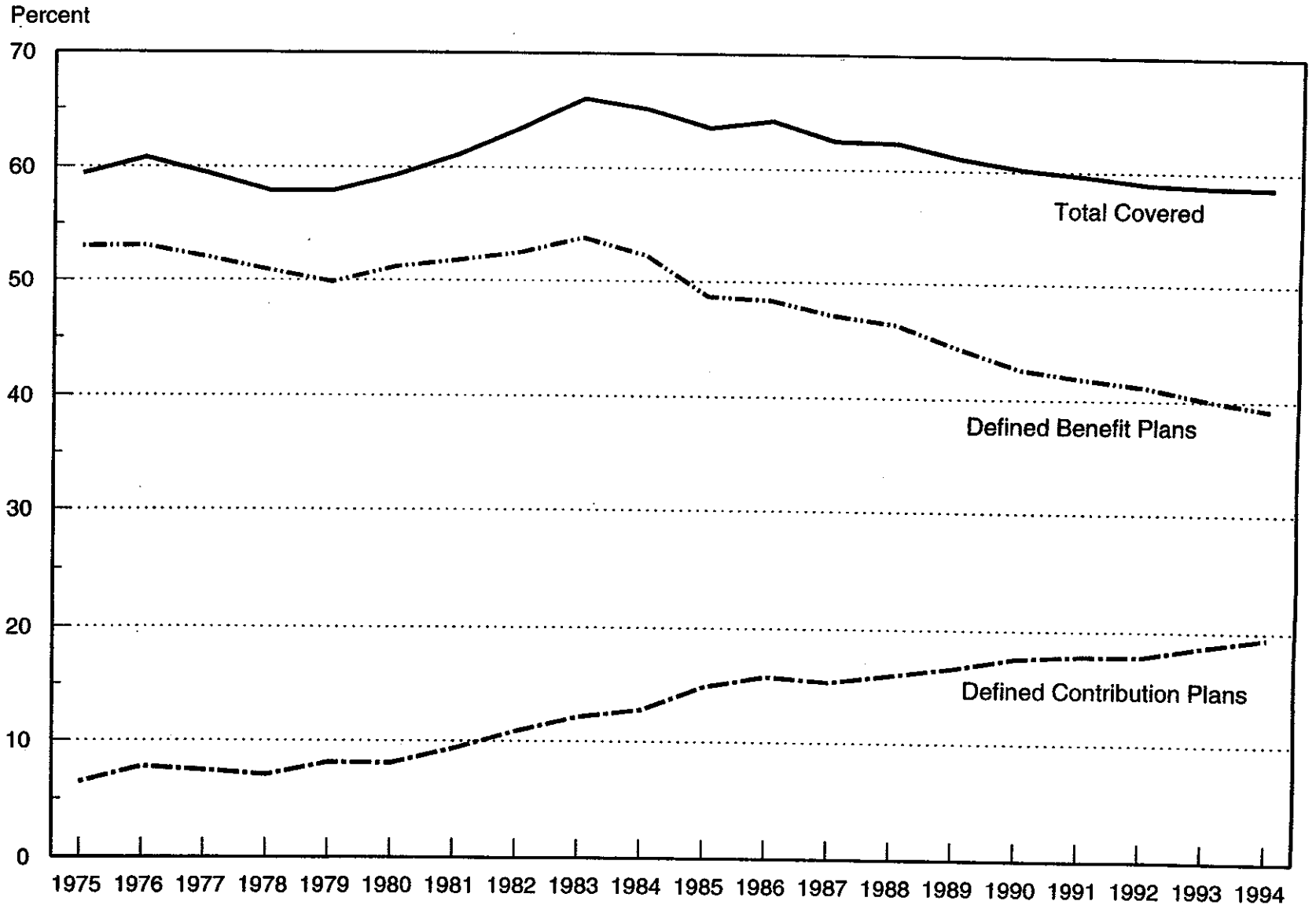
Year	Defined Benefit Plan Assets	Defined Contribution Plan Assets	Ratio of DC to DB Assets
1988	1282.9	302.9	0.236
1989	1481.0	374.0	0.253
1990	1466.0	391.4	0.267
1991	1688.0	474.1	0.281
1992	1812.0	572.0	0.316
1993	2022.0	610.0	0.302
1994	2054.0	657.4	0.320
Annual Growth	8.16%	13.79%	

Source: Pensions and Investments, Various Issues

Chart 1

Pension Coverage by Type of Primary Plan

Private Nonfarm Wage and Salary Workers



Source: Berstein Research, The Future of Money Management in America, 1994 Ed.

Table 2

Rates of Sponsorship, Participation, and Contributions by Salary in 1993

Salary	Sponsored Rate	Sponsored Participation Rate	Average Contribution if Participate	Percent of Salary Contributed
less than $10,000	13.7	22.6	360	7.33
$10,000 – $19,999	35.5	42.8	774	5.52
$20,000 – $29,999	51.8	56.0	1319	6.24
$30,000 – $49,999	62.2	65.0	2309	7.18
$50,000 – $74,999	68.6	76.2	4056	7.75
greater than $75,000	66.3	79.6	6000	7.60

Note: The high contribution rate for people with salaries less than $10,000 appears to be the result of big contributions from several married people who were working part–time. Without these observations the contribution rate is 5.18%.

Source: Author's estimates from the April 1993 Current Population Survey and Employee Benefits Supplement

Table 3

Mean Contribution Rate, With and Without Match Rate

	Have Match Rate			No Match Rate			
Income	Mean	Std Dev	N	Mean	Std Dev	N	t-statistic
Under $10,000	2.76	5.12	92	3.68	5.69	64	-1.03
$10 - $19,999	3.92	4.52	551	3.97	5.82	211	-0.11
$20 - $29,999	4.97	4.45	737	4.01	5.19	332	2.92 *
$30 - $49,999	6.11	4.78	789	5.77	5.75	515	1.11
$50 - $74,999	6.86	4.20	328	5.91	5.14	177	2.11 *
Over $75,000	7.83	5.35	162	6.27	5.10	72	2.13 *

Source: 1993 Current Population Survey and Employee Benefits Supplement

Table 4

Regression Analysis for Effects of Match Rate

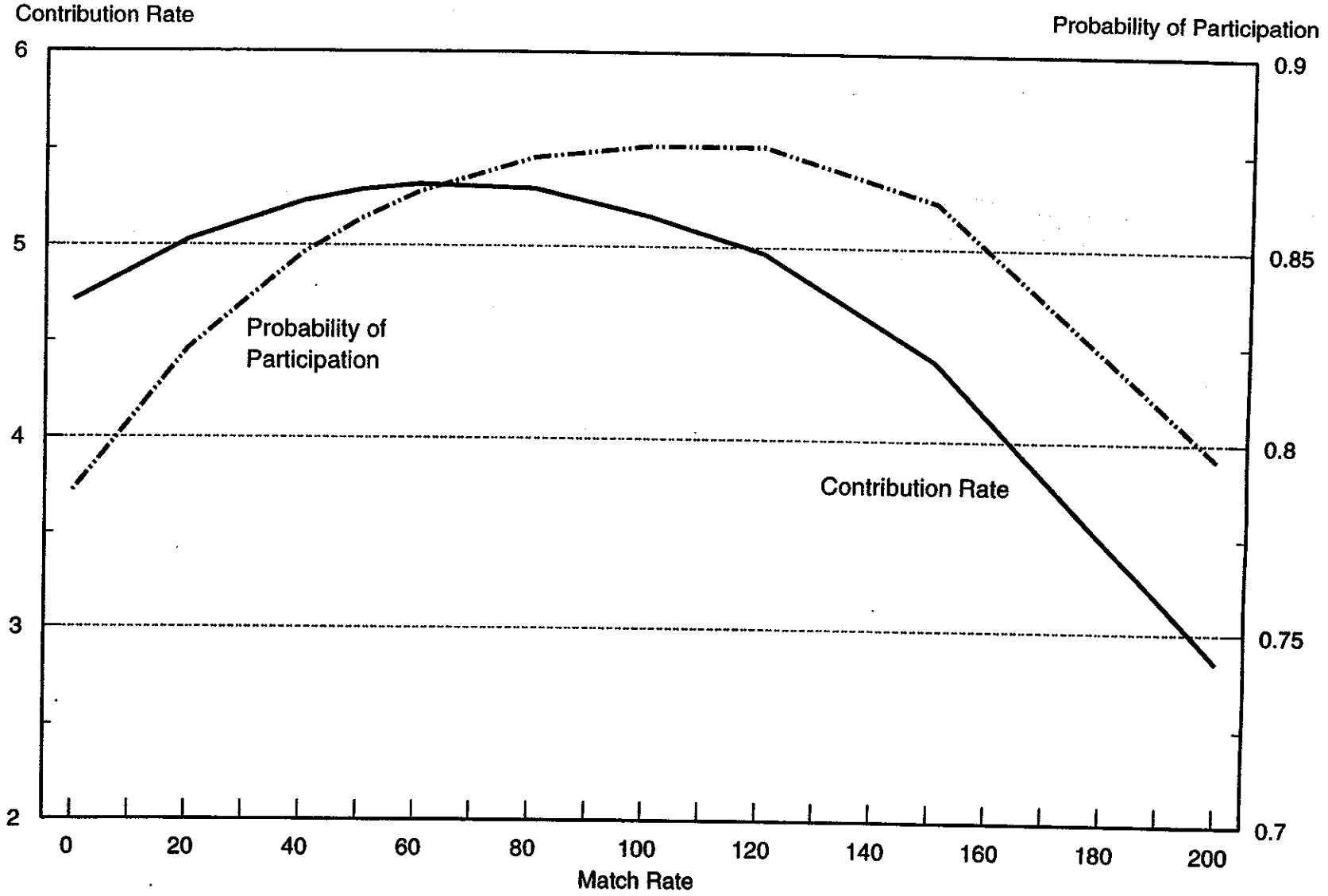
Number of Observations: 4008

Variable	Logit Regression	Tobit Regression
Dependent Variable	Participate (Y or N)	Contribuition Rate
Intercept	3.491 **	-10.989 **
Match	-0.0093 **	0.0369 **
Match squared	0.0001 **	-0.0002 **
Match * Income	-0.0002 *	0.0002 **
Match * Age	0.0001	-0.0006 **
Soleplan	-0.057	0.099
Income (000's)	-0.047 **	0.146 **
Income (000's) squared	0.000 **	0.000 **
Age	-0.100 **	0.321 **
Age squared	0.001 **	-0.002 *
Age*Income	0.000	-0.002 **
Spouse Income (000's)	-0.004 **	0.020 **
College	-0.023	0.526 **
High School	-0.737 **	2.501 **
Married	-0.146	0.635 **
Number of Children	0.068 *	-0.383 **
Small Employer	0.086	-0.090
Union member	0.402 **	-0.486 *
Scale		6.158
Log Likelihood	-2307.1	-10513.0
Concordant Obs.	68.8%	

Note: ** significant at 5% level; * significant at 10% level

Chart 2

Effect of Match Rate on Participation in and Contributions to DC Plans



Source: April 1993 CPS and Supplement

Note: Chart depicts predicted values based on the regression results evaluted at the sample means while varying the match rate.

Table 5

Asset Mix of Largest 1000 Pension Funds, 1989–94

By Type of Plan

Defined Benefit Plans

	1989	1990	1991	1992	1993	1994
Total Equity	46.6	43.6	45.7	48.0	48.4	53.9
Cash	8.9	8.7	6.2	5.9	4.1	3.9
Fixed Income	33.3	36.0	35.8	35.7	35.5	33.6
Real Estate Equity	4.1	4.8	3.9	3.4	3.2	3.3
Mortgages	1.1	1.1	1.0	1.4	1.1	1.0
GIC/BIC	3.2	3.1	2.3	2.4	1.8	1.5
Annuities	0.6	0.7	0.3	0.5	0.4	0.2
Other	2.2	2.0	4.8	2.7	5.0	2.6
Total Assets	1481.0	1466.0	1688.0	1812.0	2022.0	2054.0

Defined ContributionPlans

Company Stock	23.2	24.0	23.9	21.2	23.4	23.3
Other Stock	18.7	15.8	17.6	23.3	21.7	24.4
Cash	7.3	8.7	7.7	6.2	6.1	5.8
Fixed Income	11.7	11.4	11.5	14.0	15.2	14.5
GIC/BIC	35.7	33.2	33.8	30.3	26.7	24.8
Annuities	0.7	0.7	0.5	0.5	1.6	1.8
Other	2.7	6.2	5.0	4.5	5.3	5.4
Total Assets	374.0	391.4	474.1	572.0	610.0	657.4

Source: Pensions and Investments, Various Issues

Table 6

Asset Allocation at Firms With Both a Defined Benefit and a Defined Contribution Pension Plan, 1993

	All Defined Contribution		Supplemental Defined Contribution	
	Total	Not Including Company Stock	Total	Not Including Company Stock
Company Stock	23.4%	--	33.8%	--
Other Stock	21.7%	28.3%	19.2%	29.0%
Fixed Income	15.2%	19.8%	14.4%	21.8%
GIC/BIC	26.7%	34.9%	25.8%	39.0%
Cash	6.1%	8.0%	4.3%	6.5%
Other	6.9%	9.0%	2.4%	3.6%

Source: Pensions and Investments, January 24, 1994

Table 7

Reported Uses for **Any Portion** of Most Recent Lump Sum Distribution

By Age When Distribution Received

Age	Rollover	Investment*	House**	Spent+
16–24	7.1%	15.0%	2.9%	70.7%
25–34	16.5%	18.1%	12.9%	66.3%
35–44	31.2%	21.8%	8.0%	56.0%
45–54	41.4%	22.1%	6.1%	50.5%
55–64	49.8%	26.0%	7.7%	28.8%
TOTAL	29.2%	20.6%	7.5%	54.5%

By Income in 1993

Income	Rollover	Investment*	House**	Spent+
under $10,000	12.8%	20.4%	7.0%	68.3%
$10–$19,999	15.4%	17.7%	6.7%	67.8%
$20–$29,999	19.4%	18.2%	8.7%	66.8%
$30–$49,999	25.5%	19.9%	11.0%	56.1%
$50–$74,999	39.5%	21.7%	11.0%	35.0%
over $75,000	42.8%	22.1%	15.5%	27.2%
TOTAL	25.9%	20.0%	10.0%	53.5%

* Investment includes non–tax qualified saving and starting a business.
** House includes buying a house or paying off a mortgage.
\+ Spent includes paying off other loans, purchases of consumer durables, spending for education, and other general expenditures.

Source: Authors estimates from April 1993 Current Population Survey and Employee Benefits Supplement

Table 8

Use of Retirement Plan Early Distribution

by Type of Plan

	No Defined Benefit Plan		Have Defined Benefit Plan		
	Proportion	Std Dev	Proportion	Std Dev	t-statistic
Retirement Savings	26.1%	0.439	23.1%	0.421	1.276
Taxable Savings	16.4%	0.370	16.4%	0.370	0.002
Business	2.1%	0.141	1.2%	0.110	1.266
House	9.5%	0.294	13.3%	0.340	-2.180 *
Loans	17.1%	0.377	17.6%	0.381	-0.242
Durable Goods	4.1%	0.198	8.3%	0.275	-3.214 *
Education	4.1%	0.198	2.5%	0.155	1.662
Spending	34.0%	0.474	31.3%	0.464	1.047
N	625		716		

Source: 1993 Current Population Survey and Employee Benefits Supplement