



The decision to defer: factors affecting employee deferral incentives

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Abstract

The purpose of this study is to examine employee participation and contribution incentives among defined contribution retirement plans. Using data from the 1995 Survey of Consumer Finances, probit and tobit analysis indicates no significant relationship between employer contributions and an employee's decision to make contributions into his or her retirement plan. However, of those employees who are contributing to their pension plans, the employer contribution percentage has a significant positive effect on employee contribution rates. Therefore, the findings support our hypothesis of a direct relationship between the average employee deferral percentage and the existence of an employer matching contribution. © 2001 Elsevier Science Inc. All rights reserved.

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1. Introduction

Retirement income generally comes from three sources: Social Security, employer-sponsored retirement plans, and individual savings. While Social Security pays medical, disability, death, and retirement benefits, the amount of compensation is inadequate for most consumers. Employer sponsored retirement plans have become the main source of retirement income due to the inadequacy of the Social Security system and low levels of personal savings. These plans are maintained by the business entity and provide income to the employees upon retirement or termination of employment. Since employer sponsored retirement plans are such an important source of retirement income, we have decided to analyze some possible contributing factors influencing employee participation and contribution levels in such plans.

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The motivation for examining employee participation and contribution incentives among employer sponsored retirement plans is two-fold. First, the 1995 Survey of Consumer Finances (SCF) is now available for use. This data set has detailed information regarding both the features of retirement plans and employee participation habits of such plans. Therefore, the 1995 SCF provides the opportunity to expand research in specific areas that we have chosen: plan participation, plan contribution rates, employer matching contributions, self-directed accounts, loans, and hardship withdrawals. Second, there is a continued shift away from traditional defined benefit pension plans in which the employer makes some or all of the contributions toward defined contribution plans where the employee decides his or her contribution amount and in many cases, how the funds should be invested. Thus, it is becoming increasingly important to study the underlying motivation for employee participation in employer sponsored retirement plans and contributions to such plans. The reason is that a firm's policy of matching employee deferrals, the availability of self-directed accounts, and the existence of loans or hardship withdrawals, may have an impact on employee participation and contribution rates. In addition, the incentive effects of employer contributions are of interest to firms regarding employee motivation and retention. Moreover, employee contribution patterns have implications regarding the national average savings rate and resulting socio-economic status of individuals in their retirement years.

2. Evolution of deferral literature and significance of this study

A recent study by Xiao (1997) used tobit regressions to analyze saving motives and 401(k) contribution plans with data from the 1995 Survey of Consumer Finances. The results indicate that possible saving motives for retirement include tax saving and 401(k) plan features such as employer matching, loans, and hardship distributions. In addition, the findings show a positive relation between contributions and risk tolerance, labor income, and years of working. Xiao's (1997) results regarding risk tolerance support an earlier study by Yuh and DeVaney (1996). Using data from the 1992 Survey of Consumer Finances, the results from Yuh and DeVaney's (1996) multi-variate analysis indicate that risk averse individuals have smaller amounts of defined contribution funds. In addition, households with lower education levels and less skilled occupations or who were black or hispanic tended to have lower levels in defined contribution funds. Other findings by Yuh and DeVaney (1996) indicate that funds increase as years of employment increase.

Note that 401(k) plans may be comprised of both employee and employer contributions. Although the employer is not required to contribute to a 401(k) plan, many choose to do so, usually in the form of an employee match. Typically the employer will match a percentage of each employee's contribution up to a specific percentage of salary. According to Even and MacPherson (1994), 83% of participants in primary 401(k) plans receive either a matching contribution based on their deferral amount or some type of employer contribution such as a profit sharing contribution. Generally, the main difference among 401(k) plans is the type of contribution chosen by the sponsor.

A 401(k) survey conducted by Mohler, Nixon, and Williams (1999) of over 400 northern California firms indicates an increasing trend in the number of employers making

discretionary contributions into their 401(k) plans. Specifically, the percentage of firms making discretionary contributions increased from 38% in 1998 to 54% in 1999. Furthermore, the percentage of firms whose plans include matching contributions remains unchanged from the previous year at 75%. In addition, the findings indicate steady growth in employee participation rates. The percentage of firms reporting that 80%–100% of their eligible employees participate has increased from 35% in 1995 to 42% in 1999. The authors attribute the increase in employee participation rates to higher investment yields and greater investment flexibility. Finally, plan participation may have peaked since only 47% of plan sponsors think they will have higher enrollment over the next 2 years.

Xiao (1997) did not specifically test employee participation and contribution levels in retirement plans which have an employer matching contribution feature. Instead, the author assumed that the existence of an employer match is a favorable feature for workers, thereby motivating them to contribute more as a result of this feature. The intent of our study is to look at this issue more closely by testing the relationship between employee participation and contribution levels based on the employer matching contribution feature. Our study also analyzes an additional feature not included in Xiao's (1997) study: the availability of self-directed accounts and the effect of this feature on employee participation and contribution levels.

A recent paper by Bassett, Fleming, and Rodrigues (1998) used data from the April 1993 Current Population Survey and its Survey of Employee Benefits supplement (CPS) to analyze how workers use 401(k) plans. Their preliminary findings indicate that 65% of eligible workers participate in 401(k) plans. More specifically, only 36% of workers with family incomes of \$15,000 or less participate, whereas 81% of workers with family incomes of at least \$75,000 participate. Furthermore, the findings show that participation in a 401(k) plan increased if employer matching exists. However, the rate of matching does not appear to affect the mean level of deferrals.

All sponsors of pension plans with 100 or more participants are required to file the Form 5,500 annually with the IRS. This form provides information on plan eligibility, participation, contributions, distributions, expenses, and employment. Using the employer and employee contribution data on Form 5,500, Papke (1995) computed an average matching contribution rate for each plan studied. Of the 4,687 observations, 14% of plans had no matching contributions at all. The most frequent matching contribution rate was 50% of each dollar a participant contributed in deferrals, followed by 25% and 75%, respectively.

Regarding employee participation in his or her retirement plan, Papke's (1995) results indicate that participation is negatively correlated with firm size. This result concurs with Andrews's (1992) finding that there is more participation in smaller firms, possibly because such firms are better able to tailor the benefits offered to the needs of their employees. Moreover, larger firms tend to have higher employee turnover. Therefore, since the eligibility requirements for most plans are 1 year, according to a 1998 survey conducted by the Profit Sharing/401(k) Council of America (1998), it is logical that larger firms would have a lower participation rate.

Papke's (1995) analysis, however, shows that the greatest impact on employee contributions results in moving from no match to a 10% match-causing an increase in employee contributions of 38.96%. However, the findings indicate that all employer

matching beyond the 10% level results in employee contributions that are statistically insignificant with two exceptions. Contributions increase by 7.36% between a 30% and 40% match but decrease by 9.97% between a 40% and 50% match. Furthermore, there is evidence of a decrease in contributions at high match rates. This could be a result of anomalies in the data. An alternative explanation is that as the employer matching rate increases, employees have the incentive to increase the amount of their contributions in order to obtain the maximum matching benefit. Although employees will eventually reach a point where they will not contribute any additional dollars due to limited income allocations. Hence, the income effect has outstripped the substitution effect. Papke (1995) concludes that there is indeed a difference in contribution behavior at low and high match rates. A small positive match rate significantly increases employee contributions. Conversely, at higher match rates employees appear to actually decrease their contributions. Papke (1995) suggests that this may indicate a “target saving” approach.

One weakness of this study arises from using the Form 5,500 to compute the employer matching percentage. The Form 5,500 breaks down the total contributions given by the employer and the employees. However, the total employer contribution may be comprised of more than just employer matching contributions. For instance, the employer may be required to make an additional contribution in order to pass certain nondiscrimination tests. This occurs when the average deferral percentage (ADP) of the highly compensated employees exceeds the ADP of the nonhighly compensated employees by an amount causing the plan to fail the nondiscrimination tests. Note that in general, a highly compensated employee is an employee who is at least a 5% owner of the company or earns more than a certain indexed income level. If a plan sponsor has given a contribution in order to comply with the nondiscriminatory requirements, the employer matching percentage calculated from the Form 5,500 will be overstated. In addition, some 401(k) plans have a profit sharing component in which employees may elect to give a discretionary contribution up to the Section 415 limits of the Internal Revenue Code. These contributions are completely unrelated to any deferrals that employees have made in the 401(k) section of the plan.

In sum, there are two possible employer contribution components that can inflate the employer matching percentage when calculated using the Form 5,500: contributions required to pass nondiscrimination tests and discretionary profit sharing contributions. In an attempt to avoid these biases we will use individual data, rather than plan data, from the 1995 Survey of Consumer Finances.

Earlier studies of the effects of employer matching have yielded mixed results. Andrews (1992) found a positive correlation between employer matching and participation with the May 1988 CPS. Likewise, Papke (1995) found similar results using data provided by the IRS. Papke and Poterba (1995) used data from 43 firms and also found evidence that employee participation increased with the existence of employer matching. In addition, they found weak evidence that participation increased with the matching level. However, Kusko, Poterba, and Wilcox (1994) found no relationship between matching and participation. It should be noted though that their study consisted of only one medium sized firm.

A 1998 401(k) plan survey by Buck Consultants Inc. (1998) yielded some interesting results. They mailed surveys to approximately 4,000 organizations. Of the 765 firms that responded, 646 reported sponsoring a 401(k) plan. Their tabulated results indicate that the average

employee participation rate in 401(k) plans is 77%. The average employee deferral rate ranges from 3% to 8%. In addition, 89% of the plans provided employer matching contributions. The most common employer match rate is a 50% match with almost half of the respondents reporting this. Furthermore, 46% of respondents report a maximum match of 6% of salary.

Regarding 401(k) loans and withdrawals, 87% of plans surveyed by Buck Consultants Inc. (1998) have a loan provision for participants. In addition, 92% of plans offer hardship withdrawals. Other findings by Buck Consultants Inc. (1998) indicate that larger firms, with an average of 9,225 employees tend to sponsor both defined benefit and defined contribution plans. However, firms with fewer employees, averaging 4,613, tend to sponsor 401(k) plans exclusively. In addition, their survey concurs with other research findings in that participation in and knowledge about an employer sponsored retirement plan is positively correlated with firm size. Although this survey provides a wealth of statistical information about retirement plans, it does not provide us any insight into possible correlations between employer matching rates and employee deferral rates.

Regarding the investment of pension assets, plans may be set up to have the assets directed by the administrators or they may be participant directed. In addition there is the issue of investing in employer stock. Howe and Pope (1998) examined the risk and return effects of limiting the percentage of employer contributions to defined contribution plans in the form of employer stock. Portfolios were constructed using employer stock, treasury bonds, and a broadly based stock portfolio. He found that the average return for the employer stock was similar to the average return on the broadly based stock index. However, adding the stock index to the portfolio reduces the risk.

3. Data

The data for this study were obtained from the 1995 Survey of Consumer Finances available from the Federal Reserve System in cooperation with the Statistics of Income Division at the Department of Treasury. The SCF is a triennial type of survey and is designed to provide information on households regarding their personal finances, pension plan coverage, labor force participation, and various demographic characteristics. In order to provide accurate information on characteristics that are widely distributed in the population as well as characteristics that are concentrated in a small part of the population, such as home ownership versus investment real estate, a dual frame sample design is used. The purpose is to provide an adequate descriptive base for the analysis of household assets and liabilities. The first part is a geographically-based standard multi-stage probability sample whereas the second part is a special over-sample of wealthy families taken from tax records. The second part is necessary because wealthy families hold a disproportionately large share of certain assets, such as tax exempt bonds. The response rate is approximately 70% for the standard probability sample and about 34% for the special sample. The survey was conducted by the National Opinion Research Center at the University of Chicago. The survey consists of 4,299 households, 2,780 from the area probability sample and 1,519 from the list sample. Furthermore, the time frame for the interviews averaged 90 min. In addition, there are 4,967 variables and 21,495 observations in the survey. Aside from demographic characteristics, other variables in the

survey encompass detailed information on financial assets, nonfinancial assets, and liabilities. Some examples include information on savings bonds, stocks, mutual funds, retirement accounts, life insurance, vehicles, real estate, business assets, and credit card debt.

In order to accommodate for nonresponse error statistical methods are used to impute the missing data. Specifically, the missing data in the survey was imputed five times by drawing repeatedly from an estimate of the conditional distribution of the data. These imputations are stored as five successive replicates of each data record. Thus, the number of observations in the data set, 21,495, is five times the actual number of respondents, 4,299.

4. Methodology

The purpose of this study is to analyze employee participation and contribution rates in defined contribution plans using probit and tobit analysis. The data were used to analyze five hypotheses:

H1. There is a direct relationship between employee participation in defined contribution plans and the existence of employer matching contributions in such plans.

H2. Employees' average deferral percentage is directly related to the employer matching contribution percentage.

H3. Employee participation and contributions are directly related to the existence of hardship withdrawals in defined contribution plans. Employees may be more likely to make deferrals into defined contribution plans if they have the option of making subsequent withdrawals for reasons of financial hardship.

H4. Participation and the deferral rates are directly related to the availability of employee directed retirement accounts. The idea is that if the employee is able to make the investment choice for his retirement plan assets, he will be more motivated to participate in and contribute to the plan.

H5. Employee participation and contributions are directly related to the existence of an employee loan feature in defined contribution plans. Employees may be more likely to make deferrals into defined contribution plans if they know they can have access to these funds in times of financial hardship by obtaining a loan.

The decision on whether or not to contribute to a defined contribution retirement plan is different from the decision on how much to contribute. Basically, the dependent variable in this case is part qualitative (contribute or not contribute) and part quantitative (amount of contribution).

The following empirical model will be estimated:

$$y = f(x_1^+, x_2^+, x_3^+, x_4^+, x_5^+) + u \quad (1)$$

where y is the contributing (0, 1) amount of contribution and x_1 the employer matching, x_2 the amount of employer match, x_3 the self-directed accounts, x_4 the loans, x_5 is the hardship distributions.

Probit and tobit models are used to examine both the qualitative (whether or not an employee is making deferrals) and quantitative (amount of deferrals) nature of the data. We originally started with 20 independent variables and the number of independent variables was reduced due to errors associated with multi-collinearity.

A probit model estimates the probability of an observation falling in one group. Specifically, this model assume that there is an underlying response variable y_i^* defined by the regression relationship

$$y_i^* = \beta'x_i + u_i \quad (2)$$

In practice, y_i^* is unobservable. What we observe is a dummy variable y defined by

$$\begin{aligned} y &= 1, & \text{if } y_i^* > 0 \\ y &= 0, & \text{otherwise} \end{aligned} \quad (3)$$

In this formulation, $\beta'x_i$ is $E(y_i^*|x_i)$. From the relations (2) and (3) we get

$$\text{Prob}(y_i = 1) = \text{Prob}(u_i > -\beta'x_i) = 1 - F(-\beta'x_i) \quad (4)$$

where F is the cumulative distribution function for u . The functional form for F in (4) will depend on the assumptions made about u_i in (2). In the *probit model*, we assume that u_i are $IN(0, \sigma^2)$. In this case,

$$F(-\beta'x_i) = \int_{-\infty}^{-\beta'x_i/\sigma} \frac{1}{(2\pi)^{1/2}} \exp\left(-\frac{t^2}{2}\right) dt \quad (5)$$

Since contribution to the pension fund is taken from survey data, there are a lot of observations concentrated around zero. The tobit model is defined as follows:

$$\begin{aligned} y_i &= \beta'x_i + u_i, & \text{if RHS} > 0 \\ y_i &= 0, & \text{otherwise} \end{aligned} \quad (6)$$

β is a $k \times 1$ vector of unknown parameters, x_i a $k \times 1$ vector of known constants, u_i are residuals that are independently and normally distributed, with mean zero and a common variance σ^2 . Tobit is a censored normal regression model, and its estimation is related to the estimation of the censored and truncated normal distributions. We used LIMDEP package to conduct our empirical estimations.

5. Results

There are two components that comprise the dependent variable CONTRIB. In the first component respondents are asked if they are currently making contributions to their pension plan whereas in the second component respondents are asked how much they are contributing to their pension plan.

Table 1 lists the results obtained from probit regression analysis. Contrary to our assumption, the findings indicate no significant relationship between the employer contribution percentage (x_2) and an employee's decision to make contributions into his or her retirement plan. These results, however, are consistent with findings of Kusko et al.

Table 1

Probit analysis of factors affecting employees' decision to contribute to employer sponsored retirement plans

Independent variables	Coefficient	Marginal effect	<i>p</i> -value
Employer contributions	-0.1214234522	-0.4782386932E-01	0.1332
Employer contribution percentage	0.5414679206E-04	0.2132626820E-04	0.4192
Employee directed accounts	0.1429717189	0.5631087469E-01	0.0047
Employee loan feature	0.3797063912	0.1495512481	0.0032
Current loans against account	0.2880608984	0.1134557329	0.0041
Hardship withdrawals	-0.1524073120E-02	-0.6002717961E-03	0.9801

A probit two-stage least squares procedure was employed using data taken from the 1995 SCF. The coefficient, marginal effect, and *p*-values of each of the independent variables tested in relation to the dependent variable, the employee contribution decision. Log likelihood = -1559.640, Chi-squared = 333.3050, predictability = 0.63, dependent variable: is employee currently contributing to pension plan?

(1994) in which no relationship was found between an employer matching feature and employee participation. Based on these results, one may conclude that an employee's decision to participate in his or her company sponsored retirement plan is independent of the existence of an employer contribution feature. Thus, employer contributions do not appear to be an incentive in motivating employees to begin saving for their retirement via company sponsored plans.

The findings support the hypothesis of a significant positive relation between employee participation and the availability of employee directed retirement accounts (x_3). These results seem to indicate that if an employee has some control over the investment allocation of his contributions he will be more likely to participate in the company sponsored retirement plan. Likewise, the existence of an employee loan feature (x_4) among retirement plans has a significant positive effect on employee participation. Therefore, the option to take future loans on retirement plan contributions also appears to be a motivator for employee participation in retirement plans. This finding is consistent with an earlier study by Xiao (1997).

The availability of hardship withdrawals (x_5) is not significant regarding retirement plan participation. The approved reasons for a hardship withdrawal are generally subject to stringent IRS regulations. Thus, it is much more difficult for an employee to receive a hardship withdrawal from his or her retirement plan than to receive a loan. In addition, hardship withdrawals are subject to an early withdrawal penalty from the IRS. Therefore, the limitations associated with hardship withdrawals may outweigh the benefits. As a result, this feature does not appear to be a motivator in an employee's decision to participate in an employer sponsored retirement plan.

Table 2 presents the results of the tobit regression analysis for the second component of the dependent variable CONTRIB which asks respondents how much they are contributing to their pension plan. The findings indicate that of those employees who are contributing, the employer contribution percentage (x_2) has a significant positive effect on employee contribution rates. Therefore, the findings support our hypothesis of a direct relationship between the average employee deferral percentage and the existence of an employer matching contribution. These findings are consistent with Papke (1994). However, our

Table 2

Tobit analysis of factors affecting employee contribution rates to employer sponsored retirement plans

Independent variables	Coefficient	Marginal effect	<i>p</i> -value
Employer contributions	47.62973663	42.26863295	0.3711
Employer contribution percentage	0.1815862880	0.1611473147	0.0000
Employee directed accounts	46.07745836	40.89107588	0.1011
Employee loan feature	102.7753046	91.20713101	0.1597
Current loans against account	126.5899668	112.3412645	0.0285
Hardship withdrawals	61.10218382	54.22464962	0.0559

A tobit procedure was employed using data taken from the 1995 SCF. The coefficient, marginal effect, and *p*-values of each of the independent variables tested in relation to the dependent variable, employee contribution rate. Log likelihood = -9294.680, dependent variable: employee contribution rate.

findings are inconsistent with Bassett et al. (1998) whose results indicate that the rate of employer matching did not affect the mean level of employee deferrals.

Regarding the availability of employee directed retirement accounts (x_3), the findings indicate no significant effect on the amount of employee contributions in relation to the availability of this feature. Although the existence of an employee loan feature (x_4) has a significant positive effect on the decision to contribute, it is not significant regarding employee contribution rates. Conversely, the availability of hardship withdrawals (x_5) has a significant positive effect on contribution rates but is not a significant factor in the employee's decision to contribute to his or her defined contribution plan. The finding of significant positive effects on contribution rates due to the availability of hardship withdrawals is consistent with findings by Xiao (1997).

6. Discussion of results and policy implications

Using survey data from the 1995 SCF, this study analyzes employee retirement plan participation and various socio-demographic and economic factors as predictors of employer sponsored pension plan contributions. The following two questions were used to measure pension plan contributions:

1. Are you currently making contributions?
2. What is the amount of your contributions?

Our results indicate no significant relationship between employer contributions and an employee's decision to participate. However, our results do indeed indicate that once an employee has made the decision to participate, the level of employer contributions has an effect on the how much an employee is willing to contribute from his or her earnings.

The findings have policy implications for both employers, and public policy makers. Regarding employers, the findings indicate that self-directed accounts and loan features in retirement plans have a positive effect on the employee contribution decision. Therefore, employers should use these features in the design of pension plans as a means of maximizing employee participation, recruiting future employees, and retaining existing employees.

Since self-directed accounts and loan features have positive effects on employee contribution decisions, public policy makers should institute policies that encourage firms to include these feature in their retirement plans. In addition, the government can promote higher contribution rates by increasing the annual contribution limit and providing additional tax incentives.

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