What Determines 401(k) Participation and Contributions?

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In addition to variables such as age, income, and job tenure, the length of an employee's planning horizon is a crucial factor affecting participation in and contribution to a 401(k) plan. On the plan side, the most important factors are the availability of matching contributions from the employer and the ability of employees to gain access to their funds before retirement through borrowing. Good information about the need for retirement savings and good plan design could significantly increase eligible employees' participation and contributions.

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Summary and Introduction

The U.S. retirement income system is often described as a "three-legged stool," consisting of Social Security, employer-provided supplementary pensions, and individual savings. In fact, the stool is pretty wobbly. In 2000, only half of wage and salary workers in the private sector between the ages of 25 and 64 were covered by a pension plan of any sort. Moreover, the trend is not encouraging: between 1979 and 1999, coverage remained virtually unchanged, even though 1979 marked the end of a decade of retrenchment and 1999 was the height of the longest expansion in the post-World War II period (U.S. Census Bureau 1980, 2000).[1]

At the same time, the nature of pension coverage has changed sharply. The defined contribution plan, in which retirement benefits depend on contributions and the earnings on those contributions, has to a large extent replaced the defined benefit plan, in which benefits are provided as a lifetime annuity based on final average salary and years of service (Munnell and Sundén 2001). Within the defined contribution world, the fastest growing type of plan is the 401(k). Participation in 401(k) plans is voluntary, and employees as well as employers can make pretax contributions. These characteristics shift a substantial portion of the burden for providing for retirement to the employee: the employee decides whether or not to participate, how much to contribute, and how to invest the assets. Since a growing proportion of workers is covered solely by a 401(k) plan, and since payments from these plans are essential for a comfortable retirement, employees' participation and contribution decisions are extremely important.

The goal with regard to 401(k) plans is to ensure that those who are eligible to participate choose to do so and that those who participate contribute as much as possible. The question is whether policies can alter the attributes of employees or plans to enhance the likelihood of participation and contribution. It is not enough to determine that employees' decisions are related to age, income, and years of schooling, since these factors cannot be easily altered. Rather, one must examine factors that are amenable to change by employers or the government. One important set of such variables, which has not been covered in previous studies, is individuals' attitudes about planning for the future and saving for retirement.

This article describes how 401(k) plans work, briefly summarizes findings

from earlier studies of employee participation in and contributions to such plans, and presents our analysis of how attitudinal variables affect employees' decisions. The analysis is based on data from the 1998 Survey of Consumer Finances (SCF) (Board of Governors of the Federal Reserve System 1998), a resource rich in demographic and financial information on households.

On the employee side, our analysis indicates, the most important thing affecting participation and contribution decisions is the planning horizon. Employees who plan for periods of less than 5 years are much less likely to provide for their retirement than those who have a longer perspective. These findings are encouraging, because unlike wealth, income, or years of schooling, planning horizon is a variable that could be affected by educating employees about the importance of looking to the future and preparing for retirement. In fact, other studies have suggested that employee education can have a major impact on retirement saving (Bernheim and Garrett 1995; Clark and Schieber 1998). On the plan side, the most important determinants are the availability of an employer match and the ability of employees to gain access to their funds before retirement through borrowing. In short, good information about the need to save for retirement and good plan design can significantly increase both participation and contributions. The question is whether employers have the incentive to make this effort under the new safe harbor nondiscrimination provisions.

How 401(k) Plans Work

A 401(k) plan is a profit-sharing or stock bonus plan that contains a cash-or-deferred arrangement (CODA). The most prevalent CODA is a salary reduction agreement.[2] Under such an agreement, eligible employees may elect to reduce their compensation and have their employer contribute the difference to a retirement plan. Employers often match the employee's contribution. A typical match is 50 cents for each dollar contributed by the employee, with the match ending when employee contributions equal 6 percent of compensation.[3] Beyond 6 percent, plans often permit employees to make unmatched pretax contributions up to the legislated limit.

Both employee and employer contributions to 401(k) plans are tax-deferred. That is, no income taxes are levied on the original contributions or the earnings on those contributions until funds are withdrawn from the plan.[4] Because the saving is tax-favored, the Internal Revenue Code (IRC) limits the amount that employees and employers can contribute. For instance, elective employee contributions could not exceed an indexed amount of $10,500 in 2001.[5] Some plans allow employees to make after-tax contributions beyond the limit set for tax-deferred contributions. Total contributions (employee's pretax, plus employer's pretax, plus employee's after-tax) were limited in 2001 to the lower of $35,000 or 25 percent of the participant's compensation.[6]

Because funds contributed to 401(k) plans receive favorable tax treatment, the IRC restricts access to them. Before age 59½, an employee can generally withdraw money without penalty only in case of disability or death; otherwise, the employee must pay a 10 percent penalty in addition to income taxes. After 59½, an employee may withdraw funds without penalty. Many participants do have limited access to their funds without penalty through provisions that allow them to borrow the lesser of 50 percent of their holdings or $50,000.[7]

In addition to contribution and access limits, 401(k) regulations include nondiscrimination provisions aimed at preventing highly paid workers from benefiting unduly. In particular, the provisions limit the ratio of contributions made by highly paid employees to contributions made by non-highly paid employees.[8] Over and above the nondiscrimination provisions applicable to all plans covered by the Employee Retirement Income Security Act (ERISA), 401(k) plans have to satisfy an actual deferral percentage (ADP) test. This test can result in an adjustment to the employer's match rate for some participants at the end of the year if it turns out that highly paid workers have contributed disproportionately to the plan.[9] Recently, the introduction of a so-called safe harbor provision, whereby the existence of an employer match allows a 401(k) plan to qualify automatically, even if no non-highly paid employees take advantage of the match, has weakened protections for low and moderate earners (Langbein and Wolk 1995).[10] Under the original nondiscrimination provisions, employers had a strong incentive to educate moderate and low earners about the virtues of saving for retirement or, if that failed, to make contributions on the employees' behalf. Under the new safe harbor provision, employers have nothing to gain from educating reluctant savers and encouraging them to participate; if anything, employers' costs increase when non-highly paid employees choose to participate.

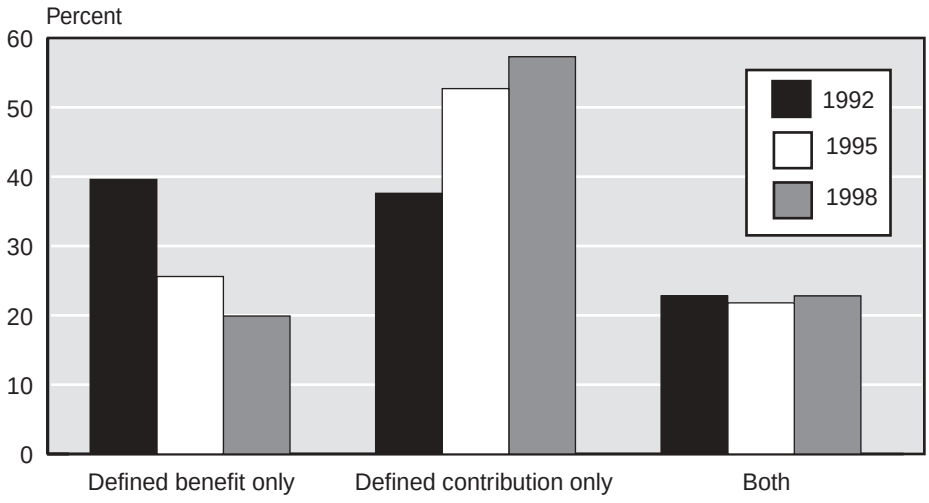
The numbers of 401(k) plans and participants have grown enormously, for a number of reasons. The plans are more appealing to a younger, more mobile workforce. For such workers, the greater portability of 401(k) plans clearly outweighs the predictability of benefits for career employees under a defined benefit plan. Workers get statements several times a year and can see their balances grow, which makes defined contribution benefits seem more tangible. From the employer's perspective, 401(k) plans may be less costly to operate than defined benefit plans, especially in the case of small- and medium-sized plans. In addition, 40l(k) plans do not require employers to contribute, although most employers

do. Because the plans are fully funded by definition, they eliminate the work associated with funding requirements and pension insurance. Finally, portability can eliminate the need for employers to keep track of pensions for departed employees.[11]

Given the popularity and growth of 401(k) plans, one would have expected them to boost pension plan coverage in the United States. But, as noted above, overall pension coverage has remained virtually unchanged. This means that the enormous expansion of defined contribution plans, especially 401(k)-type plans, has produced a sharp decline in the percentage of the workforce covered under traditional defined benefit plans. This decline reflects shifts in employment from manufacturing to service industries and employers' substitution of defined contribution plans for defined benefit plans. Researchers attribute about half of the decline in defined benefit coverage to employment shifts and half to substitution (Ippolito and Thompson 2000; Gustman and Steinmeier 1992).[12]

As a result of the growth of 401(k) plans, the proportion of covered households with only a defined contribution plan increased from 37 percent in 1992 to 57 percent in 1998 (Chart 1). Over the same period, the proportion with a defined benefit plan dropped from about 40 percent to 20 percent, and the proportion with dual coverage remained unchanged. Because 401(k) plans are becoming the only pension arrangement for more and more households, employee participation and contribution decisions are increasingly important determinants of retirement saving. What makes employees participate and contribute? What can policy do about these issues?

Chart 1.
Households with pension coverage, by plan type, 1992, 1995, and 1998



SOURCE: VanDerhei and Copeland (2001), Chart 2.

Earlier Findings

A handful of studies have explored the factors that affect participation in and contributions to 401(k) plans. The studies fall into two groups: those based on the 1988 and 1993 Employee Benefit Supplements to the Current Population Survey (CPS) and those based on plan data.[13] The advantage of the CPS is that it includes information about both the individual and the plan, whereas plan data often have limited information about individual employees. Both employee and plan characteristics are likely to be important determinants of participation and contribution decisions.

On the individual side, the obvious variables for participation and contribution decisions are income, age, schooling, job tenure, and taste for saving. Income is an important determinant of participation. Low-income employees are more likely than high-income employees to be liquidity constrained (that is, to need their money for immediate purposes) and therefore less likely to invest in a pension plan, which severely limits or prohibits access to money until retirement. Low-income employees are also subject to lower tax rates and therefore benefit less from the tax-deferred nature of 401(k) plans. Finally, low-income workers experience higher replacement rates from Social Security and therefore have less need for additional retirement income to maintain their preretirement standard of living. The relationship between income and contributions is more complicated, since employee contributions are limited to a fixed dollar amount, as discussed above.

Age is an important factor because it indicates an employee's stage in the life cycle and may affect his or her interest in retirement saving. More advanced schooling would probably enhance employees' understanding of both the advantages of 401(k) plans and the need to accumulate funds for retirement. Job tenure determines the vesting of employer contributions and may affect employees' knowledge about the plan. Finally, some people simply like to save more than others, so any variable that captures a taste for saving would also be positively related to both participation and contributions.

On the plan side, the presence of an employer match in the 401(k) plan would be expected to encourage both participation and contributions because it produces a large initial return on employees' contributions and supplements the advan-

tages of tax deferral. Given some employer match, the relationship between the size of the match and employee contributions depends on whether the income or substitution effect dominates. Employee contributions may decrease because workers need to contribute less to reach their original contribution level (the income effect). On the other hand, employees may increase contributions because for each dollar they contribute they will receive more than one dollar in total contributions (the substitution effect).

Another important plan characteristic is giving employees some access to their funds before retirement without penalty. Employees who are liquidity constrained are less likely than others to participate in pension plans (Curme and Even 1995). If they can borrow against the assets in their 401(k) plan, they would be more likely to participate because they know they can get at least some of their money should they need it.

The presence of another pension plan may also affect participation, although it is unclear whether the effect is positive or negative. On the one hand, Ippolito (1994) argues that individuals with low discount rates and a taste for saving are more likely to choose jobs that offer pensions. If this is true, the presence of more than one pension plan signals that workers employed in the firm have a taste for saving, and the relation between the defined benefit plan and participation in and contributions to the 401(k) plan should be positive. On the other hand, the workers may be target savers. In that case, if the original pension plan provided sufficient income replacement for them to reach their savings target, they would be less likely to participate in the 401(k) plan.[14] This issue can only be resolved empirically.

Studies Based on the CPS and Other Surveys of Individuals

Andrews (1992) used the May 1988 CPS to estimate three equations: the probability of an employee's being covered by a 401(k) plan, the probability of a covered employee's participating in the plan, and the percentage of the employee's salary contributed. She relied on workplace characteristics to explain coverage and found that the probability of coverage increases with firm size, unionization, wage level, and so on. But coverage is only part of the story. In 1988, roughly 43 percent of workers who were offered 401(k) plans did not participate. To explain participation, Andrews used both individual and plan characteristics and found that participation rises with age, income, education, job tenure, and the presence of an employer match. Regarding contributions, she found that increasing age, family income, and participation in an individual retirement account (IRA) are important positive determinants but that the presence of an employer match is negatively related to contributions.

The Employee Benefit Research Institute (1994) compared the May 1988 CPS and the April 1993 CPS. Between 1988 and 1993, the proportion of workers employed by firms with 401(k) plans increased from 27 percent to 37 percent, and the percentage of workers offered 401(k) plans who did not participate dropped from 43 percent to 35 percent. Looking at sponsorship and participation rates by age, earnings, sex, and hours worked reveals that participation in plans with an employer match is slightly higher (78 percent) than participation in plans without a match (72 percent). Participation rates rise with age until about 50, then decline. As in Andrews's study, the percentage of earnings contributed is lower in plans with an employer match than in plans without one.

A Federal Reserve Bank of New York study also used the April 1993 CPS to analyze participation in 401(k) plans (Bassett, Fleming, and Rodrigues 1998). It found that participation is positively related to income, age, job tenure, and home ownership. Participation is sharply higher when the 401(k) plan is the only retirement plan offered by the employer. On the plan side, the study found that the presence of an employer match significantly increases participation. The April CPS also contains detailed measures of match rates that enable researchers to test whether participation increases when employers offer higher matches; the study found no evidence to support such an increase in participation.

Using data from a nationally representative sample of 2,000 people aged 30 to 48 taken by Merrill Lynch in 1994, Bernheim and Garrett (1996) assessed the effects of employer-based information programs on participation in and contributions to retirement plans.[15] The authors related participation rates to standard economic characteristics (age, employee's wage, and education), the presence of another plan, and two measures of employer-provided informational programs—whether the employer offers information about retirement planning and whether the employee uses it. They discovered that the employee's wage has a positive effect, the presence of another plan has a negative effect, and age and education are statistically insignificant. The most important determinant of participation is employer-provided informational materials: the participation rates of employees who use these materials are significantly higher than those of employees who do not receive or use such materials. The authors employed a similar model to explain contributions and again found that the effects of employer-provided information are large and highly significant.[16]

Studies Based on Plan Data

Papke (1995) used Department of Labor Form 5500 data for 1986 and 1987 to estimate participation and contribution rates. She related the participation ratio (the number

of active employees divided by the number eligible to participate) to several match-rate variables. She found that participation is positively related to the presence of an employer match but that the marginal effect of moving to a higher match is small. Even those small marginal effects disappeared when Papke estimated a fixed-effects model. The implication of these findings is that participation rates are affected more by the efforts of the benefits staff and the quality of their communications than by employers' match rates. Finally, Papke used the same model to examine employee contributions. She found that contributions increase with match rates up to 80 percent of the employee's contribution but that the marginal effect of increasing match rates above 10 percent is small, generally insignificant, and often negative. Plans with match rates in excess of 80 percent have lower employee contributions than plans with no employer match at all.

Using 1986 and 1990 survey data from 43 firms, Papke and Poterba (1995) related the proportion of eligible employees participating in 401(k) plans to the employer's match rate, the availability of an alternative plan, and plan size. They found that participation is higher when employers match employee contributions and saw some evidence that participation increases with the match rate. The link between employee contributions and match rates is much weaker.

Another study examined employee participation and contributions among 12,000 salaried and nonunion hourly workers in a medium-sized manufacturing firm between 1988 and 1991 (Kusko, Poterba, and Wilcox 1998). During this period, the employer's match increased from 25 percent of the first 6 percent of employee compensation to over 100 percent, and then disappeared entirely in the final year. That substantial variation in the match rate produced almost no change in the participation rate of employees over the 4-year period and had only a small, albeit significant, effect on contributions. Most participants were bunched at one of three constraints—the maximum plan limit of 10 percent of compensation, the maximum employee contribution eligible for an employer match (6 percent of compensation), or the Internal Revenue Service's limit on employee contributions ($7,313 in 1988 to $8,475 in 1991)—and rarely changed their contributions to reflect changes in the employer's match.

Clark and Schieber (1998) examined 1994 administrative records for 19 firms, including information on employee wages, age, contribution rates, match rates, and the existence and generosity of a defined benefit plan. The authors related participation rates to individual and plan characteristics, to the extent of communication regarding the plan, and to different match rates, since all plans in the sample provided some match. They found that higher match rates increase participation in 401(k) plans, but they were unable to test the effect of some match versus no match. They also found that increasing the quality of communication significantly increases participation rates. Higher replacement rates in a defined benefit plan tend to reduce participation, but the impact is small. The authors used the same model to explain employee contributions and again found that increased employer match rates and communications have a positive effect.

The State of the Debate

To date, the story is as follows. The CPS studies confirm that participation and contributions are related positively to income, age, education, and job tenure.[17] The evidence also suggests that participation and contributions are negatively related to the presence and generosity of a defined benefit plan. None of the studies has a comprehensive measure of household wealth or any measure of a taste for saving.

All of the studies suggest that employees respond positively to the presence of an employer match. There is no consensus, however, as to whether employees respond to the size of the match. Kusko, Poterba, and Wilcox (1998) found little change in either participation or contributions in response to large changes in employer matches over time. Bassett, Fleming, and Rodrigues (1998) uncovered no evidence that participation rises with the match rate. Papke (1995) showed that participation increases with the match rate, with smaller marginal effects at higher match rates; moreover, contributions increase markedly when employers offer a match, though the effect on contributions was negative at very high match rates. Papke and Poterba (1995) concluded that participation increases with the match rate, but they found no significant effect on contributions. Clark and Schieber (1998) observed a positive effect of the match rate on both participation and contributions, but their sample contained no firms without a match rate.[18]

Results of an Empirical Study

This study uses a different data set, the 1998 Survey of Consumer Finances (SCF), to explore the relationship between individual and plan characteristics and employees' decisions to participate in and contribute to 401(k) plans. The SCF is a triennial survey sponsored by the Federal Reserve Board in cooperation with Statistics of Income of the Department of the Treasury. The SCF collects detailed information on households' assets, liabilities, and demographic characteristics, as well as on pension coverage, participation, and pension plan characteristics.[19] It provides much more information about individuals than other studies do, specifically with regard

to workers' attitudes toward saving and to nonpension assets owned by covered workers or by others in their family.

Most information in the SCF is collected at the household level; however, data on pension coverage, employment, and other demographic characteristics are available for both the head of the household and the spouse or partner. In our analysis, we use person-specific information obtained by considering each person in a married couple as a separate observation. Variables collected at the household level, such as financial wealth, are attributed to both individuals, since each member of a married couple can draw on shared finances. These data permit us to analyze participation and contribution decisions in 401(k) plans based on both individual and household characteristics. While the 1998 SCF covers 4,299 households, our sample consists of 1,698 non-self-employed individuals eligible to participate in a 401(k)-type plan. The means of the variables used in our analysis are shown in Table 1. Persons eligible to participate in 401(k) plans in the SCF are a relatively well-off group, with an average income of $66,100 and a net worth of $221,700. Still, 28 percent of those eligible chose not to participate in the 401(k) plan offered by their employer.

Although the SCF provides information on wealth and tastes not available elsewhere, it suffers from lack of information about 401(k) plans offered to employees who choose not to participate in them. Therefore, our participation equation does not include information about the availability and level of employer matches or the potential for access to retirement funds. However, since the SCF does provide plan information for those who participate in 401(k) plans, our contribution equation can include plan data as well as individual characteristics.

Table 1.
Weighted means of the variables

Variable	Weighted means: Eligible for savings plan (N = 1,698)	Weighted means: Participates in savings plan (N = 1,229)
Age	40.96	41.45
Years of education	13.85	13.96
Job tenure (years)	9.37	10.14
Short planning horizon	0.53	0.49
Income (dollars)	66,100	71,700
Net worth (dollars)	221,700	251,700
Has DB pension	0.23	0.20
DB pension wealth [a] (dollars)	86,900	84,700
Employer contributes	. . .	0.82
Employer match rate	. . .	0.62
0 to 0.49	. . .	0.31
0.5 to 1.0	. . .	0.26
More than 1.0	. . .	0.13
Can borrow	. . .	0.85
Respondent participates in tax-deferred savings plan	0.72	1.00
Percentage of earnings respondent contributes to plan	. . .	6.42

SOURCE: Authors' calculations using the Federal Reserve's 1998 Survey of Consumer Finances.

NOTE: DB = defined benefit; . . . = not applicable.

a. For those with a defined benefit plan.

The Participation Equation

The first task is to estimate the probability that workers who are eligible to participate in a 401(k) plan will join the plan. The dependent variable has a value of one if a worker participates in the 401(k) plan and a value of zero if the worker elects not to participate. The explanatory variables include those used in earlier studies (age, income, education, and job tenure) plus three new ones—household net worth, the present discounted value of future benefits in the individual's defined benefit plan, and the individual's planning horizon.

The relation between net worth and participation in a 401(k) plan could be positive or negative. If workers have a taste for saving, high net worth would be positively related to participation. On the other hand, if workers are target savers, high net worth could be negatively related to participation. The second new variable, defined benefit pension wealth, is expected to be negatively related to participation. Theoretically either a positive or negative effect is possible, but previous studies have found a negative relationship between participation and the presence of a defined benefit plan. That is, workers who anticipate that their defined benefit plan will provide adequate retirement income will be less likely to participate in a second plan.

To provide a measure of a respondent's planning horizon, the SCF asks the following question: "In planning your family's saving and spending, which of the time periods listed on this page is most important to you?" The possible responses are "next few months," "next year," "next few years," and "next five to ten years."[20] We incorporated a respondent's planning horizon into our analysis by creating an indicator variable that equals one if the respondent picks any period of less than 5 years. A short planning horizon is likely to be associated with a lower taste for saving and a smaller probability of participating in a pension plan. Previous studies have reported a positive relationship between planning and saving. For example, in a recent article based on the Health and Retirement Study, Lusardi (1999) found that those who had thought a lot about retirement had more wealth, all

else being equal, than those who had not thought about retirement.

The participation equation was estimated using a multivariate probit (see Table 2). The values reported in Table 2 represent the change in the probability of participation from a one-unit change in a continuous variable evaluated at the mean or the shift in a dichotomous variable from zero to one. For example, if job tenure increases by 1 year from the mean (9 years), the probability of participating increases by 0.7 percentage point.

Overall, the results confirm earlier findings that age, income, and job tenure increase the probability of participating in a 401(k) plan. Education is not statistically significant, a result that holds regardless of how the education variable is specified. Age has a large impact. An eligible worker between the ages of 25 and 34 has a 14 percent greater probability of participating in a 401(k) plan than a counterpart under age 25, and the probability increases for workers aged 35 to 44. Interestingly, for workers aged 45 and over, the probability of participation is only 11 percent greater than for workers under 25. Income has a more modest effect. Translating the impact back into dollars, the results indicate that if household income rises $10,000 above the mean (from $66,100 to $76,100), participation would rise by 0.6 percentage point. Job tenure has a statistically significant impact; as noted earlier, one additional year of tenure raises the probability of participation by 0.7 percentage point.

The new variables—net worth, pension wealth, and planning horizon—all have statistically significant effects. Net worth exerts a small positive effect on the participation decision: increasing net worth by $10,000 from the mean raises participation by 0.1 percentage point. Nevertheless, the finding supports the notion that workers with a taste for saving are more likely to participate in a pension plan.[21] Being covered by a defined benefit plan reduces the probability of participating in a 401(k) plan by 11 percent. The amount of pension wealth, however, has only a small negative effect on the probability of participation.[22] Finally, having a short planning horizon dramatically decreases the probability of participation—by almost 9 percentage points.

Since the planning horizon variable turns out to be quite important statistically and potentially important in terms of affecting participation, it is useful to take a closer look at how it is specified. In Equation 2, the planning horizon is expressed as a separate indicator variable for each category with the "next few years" as the omitted variable. The results support the specifica-

Table 2.
Probit estimates of the probability of participating in a 401(k) plan

	Equation 1		Equation 2		OLS of Equation 1	
Variable	Marginal effects	t-statistic	Marginal effects	t-statistic	Coefficient	t-statistic
Age						
25–34	0.137	2.72	0.138	2.74	0.198	3.01
35–44	0.170	3.26	0.170	3.27	0.230	3.50
45 or older	0.113	1.96	0.114	1.99	0.164	2.42
Log of income	0.040	3.23	0.040	3.21	0.033	2.76
Job tenure	0.007	4.00	0.007	4.09	0.006	4.27
Years of education	0.005	0.94	0.005	0.87	0.005	0.83
Log of net worth	0.022	2.83	0.022	2.78	0.020	2.51
Has DB pension	-0.108	-2.58	-0.109	-2.61	-0.105	-2.48
Log of DB pension wealth	-0.012	-3.41	-0.012	-3.45	-0.010	-2.94
Short planning horizon	-0.088	-3.83	. . .	. . .	-0.083	-3.75
Planning horizon						
Next few months	. . .	. . .	-0.064	-0.18	. . .	. . .
Next year	. . .	. . .	-0.052	-2.88	. . .	. . .
Next few years	. . .	. . .	Omitted	. . .	. . .	. . .
5 to 10 years	. . .	. . .	0.062	2.15	. . .	. . .
Longer than 10 years	. . .	. . .	0.090	1.31	. . .	. . .
Constant	. . .	. . .	. . .	. . .	0.095	0.69
Pseudo-R^2	0.103		0.105		0.113	

SOURCE: Authors' calculations based on the Federal Reserve Board's 1998 Survey of Consumer Finances.

NOTES: Number of observations is 1,698.

OLS = ordinary least squares; DB = defined benefit plan; . . . = not applicable.

tion of planning horizon in Equation 1. Workers with planning horizons of the next few years or shorter are less likely to participate in a 401(k) plan than workers with horizons of 5 to 10 years and 10 years or more. The question is whether planning horizon affects contributions as well as participation.

The Contribution Equation

The contribution equation attempts to explain the percentage of income that those who choose to participate contribute to a plan. This equation includes most of the variables described above plus three plan characteristics—the existence of an employer match, the size of that match, and whether workers can borrow against the plan.[23] The existence of an employer match should have a positive effect. As discussed earlier, the evidence to date is mixed regarding the impact of match rate. Theoretically, it could have a positive or negative effect on employee contributions, depending on whether the substitution or income effect dominates. Access to funds before retirement would clearly be expected to have a positive effect on contributions.[24]

The results of the contribution equation are presented in Table 3. Since the equation includes plan information as well as individual characteristics, it explains a substantial amount of the variation in contribution rates across employees. Moreover, the effects are straightforward to interpret since the equation is estimated using ordinary least squares (OLS).

Many of the individual variables that were important in the participation decision appear not to affect the contribution rate. For example, age, the presence of a defined benefit plan, and the wealth in that plan are no longer statistically significant, and education remains insignificant. In contrast, a short planning horizon continues to have a statistically significant and important effect: a

Table 3.
Ordinary least squares estimates of the percentage of earnings that employees contribute to a 401(k) plan

	Equation 1		Equation 2		Equation 3	
Variable	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Age						
25–34	-0.164	-0.23	-0.543	-0.81	-0.578	-0.88
35–44	0.216	0.30	-0.098	-0.15	-0.133	-0.20
45 or older	-0.060	-0.08	-0.254	-0.36	-0.339	-0.49
Log of income	-0.499	-1.87	-0.429	-1.94	-0.420	-1.89
Years of education	0.045	0.64	0.064	1.01	0.071	1.12
Log of net worth	0.600	4.27	0.520	4.38	0.535	4.53
Has DB pension	-0.057	-0.10	-0.465	-0.87	-0.498	-0.93
Log of DB pension wealth	0.032	0.63	0.069	1.43	0.073	1.51
Employer contributes	0.707	1.69	. . .	. . .	. . .	. . .
Employer has match rate	-0.515	-3.36	. . .	. . .	. . .	. . .
Match rate						
0 to 0.49	. . .	. . .	4.533	11.73	4.518	11.72
0.5 to 1.0	. . .	. . .	2.009	5.97	2.003	5.97
More than 1.0	. . .	. . .	1.508	3.04	1.479	2.99
Can borrow	2.619	6.30	1.712	4.59	1.779	4.78
Short planning horizon	-1.182	-3.78	. . .	. . .	-1.122	-3.84
Planning horizon						
Next few months	. . .	. . .	-0.371	-0.79	. . .	. . .
Next year	. . .	. . .	-0.894	-2.22	. . .	. . .
Next few years	. . .	. . .	Omitted	. . .		
5 to 10 years	. . .	. . .	0.646	1.72	. . .	. . .
Longer than 10 years	. . .	. . .	1.170	2.75	. . .	. . .
Constant	7.976	2.93	5.440	2.36	6.061	2.61
R^2	0.098		0.206		0.203	

SOURCE: Authors' calculations based on the Federal Reserve Board's 1998 Survey of Consumer Finances.

NOTES: Number of observations is 1,229.

DB = defined benefit plan; . . . = not applicable.

planning horizon of less than 5 years reduces the contribution rate by roughly 1.2 percentage points. The contribution rate is positively related to wealth, which again suggests that the variable reflects a taste for saving. Household income has a statistically significant negative effect. This can be explained by the $10,000 limit on employee contributions in 1998, which essentially forced the contribution rate to decline as income rose above the limit.

Plan variables are critical to the contribution decision. The ability to borrow increases the contribution rate by 2.6 percentage points, and the presence of an employer match increases it by 0.7 percentage point. As some earlier studies suggest, the size of an employer match does not appear to encourage further contributions once the match exists. In fact, a larger match negatively affects employee contributions. This effect, though statistically significant, is small. If the match goes from 40 percent to 80 percent, the employee contribution rate would decline by only 0.2 of one percentage point. The negative relationship is confirmed by the results shown in Equation 3 (Table 3).

Conclusion

Our results support earlier findings and add to the debate, in particular by documenting the importance of an individual's planning horizon in participation and contribution decisions. On the plan side, our results confirm speculation by many economists that access to funds is an important determinant of employees' contribution rate.

The question for policymakers and employers is why people have different planning horizons and what can be done to lengthen those horizons. A short planning horizon would be rational if individuals planned to work their entire life or expected to die at an early age. Alternatively, a short planning horizon could result from misinformation, such as the assumption that Social Security will provide adequate retirement income. To the extent that short planning horizons are based on misinformation, giving employees accurate data about typical work patterns, life expectancies, and expected Social Security benefits could make them more forward-looking in their planning.

In terms of the implications for policy, the results of this analysis are encouraging. If participation and contribution rates were related solely to income and age, then little could be done to change them. But they appear to be related to planning horizon on the individual side and to the existence of a match rate and access to funds on the plan side. Individuals' horizons can be extended by information about the importance of planning for retirement. In fact, studies by Bernheim (1998) and Clark and Schieber (1998) suggest that employer-provided information can be very important. Similarly, employers can improve the appeal of their plans by matching employee contributions and allowing employees to borrow funds. These changes should improve both participation and contributions, thereby enhancing pension coverage and ensuring that more Americans are prepared for retirement.

The question is whether employers will encourage moderate and low earners to save for retirement. As noted earlier, employers had a strong incentive to do so under the original 401(k) nondiscrimination provisions, but the safe harbor provision contains no such incentives. One can simply hope that employers will undertake employee education initiatives even without an incentive to do so.

Appendix: Construction of Defined Benefit Pension Wealth

Defined benefit pension wealth is the present discounted value of payments from defined benefit pension plans. For respondents currently working, the SCF asks how much they expect to receive from their defined benefit plan and the age at which they expect to start receiving benefits. The benefit information is reported in one of two ways: as dollar amounts or as a percentage of final pay. When a dollar amount is reported, the annual amount of expected benefits is used to calculate a present value. When the expected benefit is reported as a percentage of final pay, final wages are estimated by assuming a nominal wage growth of 5 percent per year (the intermediate assumption of the 2001 Social Security Trustees' Report). The replacement rate is applied to the final wage at the age when the person expects to start collecting benefits, resulting in an annual amount that can be used to calculate present discounted value. For people who are currently receiving pension benefits, current annual benefits are used. Respondents also report the amount they expect to receive from pensions from previous jobs. In such cases, the annual benefit is computed from the information provided by the respondent.

To compute the present discounted value, the expected value of the annual benefit is calculated for each year from retirement age until the age at which the probability of being alive is zero (usually around age 119). The expected value is the annual benefit multiplied by the sex-specific probability that the person is still alive. The calculation assumes that everyone reaches retirement with certainty and that after retirement the survival probability for a given year is conditional on surviving to the previous year.[25]

The expected value of the annual benefit is discounted to 1998, using the nominal interest rate. The Trustees'

intermediate assumption for future nominal interest rate is 6.3 percent. The present discounted value of defined benefit payments is the sum of the annual benefits. Following Gustman and Steinmeier (1998), the discounted value is prorated to reflect the fact that the worker has not yet finished working. For example, a respondent who is 40 years old, who started working at the current job at age 20, and who expects to work there until age 60 has completed 50 percent of his or her career; the present discounted value in this case is multiplied by 0.5. Pensions that are currently being received or that are from previous jobs are not prorated since the respondent has completed his or her career at the job from which the pension is derived.

Notes

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[1] Coverage data come from the Current Population Survey, which measures coverage for individual workers at one point in time. Pension coverage is more extensive when considered over workers' lifetimes and on a household, rather than an individual, basis. Nevertheless, a significant portion of households reach retirement with no pension benefits at all.

[2] 401(k)-type plans had existed for decades, but they were clearly authorized in the Revenue Act of 1978, which ended any ambiguity surrounding their status. They became popular and spread after the Internal Revenue Service (IRS) proposed clarifying regulations in 1981 that allowed the use of salary reduction arrangements as a source of 401(k) plan contributions.

[3] The tendency to limit the proportion on which the match is based (the employee's basic contribution) to 6 percent reflects the IRS requirement that employers with basic rates above 6 percent prove that they are not discriminatory (McGill and others 1996, 279). The notion is that low- and middle-income workers would be hard-pressed to contribute more than 6 percent of their earnings to a pension.

[4] Not all taxes are deferred, however. As a result of the 1983 Social Security Amendments, payroll taxes are levied on employee contributions to 401(k) plans.

[5] Under the Economic Growth and Tax Relief Reconciliation Act of 2001, salary reduction deferral limits for 401(k), 403(b), and 457 plans increase to $11,000 in 2002, $12,000 in 2003, $13,000 in 2004, $14,000 in 2005, and $15,000 in 2006. Thereafter, the limits rise in line with the consumer price index in $500 increments.

[6] For the purpose of this calculation, compensation cannot exceed a specified limit ($170,000 in 2001). Under the Economic Growth and Tax Relief Reconciliation Act of 2001, the contribution limit increases to $40,000 in 2002 and in line with the consumer price index thereafter, and the annual compensation limit increases from $170,000 to $200,000 and is indexed in $5,000 increments thereafter.

[7] The General Accounting Office (1997) reports that approximately half of all 401(k) plans offer loans and that the proportion offering loans increases with plan size. Mitchell (1999) found that 51 percent of 401(k) plans and 32 percent of profit-sharing plans allowed loans in 1997. VanDerhei and others (1999) report that 90 percent of large 401(k) plans allow loans.

[8] In 2000, highly compensated workers included 5 percent owners and persons with salaries over $85,000.

[9] Under the ADP test, elective contributions are not discriminatory if the 401(k) plan satisfies one of two criteria: (1) the average ADP for highly compensated employees is not more than 125 percent of that for non-highly compensated employees (that is, if the deferral for the non-highly compensated is 10 percent and that for the highly compensated does not exceed 12.5 percent, the plan passes the first test); (2) the average ADP for the highly compensated is not more than twice the average deferral for the non-highly compensated, and the difference between the percentages is not more than 2 percent (that is, if the ADP is 2 percent for the non-highly compensated and 4 percent for the highly compensated, the plan satisfies the second test).

[10] Safe harbor provisions were introduced as part of the pension simplification provisions of the Small Business Job Protection Act of 1996 and became effective in 1999.

[11] Many employees leave accounts behind when they move to another job, requiring the former employer to pay some record-keeping fees. This administrative burden may help explain the trend toward lump-sum payments in defined benefit as well as defined contribution plans.

[12] Most employer substitution of defined contribution plans for defined benefit plans occurred in the late 1980s and 1990s. Before 1986, a large number of 401(k) plans were converted thrift plans, which had typically supplemented defined benefit plans but allowed only after-tax employee contributions. Engen, Gale, and Scholz (1996) contend that even by 1991, a large portion of 401(k) assets was in plans originating before 1982. Between 1985 and 1992, however, Papke (1999) found that about 20 percent of ongoing sponsors dropped defined benefit plans entirely in favor of defined contribution plans and that they replaced traditional defined contribution plans with 401(k) plans. Papke may overstate the rate of substitution slightly since she does not take into account plan mergers and changes in plan identification numbers (Ippolito and Thompson 2000). Nevertheless, both substitution and increased employment in the service industry explain why coverage under 401(k) plans has not increased.

[13] The CPS interviews roughly 50,000 households each month, primarily about labor force activity, to estimate the unemployment rate. Each March, the survey includes supplemental economic and demographic questions and questions about income and employment during the previous year. Respondents are asked whether any employer for whom they worked in the previous year had a pension or other type of retirement plan for any of its workers. Those who answer "yes" to this question are asked whether they were included in the plan. Consistent March CPS data are available since 1979. In addition to the March data, the Bureau of Labor Statistics (BLS) has conducted supplementary surveys on employee benefits in April 1972; in May 1979, 1983, and 1988; and in April 1993. Although the BLS has no current plans to repeat those surveys, questions on health and retirement benefits were included in CPS supplements on workers in contingent and alternative employment arrangements conducted in February 1995, 1997, and 1999.

[14] A recent study confirmed that the framing of the participation option, as well as specific plan characteristics, has an important effect on the extent to which employees elect to join. Madrian and Shea (2000) found that participation increased sharply when a company introduced automatic enrollment, forcing employees to opt out if they did not want to participate.

[15] See Bernheim (1998) for a survey of employees' financial sophistication and other evidence regarding the impact of employer-provided education.

[16] It is possible that workers with a taste for saving are more likely to take part in educational programs, but the authors (Bernheim and Garrett 1996) have found that educational programs tend to be offered more frequently in situations where employees are predisposed against saving. Moreover, participation in educational programs does not appear to be related to a taste for saving.

[17] Even and Macpherson (2000) point out that single men are particularly unlikely to participate in 401(k) plans.

[18] In addition to the studies discussed above, two recent publications, neither of which focuses on participation and contribution decisions, report findings on the effect of the match rate. Clark and others (2000) found a positive effect of the match rate on participation and a negative effect on contributions. VanDerhei, Copeland, and Quick (2000) note in a draft report that the match rate has a negative effect on contributions.

[19] Kennickell, Starr-McCluer, and Surette (2000) describe the 1998 SCF in detail.

[20] Planning horizons of respondents to the 1998 SCF are as follows (in percent):

	Participation equation sample	Contribution equation sample
Next few months	15.1	13.5
Next year	10.8	9.3
Next few years	27.1	25.9
Next 5 to 10 years	27.3	29.3
Longer than 10 years	19.7	22.2

[21] Studies have suggested that having an IRA may indicate a taste for saving (see Engen, Gale, and Scholz 1996 for an overview), since it is another vehicle that households could use for retirement savings. However, recent data on IRAs indicate that most of the flow into such accounts comes not from new contributions but from rollovers from previous pension plans and the investment returns on those rollovers. Hence, the presence of an IRA simply indicates that an individual had a pension plan in the past, not that he or she has a taste for saving (Copeland 2001).

[22] The fact that a spouse has a pension plan could also affect the decision to participate in a 401(k) plan. However, including a variable for spousal pension coverage in our analysis produced no significant effect on the decision to participate.

[23] The match rate in this exercise is the ratio of employer's contribution to employee's contribution. Thus, if a respondent contributes 2 percent of his or her salary to the plan and the employer contributes 1 percent, the plan match rate is estimated to be 0.5. The SCF does not provide information about whether the plan has an explicit match or whether the employer contributes a set amount regardless of the employee's contribution. The calculated match rate is the best one can do given the limitations of the data, but results should be interpreted with caution.

[24] Of course, if employees borrow and fail to repay the loan, they will lose retirement protection.

[25] These probabilities come from http://demog.berkeley.edu/wilmoth/mortality/states.html.

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