Saving For Retirement on the Path of Least Resistance

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Abstract: We assess the impact on savings behavior of several different 401(k) plan features, including automatic enrollment, automatic cash distributions, employer matching provisions, eligibility requirements, investment options, and financial education. We also present new survey evidence on individual savings adequacy. Many of our conclusions are based on an analysis of micro-level administrative data on the 401(k) savings behavior of employees in several large corporations that implemented changes in their 401(k) plan design. Our analysis identifies a key behavioral principle that should partially guide the design of 401(k) plans: employees often follow "the path of least resistance." For better or for worse, plan administrators can manipulate the path of least resistance to powerfully influence the savings and investment choices of their employees.

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I. Introduction

Over the last 20 years, defined contribution pension plans have gradually replaced defined benefit pension plans as the primary privately-sponsored vehicle to provide retirement income. At year-end 2000, employers sponsored over 325,000 401(k) plans with more than 42 million active participants and $1.8 trillion in assets.[1]

The growth of 401(k)-type savings plans and the associated displacement of defined benefit plans have generated new concerns about the adequacy of employee savings. Defined contribution pension plans place the burden of ensuring adequate retirement savings squarely on the backs of individual employees. However, employers make many decisions about the design of 401(k) plans that can either facilitate or hinder their employees' retirement savings prospects. Although the government places some limits on how companies can structure their 401(k) plans, employers nonetheless have broad discretion in the design of their 401(k) plans.

Making good plan design decisions requires an understanding of the relationship between plan rules and participant choices. In this paper, we analyze a new data set that enables us to carefully assess many such relationships. The data set is compiled from anonymous administrative records of several large firms that collectively employ almost 400,000 individuals. Many of these companies implemented changes in the design of their 401(k) plans. These plan changes enable us to evaluate the impact on individual savings behavior of institutional variation in 401(k) plan rules. A list of the companies studied in this paper, along with the plan changes or other interventions that we analyze, appears in Table 1.[2] Appendix A gives a brief description of the data analyzed for each company.

Because low employee savings rates have motivated plan administrators to adopt many of the 401(k) plan changes that we discuss in the rest of the paper, we start off in Section II with a discussion of savings adequacy. Using new data from a survey that we designed, we find that

[1] See *EBRI Databook on Employee Benefits* at http://www.ebri.org/facts/1200fact.htm.
[2] To maintain the anonymity of the companies described in this paper, we refer to each of them with letters.

two-thirds of employees believe that they are saving too little and that one-third of these self-reported under-savers intend to raise their savings rate in the next two months. By matching survey responses to administrative records, we show that employees who report that they save too little actually do have low 401(k) saving rates. However, almost none of the employees who report that they *intend* to raise their savings rate in the next two months actually subsequently do so.

This finding introduces a theme that we return to throughout the paper. Specifically, at any point in time employees are likely to do whatever requires the least current effort: employees often follow the "path of least resistance." Almost always, the easiest thing to do is nothing whatsoever, a phenomenon that we call "passive decision." Such passive decision-making implies that employers have a great deal of influence over the savings outcomes of their employees. For example, employer choices of default savings rates and default investment funds strongly influence employee savings levels. Even though employees have the opportunity to opt out of such defaults, few actually do so.

In section III, the heart of our paper, we discuss the impact of changes in seven different types of plan rules. In subsection III.1, we show that automatic enrollment in a 401(k) plan dramatically raises participation rates, but that the vast majority of employees accept the automatic enrollment default contribution rate investment allocation. By contrast, before automatic enrollment was instituted, few employees chose to invest at these defaults.

In subsection III.2, we discuss the effects of automatic cash distributions for terminated employees. We argue that automatic cash distributions, which are given to terminated employees with balances below $5,000, undercut retirement wealth accumulation. Most employees with balances below $5,000 who receive such automatic distributions consume the proceeds. By contrast, most employees with balances above $5,000 leave their money in the 401(k) plan. Hence, the automatic cash distributions seem to play a critical causal role in the consumption of these low-balance 401(k) accounts.

In subsection III.3, we discuss different interventions designed to raise employee contribution rates. Benartzi and Thaler (2004) have shown that employees are willing to commit to automatic schedules of slow 401(k) contribution rate increases, and that committing to such a schedule will result in substantially higher 401(k) savings rates after only a few years. We report

an experiment of our own that shows that a savings intervention that does *not* include such an automatic commitment component is not successful.

In subsection III.4, we discuss the effects of the employer match rate and the employer match threshold (the maximum employee contribution that the employer matches) on savings outcomes. We show that adopting an employer match can increase 401(k) participation, and that the match threshold is an important focal point in the selection of employee contribution rates. We also show that increasing the match threshold can raise the contribution rates of households with relatively low saving rates.

In subsection III.5, we discuss the impact of changes in eligibility waiting periods on the 401(k) participation profile (i.e. participation rates plotted against tenure at the job). We show that an increase in the length of wait before 401(k) eligibility period truncates, but does not shift, the participation profile.

In subsection III.6, we discuss mutual fund menus and the role of employer, or "company," stock. We argue that the menu of asset allocation options and the choice of the default asset allocation influence actual asset allocation decisions and portfolio diversification.

Finally, in subsection III.7 we discuss the role of financial education in the workplace. Using data that links employees' receipt of financial education to their actual savings behavior, we show that although many seminar attendees plan to make 401(k) savings changes, very few actually do so. Thus, while financial education does improve savings outcomes, its effects are modest at best.

We see passive decision-making in many of the behavioral patterns described above. Passive decision-making partially explains the powerful influence of defaults, the anchoring effects of the match threshold, the remarkable success of automatic schedules of slowly increasing contribution rates, and the impact of mutual fund menus on asset allocation decisions.

We conclude the paper by encouraging employers to implement 401(k) plans that work well for decision-makers who often use passive strategies like those described above. Employers and policy-makers need to recognize that there is no such thing as a neutral menu of options for a 401(k) plan. Framing effects will influence employee choices, and passive employee decision-making implies that the default options will often carry the day. Sophisticated employers will choose these defaults carefully, keeping the interests of both employees and shareholders in mind.

II. Savings Adequacy

In January 2001, we administered a saving adequacy survey to a random sample of employees at a large U.S. food corporation (Company A) with approximately 10,000 employees. Of these employees, 1,202 were sent an e-mail soliciting their participation in a Web-based survey on satisfaction with various aspects of the company-sponsored 401(k) plan.[3] Because participation in the survey was solicited by e-mail and the survey itself was conducted on the Web, the universe of potential respondents is restricted to those with Internet access at work.[4]

Our survey had two different versions. In this section, we discuss the savings adequacy version that was sent to 590 of the employees with computers. From this sample we received 195 usable responses. A copy of the complete survey is reproduced in Appendix B, although we discuss only a subset of the questions in the analysis below. In addition to the survey responses, we also have administrative data on the 401(k) savings choices of survey respondents both before and after the survey. This includes participation decisions, contribution rates, and asset allocation choices from January 1996 through April 2001.

We first asked respondents to report how much they should *ideally* be saving for retirement.[5] The average response is 13.9 percent of income. We then asked respondents to evaluate their *actual* saving rate. Two-thirds (67.7 percent) of the respondents report that their current savings rate is "too low" relative to their ideal saving rate.[6] One-third (30.8 percent) of the respondents report that their current savings rate is "about right." Only 1 out of 195 respondents (0.5 percent) reports that his or her current savings rate is "too high."

To evaluate how well individual perceptions of saving adequacy correlate with actual savings behavior, we report in Table 2 the distribution of actual pre-tax 401(k) savings rates conditional on respondents' answers to the savings adequacy questions discussed above. Since we use the plan's administrative records, our analysis of actual 401(k) savings rates does not

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[3] The solicitation included an inducement to actually complete the survey: two respondents were randomly selected to receive gift checks of $250, and one respondent was selected to receive a gift check of $500.

[4] Naturally, restricting our sample to Internet users biases our sample toward employees with greater financial sophistication. Our survey reveals that an employee's level of Internet experience correlates with his self-reported financial knowledge. Likewise, home Internet access also correlates with financial knowledge.

[5] See question 10 from the survey (Appendix B).

[6] See question 11 from the survey (Appendix B). For our empirical analysis we aggregate the categories "far too low" and "a little too low" into one category ("too low"). Likewise, we aggregate the categories "far too high" and "a little too high" into one category ("too high").

suffer from reporting biases. We divide the actual pre-tax 401(k) savings rates into three categories: 0 to 4 percent of income, 5 to 8 percent of income, and 9 to 12 percent of income. Our scale tops out at 12 percent because this is the maximum pre-tax 401(k) contribution rate in Company A. Among the respondents who said that their current savings rate is "too low," 36 percent had an actual 401(k) savings rate of 0-4 percent, another 36 percent had a 401(k) savings rate of 5 to 8 percent, and 27 percent had a 401(k) savings rate of 9 to 12 percent. In contrast, among those who said that their current savings rate is "about right," 12 percent had a 401(k) savings rate of 0 to 4 percent, 15 percent had a savings rate of 5 to 8 percent, and 73 percent had a 401(k) savings rate of 9 to 12 percent. These comparisons reveal that respondents who report that their savings rate is too low do have lower actual savings rates than respondents who report that their savings rate is about right. In the former group the average pre-tax 401(k) contribution rate is 5.8 percent of income, in contrast to an average 401(k) savings rate of 9.0 percent in the latter group.

We also asked respondents to describe their plans for the future. None of our respondents expressed an intention to lower their contribution rate. But 35 percent of the respondents who said that their savings rate was too low intended to increase their contribution rate over the next few months. By contrast, 11 percent of respondents who said their savings rate was about right intended to increase their contribution rate over the next few months. Among those who planned to raise their contribution rate, over half (53 percent) said that they planned to do so in the next month. Another quarter (23 percent) planned to make the change within two months.

So far our data shows a familiar pattern. Respondents report that they save too little and that they intend to raise their savings rate in the future. Other savings adequacy surveys reach similar conclusions (Bernheim 1995; Farkas and Johnson 1997). Our survey is distinguished by our ability to cross-check responses against actual 401(k) records. We have shown that respondents who say that their savings rate is too low actually do have substantially lower pre-tax 401(k) contribution rates. So their retrospective reports are accurate.

We have also checked to see whether their forward-looking plans are consistent with their actual subsequent behavior. Of those respondents who report that their savings rate is too low and who plan to increase their contribution rate in the next few months, only 14 percent of this subgroup actually do increase their contribution rate in the four months after the survey. Hence, we find that respondents overwhelmingly do not follow through on their good intentions.

In summary, out of every 100 respondents, 68 report that their savings rate is too low; 24 of those 68 plan to increase their 401(k) contribution rate in the next few months; but only 3 of those 24 actually do so. Hence, even though most employees describe themselves as undersavers and many report that they plan to rectify this situation in the next few months, few follow through on this plan.

Needless to say, these data are hard to interpret. It's not clear what subjects mean when they say that they save too little. It's also not clear what subjects mean when they say that they intend to raise their contribution rate in the next few months. However, this evidence is at least consistent with the idea that employees have a hard time carrying out the actions that they themselves say they wish to take. Employers seem to be concerned about such failures. Many of the institutional changes discussed below in Section III were initiated by plan administrators in an effort to raise employee savings rates.

III. Seven Institutional Features of 401(k) Plans

In this section, we turn to an analysis of how several different 401(k) plan features affect employee 401(k) savings behavior.

III.1 Automatic Enrollment

The typical 401(k) plan requires an active election on the part of employees to initiate participation. A growing number of companies, however, have started automatically enrolling employees into the 401(k) plan unless the employee actively opts out of 401(k) participation. While automatic enrollment is still relatively uncommon, a recent survey indicates that its adoption has increased quite rapidly over the past few years.[7]

The interest of many companies in automatic enrollment has stemmed from their persistent failure to pass the IRS non-discrimination tests that apply to pension plans. As a result of failing these tests, many companies have either had to make ex post 401(k) contribution refunds to highly compensated employees or retroactive company contributions on behalf of non-highly compensated employees in order to come into compliance. In addition, many companies have tried to reduce the possibility of non-discrimination testing problems by ex ante

[7] In a recent survey, Hewitt Associates (2001) reports that 14 percent of companies utilized automatic enrollment in 2001, up from 7 percent in 1999.

limiting the contributions that highly compensated employees can make. The hope of many companies adopting automatic enrollment has been that participation among the non-highly compensated employees at the firm will increase sufficiently such that non-discrimination testing is no longer a concern.

While some companies have been concerned about the potential legal repercussions of automatically enrolling employees in the 401(k) plan, the U.S. Treasury Department has issued several opinions that support employer use of automatic enrollment. The first Treasury Department opinion on this subject, issued in 1998, sanctioned the use of automatic enrollment for newly hired employees.[8] A second ruling, issued in 2000, further validated the use of automatic enrollment for previously hired employees not yet participating in their employer's 401(k) plan.[9] In addition, during his tenure as Treasury Secretary, Lawrence H. Summers publicly advocated employer adoption of automatic enrollment.[10]

A growing body of evidence suggests that automatic enrollment—a simple change from a default of non-participation to a default of participation—substantially increases 401(k) participation rates.[11] To assess the impact of automatic enrollment on savings behavior, we examine the experience of four large companies that implemented automatic enrollment.[12] Company B implemented automatic enrollment in January of 1997 for new hires with a default contribution rate of 2% and a stable value fund as the default investment option. Company B subsequently abandoned automatic enrollment in January 2001. Company C implemented automatic enrollment in April 1998 for new hires with a default contribution rate of 3% and a money market fund as the default investment option. In May of 2001, the company made two changes to its automatic enrollment design. First, it changed the default investment option to a lifestyle fund. And second, it decided to automatically increase the contribution rate of employees from 3% to 6% once employees reached one year of tenure if the employees were still contributing at the original default contribution rate of 3%. This change took effect going

[8] See IRS Revenue Ruling 98-30 (Internal Revenue Service 1998).
[9] See IRS Revenue Ruling 2000-8 (Internal Revenue Service 2000a). See also Revenue Rulings 2000-33 and 2000-35 (both Internal Revenue Service 2000b).
[10] See "Remarks of Treasury Secretary Lawrence H. Summers at the Department of Labor Retirement Savings Education Campaign Fifth Anniversary Event" at http://www.ustreas.gov/press/releases/ps785.htm along with related supporting documents.
[11] See Madrian and Shea (2001a), Choi et al. (2004a), Fidelity (2001) and Vanguard (2001).
[12] The experience of the first three of these companies, B, C and D, is first examined in Choi et al. (2004a). We extend the analysis there to account for up to an additional two years of data following the adoption of automatic enrollment.

forward—it did not apply to employees who had obtained one year of tenure prior to May 2001. Company D adopted automatic enrollment in January 1998 for new employees with a default contribution rate of 3% and a stable value fund as the default investment option. Company D subsequently applied automatic enrollment to non-participating employees who were 401(k)-eligible at the time when automatic enrollment was initially adopted.[13] In addition, in January of 2001, Company D increased the default contribution rate from 3% to 4% for all new employees going forward. Company H adopted automatic enrollment in January 2001 for all new employees going forward with a default contribution rate of 6% and a balanced fund as the default investment option.

Figure 1 illustrates the difference in 401(k) participation rates by tenure before, during, and for Company B, after automatic enrollment.[14] In all four companies, 401(k) participation for employees hired before automatic enrollment starts out low and increases quite substantially with tenure. At six months of tenure, 401(k) participation rates range from 25 to 43 percent at these four companies. Participation rates increase to 50 to 63 percent at 24 months of tenure, and to 57 to 71 percent at 36 months of tenure. The profile of 401(k) participation for employees hired under automatic enrollment is quite different. For these employees, the 401(k) participation rate starts out high and remains high. At six months of tenure, 401(k) participation ranges from 86 to 96 percent at these four companies, an increase of 50 to 67 percentage points relative to 401(k) participation rates prior to automatic enrollment. Because 401(k) participation increases with tenure in the absence of automatic enrollment, the incremental effect of automatic enrollment on 401(k) participation declines over time. Nonetheless, at 36 months of tenure, 401(k) participation is still a sizeable 20 to 34 percentage points higher under automatic enrollment.

Interestingly, it does not appear that the participation rate obtained under automatic enrollment is very strongly influenced by the level of the default contribution rate. Company H has the highest participation rates under automatic enrollment, despite also having the highest

[13] Because of concurrent changes in eligibility for employees under the age of 40 at Company D, we restrict the sample of employees in the analysis at the company to those aged 40 or over at the time of hire. These employees were immediately eligible to participate in the 401(k) plan both before and after the switch to automatic enrollment.
[14] Because of differences in the data obtained from these companies, the participation rates across companies are not directly comparable. For Company C, we have data on 401(k) participation on the data collection dates, and thus the participation percentages in Figure 1 for Company C represent contemporaneous 401(k) participation rates. For Companies B, D, and H we have the date of initial 401(k) participation, and thus the participation percentages in Figure 1 for these firms represent the fraction of employees who have ever participated in the 401(k) plan.

initial default contribution rate (6%). The participation rate in Company C is virtually identical for employees subject only to a 3% default and those subject to an initial default contribution rate of 3% that increases to 6% at one year of tenure. Similarly, the participation rate in Company D is virtually identical for employees hired with a 3% default contribution rate or a 4% default contribution rate.

While most companies that implement automatic enrollment do so only for newly hired employees, some companies have applied automatic enrollment to previously hired employees who have not yet initiated participation in the 401(k) plan. Choi et al. (2004a) show that for previously hired employees at Company D, automatic enrollment also substantially increases the 401(k) participation rate, although the increase in participation is slightly smaller than that seen for newly hired employees. Madrian and Shea (2001a) and Choi et al. (2004a) also discuss how the effects of automatic enrollment vary across various demographic groups. While automatic enrollment increases 401(k) participation for virtually all demographic groups, its effects are largest for those individuals least likely to participate in the first place: younger employees, lower-paid employees, and Blacks and Hispanics.

One might conclude that since 401(k) participation under automatic enrollment is so much higher than when employees must choose to initiate plan participation, automatic enrollment "coerces" employees into participating in the 401(k) plan. However, if this were the case, we should expect to see participation rates under automatic enrollment declining with tenure as employees veto their "coerced" participation and opt out. But remarkably few 401(k) participants at these companies, whether hired before automatic enrollment or hired after, reverse their participation status and opt out of the plan. In our four companies, the fraction of 401(k) participants hired before automatic enrollment that drop out in a 12-month period ranges from 1.9 to 2.6 percent, while the fraction of participants subject to automatic enrollment who drop out is only 0.3 to 0.6 percentage points higher. To us, this evidence suggests that most employees do not object to saving for retirement. In the absence of automatic enrollment, however, many employees tend to delay taking action. Thus, automatic enrollment appears to be a very effective tool for helping employees begin to save for their retirement.

While automatic enrollment is effective in getting employees to participate in their company-sponsored 401(k) plan, it is less effective at motivating them to make well-planned decisions about how much to save for retirement or how to invest their retirement savings.

Because companies cannot ensure that employees will choose a contribution rate or an asset allocation before the automatic enrollment deadline, the company must establish a default contribution rate and a default asset allocation. Most employees follow the path of least resistance and passively accept these defaults.

Figure 2 shows the distribution of 401(k) contribution rates at our four companies for employees hired before, during, and for Company B, after automatic enrollment. As noted earlier, the default contribution rate under automatic enrollment varies both across firms at a given point in time, and across time within a given firm. Because contribution rates may change with tenure, it would be preferable to compare the contribution rates of employees with equivalent levels of tenure (as done in Figure 1). However, because of firm-level changes in the features of automatic enrollment and the timing of the data collection, it is not possible to get employee groups with equivalent levels of tenure for all of the comparison groups of interest. So the tenure composition of the groups in Figure 2 do differ somewhat. However, in the previous work we have made more limited comparisons for employee groups with equivalent levels of tenure (e.g. Choi et al. (2002) and Choi et al. (2004a)), and the general patterns of interest hold whether or not tenure is held constant. The impact of the automatic enrollment default on the distribution of contribution rates is readily apparent in Figure 2. At all four companies in Figure 2, the modal contribution rate of employees hired before automatic enrollment (and after automatic enrollment at Company G) is 6%, which is the match threshold at all four of these companies. For those employees hired during automatic enrollment at Company B (Figure 2A), the modal contribution shifts to 2%, the automatic enrollment default. For those employees hired under automatic enrollment at Company C (Figure 2B) at a 3% default, the predominant contribution rate is 3%, while for those affected by the automatic increase to 6% at one year of tenure, the predominant contribution rate is 6%. For those employees hired under automatic enrollment at Company D (Figure 2C) with a 3% default, the modal contribution rate is 3%, while for those hired after the increase in the default contribution rate to 4%, the modal contribution rate is 4%. Finally, at Company H (Figure 2D), where the automatic enrollment default equals the match threshold of 6%, the fraction of participants at the match threshold is 24 percentage points higher for those hired under automatic enrollment. The default contribution rate clearly has a strong impact on the overall distribution of employee contributions to the 401(k) plan.

Automatic enrollment has similar effects on the asset allocation of plan participants. Table 3 shows the fraction of plan participants with any assets allocated to the default investment fund, and the fraction of plan participations with all assets allocated to the default investment fund. In two of the four companies (B and D), the default fund under automatic enrollment is a stable value fund; in Company D, the default fund was initially a money market fund, but was later changed to a lifestyle fund; while in Company H, the default was is a balanced fund. As Table 3 shows, the fraction of 401(k) participants that have all of their assets allocated to the default investment fund is relatively low (less than 15%) for those employees hired before (or after) automatic enrollment. In contrast, the vast majority of participants hired under automatic enrollment have their assets entirely invested in the automatic enrollment default fund. Choi et al. (2004a) shows that this effect is driven both by the conversion of would-be non-participants to the defaults and by employees who would have participated in the absence of automatic enrollment but with different elections.

Given the evidence of delay in the election of 401(k) participation before automatic enrollment shown in Figure 1, one might speculate that there is the same type of delay in the movement away from the default contribution rate and asset allocation under automatic enrollment. Figure 3 suggests that this is indeed the case. At six months of tenure, between 48 and 73 percent of participants contribute at the default and have their assets invested wholly in the default fund. At 24 months of tenure, the fraction of participants at the default falls to 37 to 50 percent, and at 36 months of tenure to 29 to 48 percent. So, with time, employees do move away from the automatic enrollment defaults. Nonetheless, after three years, between one-third and one-half of participants are still "stuck" at the default.[15]

Taken as a whole, the evidence in this section indicates that defaults can have a powerful effect on the nature of individual saving for retirement. In terms of promoting overall savings for retirement, automatic enrollment as structured by most employers is a mixed bag. Clearly automatic enrollment is very effective at promoting one important aspect of savings behavior, 401(k) participation. This simple change in the default from non-participation to participation results in much higher 401(k) participation rates. But, like companies B, C, D (before May 2001) and H, most employers that have adopted automatic enrollment have chosen very low

[15] Choi et al. (2004a) show that compensation is the strongest determinant of how quickly employees move away from the automatic enrollment default—highly compensated employees tend to move away from the default more rapidly than those with lower pay.

default contribution rates and very conservative default funds (Profit Sharing/401(k) Council of America 2001; Vanguard 2001). These default choices are inconsistent with the retirement savings goals of most employees.

This evidence does not argue against automatic enrollment as a tool for promoting retirement saving; rather, it argues against the specific automatic enrollment defaults chosen by most employers. Employers who seek to facilitate the retirement savings of their employees need to respond to the tendency of employees to "stick with the default." Employers should choose defaults that foster successful retirement saving when the defaults are passively accepted in their entirety. Automatic enrollment coupled with higher default contribution rates and more aggressive default funds would greatly increase wealth accumulation for retirement.[16] The results in this section also suggest an important caveat in thinking about the design of personal accounts in a reformed Social Security system—whatever defaults are chosen will need to be chosen carefully.

III.2 Automatic Cash Distributions for Terminated Employees with Low Account Balances

Another aspect of 401(k) plan design that highlights the importance of defaults on 401(k) savings outcomes is the treatment of the 401(k) balances of former employees. When an employee leaves a firm, the employee may explicitly request a cash distribution, a direct rollover of 401(k) balances to an IRA, or a rollover to another employer's 401(k) plan. If the terminated employee does not make an explicit request, the balances typically remain in the 401(k) plan. Under current law, however, if the plan balances are less than $5,000 and the former employee has not elected some sort of rollover, the employer has the option of compelling a cash distribution.

To document the importance of this mandatory cash distribution threshold, Figure 4 plots the relationship between the size of 401(k) balances and the likelihood that a terminated employee receives a distribution from the 401(k) plan at Companies B, D, I and J. We consider the experience of 401(k) participants whose employment terminated any time during 1999 or January through August of 2000.[17] We order the employees according to the size of their 401(k)

[16] See section III.3 for another alternative to a higher initial default contribution rate.
[17] This includes both voluntary and involuntary terminations.

balances and then divide them into groups of 100. We then calculate the average balance size for each group (the x-axis, plotted on a log scale) and the average fraction of employees who receive a distribution from the plan by December 31, 2000 (the y-axis). The measure of 401(k) balances used on the x-axis is the average participant balance as of December 31 of the year prior to the year in which the termination occurred.[18] This measure of balances is likely to understate the actual balances of plan participants at the time of termination because the incremental contributions made to an individual's account between December 31 of the previous year and the date of termination are excluded (as are any capital gains or losses over this time period).

In three of the four companies, B, D and I, 80 to 90 percent of terminated participants with prior year-end balances of less than $1,000 receive a distribution subsequent to termination. In company J, the fraction of terminated participants with a prior year-end balance of less than $1000 who receive a distribution is somewhat lower at about 65 to 75 percent (interestingly, company J is a financial services firm). In contrast, the fraction of terminated participants with balances in excess of $5000 prior to termination who receive a cash distribution is much lower. In companies D and I it is rather constant, with about one-third receiving a cash distribution (the exception is former participants in Company I with extremely high balances who are even less likely to receive a cash distribution). In companies B and J, the fraction of terminated employees with prior year-end balances exceeding $5000 who receive a cash distribution is lower still, less than 20 percent, with some additional slight decline as balances increase beyond the $5000 threshold. Between $1,000 and $5,000 in prior year-end balances, the fraction of terminated participants receiving a distribution falls rather steadily and quite significantly at all four firms. This reflects the decreasing likelihood that terminated participants will have a final balance of less than $5,000 that is subject to an involuntary cash distribution.

For example, consider an employee at Company D making $40,000 per year who is contributing 6 percent of pay to the 401(k) plan with a 50 percent employer match that is vested. If this individual leaves his job at the end of August, the additional employer plus employee contributions to the 401(k) plan will amount to $2,400. Assuming no net capital gains or losses, this individual will face a mandatory cash distribution if his prior year-end balances were less than $2,600 (because $2,400 plus anything less than $2,600 will fall under the $5000 distribution

[18] That is, employees terminated in 2000 have a balance measure from December 31, 1999, while employees terminated in 1999 have a balance measure from December 31, 1998. We use this measure of balances because it is the only measure that we have in our data.

threshold). If his prior year-end balances were higher than $2,600, however, the company would not be able to compel a cash distribution because his total balances subsequent to termination would exceed $5,000. Thus, employees with higher prior-year-end balances will be less likely to face an automatic distribution upon termination because they are more likely to have had balance increases that bring them above the $5,000 threshold.

Of course, even in the case of an automatic cash distribution, the former employee does have the option to roll the account balance over into an IRA or the 401(k) plan of another employer, regardless of the size of the account balance. But previous research suggests that the probability of receiving a cash distribution and rolling it over into an IRA or another 401(k) plan is very low when the size of the distribution is small. Instead, these small distributions tend to be consumed.[19] When employers compel a cash distribution and employees receive an unexpected check in the mail, it is much easier to consume the distribution than to figure out how to roll it over into an IRA or another employer's 401(k) plan.

This default treatment of the account balances of terminated employees provides another example of how many individuals follow the path of least resistance. When balances exceed $5,000, the vast majority of employees leave their balances with their former employer, the least effort option. When balances are below $5,000 and are subject to a mandatory cash distribution unless the employee elects otherwise, most individuals receive an unsolicited check in the mail and then consume the money rather than rolling it over into another type of saving plan—also the least effort option.

This analysis suggests that the rollover provisions of the recently passed Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) will indeed have a positive impact on retirement savings. Under the new law, if the account balance is between $1,000 and $5,000, employers will no longer be able to compel a cash distribution if a former employee does not elect a rollover; rather, employers will be required to establish an IRA on behalf of participants if they choose not to maintain these accounts (Watson Wyatt 2001). Although this provision of the law does not take effect until the Department of Labor issues final regulations

[19] Poterba, Venti and Wise (1998a) report that the probability that a cash distribution is rolled over into an IRA or another employer's plan is only 5 to 16 percent for distributions of less than $5000. The overall probability that a cash distribution is rolled over into an IRA or another employer's plan or invested in some other savings vehicle is slightly higher at 14 to 33 percent.

regarding implementation, firms need not wait until then to voluntarily adopt similar measures.[20] As with automatic enrollment in 401(k) plans, default rollovers have also been sanctioned by the IRS.[21] Such a change in the default treatment of the small balances of terminated employees is a simple step that would further enhance the retirement savings plans of many individuals.[22]

III.3 Automatic Contribution Rate Increases

One 401(k) plan feature designed to capitalize on the inertia described in sections III.1 and III.2 is the "Save More Tomorrow" ("SMarT") plan developed by Shlomo Benartzi and Richard Thaler (Benartzi and Thaler 2004). Under this plan, participants commit in advance to saving a portion of future raises. For example, suppose that a worker commits to allocate one-half of future nominal pay raises to increases in his 401(k) contribution rate. If the worker receives three percent raises in each of the following three years, then his contribution rate would rise by 1.5 percentage points per year over this time period. This plan is carefully constructed to make use of several themes in behavioral economics. By requiring a present commitment for future actions, the SMarT plan alleviates problems of self-control and procrastination. And by taking the additional savings out of future salary raises, participants in the SMarT plan are not hurt by loss aversion because workers will never see a reduction in their nominal take-home pay. (This presumes that participants are subject to money illusion because the commitment to save is out of nominal salary increases).

The striking results of the first experiment with the SMarT plan are reported in Benartzi and Thaler (2004). This first experiment was conducted at a mid-size manufacturing company. This company was experiencing problems in getting low-salary workers to participate and contribute at high levels to the 401(k) plan. To combat these problems, the company hired an investment consultant to meet with employees and help them plan their retirement savings. After an initial interview with each employee, the consultant would gauge the employee's willingness to increase his savings rate. Employees judged to have a high willingness to save more would

[20] The Department of Labor issued preliminary regulations for public comment in early 2004. Final regulations have not yet been released.
[21] See IRS Revenue Rulings 2000-36 (Internal Revenue Service 2000b).
[22] We should note, however, that previous research also suggests that although small distributions tend to be consumed rather than rolled over into other retirement savings vehicles, these small distributions represent a relatively small fraction of total retirement savings (Poterba, Venti and Wise 1998a; Engelhardt 2002). Thus, while automatically rolling such distributions over into an IRA will undoubtedly increase retirement saving, its impact on aggregate retirement saving is likely to be modest.

receive an immediate recommendation for a large increase in their savings rate. 79 workers fell into this group. Employees judged to be reluctant to save more would be offered the option of enrolling in the SMarT plan. 207 workers fell into this group. The version of the SMarT plan that was implemented set up a schedule of annual contribution rate increases of three percentage points. This is a relatively aggressive implementation, as the annual nominal salary increases at this company were only a little bit higher than three percent.

The results of the experiment show that the SMarT plan can have an enormous impact on contribution rates. Of the 207 participants offered the SMarT plan as an option, 162 chose to enroll. Furthermore, 129 of these 162 (80 percent) stayed with the plan through three consecutive pay raises. At the beginning of the SMarT plan, these 162 workers had an average contribution rate of 3.5 percent; by the time of their third pay raise, these workers (including those that eventually dropped out) had an average contribution rate of 11.6 percent. Recall that these original 207 participants were selected from a larger sample based on their relative *reluctance* to increase their savings rates. In comparison, 79 workers had indicated a willingness to increase their contributions immediately and were never enrolled in the SMarT plan; these workers increased their average contribution rate from 4.4 percent to 8.7 percent over the same time period. Since it is reasonable to assume that this latter group of workers represents a more highly motivated group of savers than the SMarT plan participants, the increases by the SMarT plan participants are very striking. As a further comparison, consider that the median 401(k) contribution rate of participants in 401(k) plans in general is approximately 7 percent of pay (Investment Company Institute 2000). Thus, the SMarT plan participants went from half of this median contribution rate before signing up for the SmarT plan to a contribution rate 50 percent higher three years later.

Despite the clear success of the SMarT plan in increasing contribution rates, there remain several important caveats. First, the plan is not guided by any well-specified model of what ideal savings should be. Even if we accept that cleverly designed commitment devices can enable workers to break from suboptimal behavior patterns, these same devices may overshoot the optimal targets. Second, the increases in 401(k) contribution rates may be offset by dissaving

elsewhere.[23] Although 401(k) saving has many advantages, it may still be inefficient if it leads participants to increase high-interest credit-card debt. Also, we do not know how much of the additional contributions were later reduced by plan loans or hardship withdrawals. In a plan that does not have an employer match—unlike the one used in the original SMarT experiment—it is not clear that increasing 401(k) contributions is always a good idea. Notwithstanding these caveats, the SMarT plan is certainly a provocative attempt to use behavioral economics to increase savings rates, and the early results are highly encouraging and deserve further study.

Our 401(k) survey (discussed in Section II) sheds light on the mechanisms that make the SMarT plan work. We generated two versions of our survey. One version (already discussed above) asked questions about both savings adequacy and intentions regarding planned future investment changes (e.g. plans to change the contribution rate and the asset mix). We call this the savings adequacy version. We also generated a pared down version of the survey that contained no questions about either savings adequacy or intentions. We call this the control version. We randomly assigned the two different versions of the survey to employees and we checked to see whether the savings adequacy questionnaire had an impact on subsequent 401(k) investment choices. In other words, we looked to see whether the process of thinking about savings adequacy and formulating one's future savings plans actually led to a greater propensity to subsequently increase (or decrease) one's saving rate.

It turns out that this attention manipulation had no impact. In other words, getting someone to think about his or her own savings adequacy did not lead to any differential future behavior. This result sheds some light on the success of the SMarT plan. The SMarT plan has many different effects. It encourages employees to think about their savings adequacy. It also sets in motion a series of automatic contribution rate increases. Our survey experiment demonstrates that getting employees to think about savings inadequacy is not enough. Employees also need a low-effort mechanism to help them to carry out their plans to increase their contribution rate. The SMarT plan provides exactly such a tool.

[23] See Engen, Gale, and Scholz (1994, 1996) for a discussion of asset shifting and its consequences for measuring 401(k) effectiveness. See Poterba, Venti, and Wise (1996, 1998b) for evidence that asset shifting effects are not large.

III.4 Matching

Although automatic enrollment and the SmarT plan provide food for thought, they are still relatively new 401(k) plan features that have yet to be adopted on a widespread scale. A more common feature of 401(k) plans is the employer match. For each dollar contributed by the employee to the plan, the employer contributes a "matching" amount up to a certain threshold (e.g. 50 percent of the employee contribution up to 6 percent of compensation). Although the effects of employer matching on 401(k) participation and contribution rates have been widely studied, the conclusions from this research are decidedly mixed. This derives in part from the inherent difficulties associated with identifying the impact of matching on 401(k) savings behavior.

In theory, introducing an employer match should increase participation in the 401(k) plan. In practice, however, it is difficult to disentangle this effect from the potential correlation between the savings preferences of employees and the employer match. For example, companies that offer a generous 401(k) match may attract employees who like to save, biasing upward the estimated impact of an employer match on 401(k) participation.

Using cross-sectional data, Andrews (1992), Bassett, Fleming and Rodrigues (1998), Papke and Poterba (1995), Papke (1995), and Even and Macpherson (1997) all find a positive correlation between the availability of an employer match and 401(k) participation. The results are more varied, however, in studies that attempt to control for the correlation between the employer match and other unobserved factors that affect 401(k) savings behavior. Even and Macpherson (1997) use an instrumental variables approach to account for the endogeneity of the employer match and still find a large positive impact of matching on 401(k) participation. However, it is not clear that the firm characteristics they use as instrumental variables are in fact uncorrelated with unobservable employee savings preferences. Because she uses longitudinal data on firms, Papke (1995) is able to include employer fixed effects to account for the correlation between the employer match and other factors that affect savings behavior. With the addition of these fixed effects, the relationship between the employer match and 401(k) participation goes away, but these results are difficult to interpret because Papke only observes average match rates, not marginal rates. Kusko, Poterba, and Wilcox (1998) examine several years of individual-level data in a company whose match rate varied from year to year based on the company's prior-year profitability. They also find no relationship between the match rate

and 401(k) participation. However, the transient nature of the match rate changes at this company make it difficult to extrapolate these results to the permanent types of match changes that most companies are likely to consider.

The empirical evidence on matching and 401(k) contribution rates is even less decisive than that on 401(k) participation, although in theory the effects here are less straightforward as well. While introducing an employer match where there wasn't one before should lower the contribution rates of employees who were already contributing in excess of the match threshold (an income effect), its impact on those previously contributing at or below the match threshold is ambiguous (opposing income and substitution effects). The effects would be similar for increasing the match rate while maintaining the same match threshold. Increasing an existing non-zero match threshold while keeping the match rate constant should have no effect on people contributing below the old threshold; increase contributions for people at the old threshold (a substitution effect); have an ambiguous effect for people above the old threshold but at or below the new threshold (opposing income and substitution effects); and decrease contribution rates for people above the new threshold (an income effect).

The actual empirical research on matching and 401(k) contribution rates has focused largely on the relationship between the match rate and average 401(k) contribution rates. Andrews (1992) finds that a higher employer match rate reduces the average 401(k) contribution rate; Bassett, Fleming and Rodrigues (1998) find no effect; Papke and Poterba (1995) and Even and Macpherson (1997) find a positive relationship; and Kusko, Poterba, and Wilcox (1998) find a small but positive effect of the match rate on average 401(k) contribution rates. Papke (1995) finds a positive effect of the match rate on total employee contributions at low match rates, but a negative effect on employee contributions at higher match rates. These disparate results are perhaps not so surprising given that theory has little to say about the impact of the match rate per se on the average 401(k) contribution rate. Engelhardt and Kumar (2004) is the only empirical paper in this literature to explicitly recognize the non-linear saving incentives generated by the employer match. Using a non-linear budget set methodology, they find that a higher employer match increases both participation in and contribution rates to the 401(k) plan.

In this paper, we are able to avoid some of the confounds of previous matching studies by examining the individual behavior of participants before and after permanent changes in the 401(k) match structure at two companies. In these natural experiments, participant behavior

before the changes serves as a control for participant behavior after the changes. We also examine the effect of matching on the distribution of 401(k) contribution rates rather than on the average 401(k) contribution rate and show the importance of considering the match threshold, a facet of employer matching largely ignored in previous research, as well as the match rate.

The first company that we consider, Company E, increased its match threshold on January 1, 1997, while keeping its match rate constant. Before that time, union workers received a 50 percent match on the first 5 percent of income contributed to the 401(k) plan, while management employees received a 50 percent match on the first 6 percent of income. On January 1, 1997, the match threshold for union employees increased to 7 percent, while that for management employees increased to 8 percent. Contributions up to the new threshold were still matched at 50 percent, although the match on the incremental 2 percent of the new threshold was invested in employer stock while the match up to the old threshold had been, and continued to be, invested at the discretion of the employee.

To examine the impact of this change in the match structure on 401(k) savings behavior, we utilize a combination of both longitudinal and cross-sectional data. We have longitudinal data on the 401(k) contribution rate in effect on each day from March 31, 1996 to February 28, 2000 for every worker who was enrolled in the 401(k) plan during that time. We also have cross-sections of all active employees at Company E at year-end 1998, 1999, and 2000 that contain information on participation status, original enrollment date, original hire date, and demographics.

In order to assess the effect of the threshold change on participation, we estimate a Cox proportional hazard model of time from hire until the date of initial participation in the 401(k) plan. We control for gender and age (with both linear and quadratic terms), and also include a dummy variable that equals 1 after the new threshold took effect (January 1, 1997). We exclude all employees hired before January 1, 1996 because the company eliminated its length-of-service requirement for 401(k) participation on that date. We also exclude employees hired after December 31, 1997 because the company switched from a traditional defined benefit to a cash-balance pension plan at that time for newly hired employees. The first column of Table 4 presents the estimated hazard ratios associated with each independent variable. As one might expect for a change that does not affect the marginal incentives to participate in the 401(k) plan, we find that this increase in the match threshold has no significant effect on 401(k) participation.

We next look at the impact of the threshold change on 401(k) contribution rates. Figure 5 plots the distribution of contribution rates over time for all workers who were contributing to the 401(k) plan on March 31, 1996. As workers leave the firm, they are dropped from the sample. The switch from the old threshold to the new threshold is clearly apparent. There is an immediate jump from the old threshold to the new threshold when the change occurred in January 1997, and a continued slower adjustment over the next three years as more and more people shift from the old to the new threshold. This suggests that there is a strong substitution effect for contributors at the old threshold. In contrast, the fraction of participants at the other contribution rates is fairly stable over this entire time period, implying only a very small income effect for contributors above the old threshold.

The shift in contribution rates from the old to the new match threshold may also reflect an "anchoring effect" of the match threshold. Specifically, the match threshold serves as a salient starting point in the decision of which contribution rate to select. Numerous studies have shown that final decisions tend to be anchored by such starting points (Kahneman and Tversky 1974).

The second company that we consider is Company F, which introduced a 25 percent match on contributions up to 4 percent of income on October 1, 2000. We suspect that this was adopted as a response to the fact that at year-end 1999, only 34 percent of its active employees had ever participated in its 401(k) plan.[24] Communication about the change started at the beginning of July 2000. Prior to this date, there was no employer match offered in the plan.[25]

Our data include cross-sections of all active employees at Company F at year-end 1998, 1999, 2000, and 2001. These data contain information on participation status, original enrollment date, effective year-end contribution rate, original hire date, and demographics. We exclude all employees hired before July 1, 1998 because on that date the company eliminated a one-year length-of-service requirement for 401(k) eligibility.

To assess the impact of the employer match on 401(k) participation, we again estimate a Cox proportional hazard model of time from hire until the date of initial participation in the 401(k) plan. As with company E, we control for gender and age, and we include a dummy variable that equals 1 after the match was announced to employees (July 2000). Results are

[24] We should note that Company F has a primary defined benefit pension plan for its employees.
[25] The company did have three acquired divisions that had employer matches previously and were not affected by this change. These divisions, as well as three divisions that were acquired after 1998, are excluded from our analysis.

presented in column 2 of Table 4. We find that introducing the match has a positive and highly significant effect on participation, with a z-statistic of 5.12. In order to assess the economic significance of the results, we plot in Figure 6 the predicted participation rate by tenure for a hypothetical population of 40-year-old males. At sixteen months of tenure, the model predicts a 17.8 percent participation rate when there is an employer match, which is 3.6 percentage points higher than would be the case without an employer match. Results at longer tenure levels are more speculative because we don't actually observe employees with more than sixteen months of tenure who have had the match in place since hire. Keeping this caveat in mind, we see that the model predicts 20.6 percent participation at two years of tenure (a 4.0 percentage point increase), and 24.5 percent participation at three years of tenure (a 4.7 percentage point increase).

Although these numbers may seem small, note that this company had unusually low participation rates to start with. When compared against the baseline, the employer match appears to have increased 401(k) participation by about 25 percent. Furthermore, relative to the match structure in other 401(k) plans, this employer match is not particularly generous.[26] A higher match rate might be expected to have a larger effect on participation.[27]

The introduction of a match seems to have had a meaningful effect on the distribution of contribution rates as well. Figure 7 is a histogram of contribution rates by hire cohort at the end of the calendar year after the year in which the cohort was hired.[28] Before the employer match, the most frequently chosen contribution rates of plan participants are 5 percent, 10 percent, and 15 percent. After the employer match, we see a large increase in the fraction of employees with a 4 percent contribution rate, the new match threshold, relative to previous cohorts with the same level of tenure at the company. This is consistent with our previous observation that the match threshold may serve as a powerful focal point in employees' choice of a contribution rate.

In sum, our limited evidence suggests that employer matching does have a significant impact on both 401(k) participation and contribution rates. Company F demonstrates that implementing an employer match can increase 401(k) participation. Company E demonstrates

[26] The modal employer match is 50% of employee contributions up to 6% of compensation (Bureau of Labor Statistics, 1998).
[27] However, Bassett, Fleming, and Rodrigues (1998) conclude that the mere presence of a match increases participation, with no marginal effect from increasing the match rate. We cannot test this hypothesis with our data.
[28] While the distribution of employees at the various contribution rates is based on the full sample of employees, not just plan participants, we have excluded the non-contributors from the graph because they constitute over 85 percent of the sample, and including them makes variation in contribution rates across the contributing population difficult to see.

that increasing the match threshold can increase 401(k) contribution rates. Both Company E and Company F show that the level of the match threshold has an important effect on the distribution of 401(k) contribution rates, with many participants clustering at the match threshold.

III.5 Eligibility

Another common 401(k) plan feature is a waiting period before employees become eligible to participate in the 401(k) plan. Employers adopt eligibility requirements for a variety of reasons, including the fixed costs of administering accounts for newly hired workers with high turnover rates, and because low participation rates of newly hired employees may adversely affect an employer's non-discrimination testing. This latter explanation, however, is less relevant as recent legislative changes have made it easier for companies to institute shorter length-of-service requirements for 401(k) participation without substantially increasing the company's risk of failing non-discrimination tests.

Earlier eligibility is valuable for employees since a shorter waiting period increases their tax-deferred savings opportunities. The extent of this benefit, however, depends on how waiting periods affect the participation profile, the relationship between 401(k) participation and tenure. For example, waiting periods may merely truncate the participation profile, so that upon eligibility, employee participation quickly catches up to the participation rate that would arise without a waiting period. Alternatively, waiting periods may shift the participation profile, so that employees who face a waiting period have permanently lower 401(k) participation rates than those who do not.

In this subsection, we examine the effect of eligibility requirements on 401(k) participation in three companies that eliminated their eligibility requirements. Both Company F and Company G went from a one-year eligibility period to immediate eligibility—Company F on July 1, 1998, and Company G on January 1, 1997.[29] Company K went from a six-month eligibility period to immediate eligibility in January 1996.

To illustrate the impact of waiting periods on 401(k) participation, we plot in Figure 8 the 401(k) participation profiles of employees who faced either a six-month, one-year or no

[29] Company G also subsequently changed the window in which participants could enroll in the plan. Prior to September 1, 1997, participants could enroll only once a year. Beginning on November 22, 1997, however, new enrollments were allowed on a daily basis. To the extent that these deadline changes affect the time path of participation, the results for Company G results could be biased.

eligibility requirement. For Company F (Figure 8A), the two groups are employees hired between July 1, 1996 and July 1, 1997 with a full one-year waiting period, and employees hired between July 1, 1998 and December 31, 2000, who faced no waiting period. For Company G (Figure 8B), the two groups are employees hired between January 1, 1995 and January 1, 1996 with a full one-year waiting period, and employees hired between January 1, 1997 and December 31, 1999 with no waiting period. For Company K (Figure 8C), the two groups are employees hired between January 1 and June 30 1996 with a six-month waiting period, and employees hired between January 1, 1996 and December 31, 1996 with no waiting period.

At all three companies, the employees with a waiting period do not immediately attain the 401(k) participation levels achieved at equivalent tenure levels by employees with shorter waiting periods, but this gap closes fairly quickly over time. If we assume that the participation series are drawn independently, the differences between the two groups are no longer statistically significant at 18 months of tenure in Company F, at 22 months of tenure in Company G, and at 9 months of tenure in Company K.

Another way to look at these participation profiles is to consider participation rates by the time since 401(k) eligibility. Doing so, we see that conditional on time since becoming eligible, employees with a one-year eligibility requirement actually have a higher 401(k) participation rate than employees who were immediately eligible. The difference in participation rates is between 2.5 and 4.6 percentage points for Company F and always significant at the 1 percent level for the first twelve months after eligibility. At Company G the difference is approximately 7 percentage points and is almost always significant at the 1 percent level for the first 24 months after eligibility. These findings are inconsistent with the notion that eligibility requirements simply shift the 401(k) participation profile without affecting its shape.

Overall, the evidence from these three companies suggests that the 401(k) participation rates of employees who face eligibility requirements catch up fairly quickly (within a matter of months) to levels that would occur without waiting periods. While this is certainly better for retirement wealth accumulation than would be the case if eligibility requirements resulted in permanently lower 401(k) participation rates, we do not take this as evidence to suggest that waiting periods are "not that bad." Nobody seems to lose when shorter waiting periods are adopted, so we see no reason why companies should not be encouraged to allow immediate eligibility for participation in 401(k) savings plans.

III.6 Asset Allocation Choices

The bulk of this paper is focused on the 401(k) participation and contribution decisions of employees. If we are concerned about savings adequacy at retirement, the questions of "whether to participate in a savings program" and "how much to save conditional on participation" are of primary importance. After these two questions have been answered, the next most important question is "how to allocate savings among different asset classes." A small but growing literature has addressed these questions in recent years; not surprisingly, many of the same behavioral issues present in the participation and contribution decisions also play a role in participants' asset-allocation choices. As discussed earlier, Madrian and Shea (2001a) and Choi et al. (2004a) show that automatic enrollment results in many participants remaining at the employer-specified default for both the contribution rate and asset allocation.

Such passive decision-making in asset allocation choices is also present in many other guises. In a series of papers, Shlomo Benartzi and Richard Thaler demonstrate several related behavioral regularities in asset-allocation decisions. Benartzi and Thaler (2001) study the relationship between the menu of investment choices and the eventual pattern of asset holdings across different classes. They suggest that participants use naive diversification strategies that are heavily influenced by the menu offered by their plan; a plan sponsor that offers ten equity options and five non-equity options may be subtly influencing its employees to put two-thirds of their money into equities. Using a database of 170 retirement savings plans, Benartzi and Thaler (2001) find that approximately 62 percent of the funds offered in these plans are equity investments; the fraction of total assets held in equities by the participants in these 170 plans is remarkably close to 62 percent as well. Furthermore, they find a positive relationship at the plan level between the fraction of equity funds offered by the plan and the fraction of individual portfolios invested in equities. These findings are further reinforced by experimental data and by evidence on individual decisions made by TWA pilots in their corporate plan.

In another study, Benartzi and Thaler (2002) gave participants a choice between the distribution of retirement outcomes implied by the actual asset allocation in their 401(k) plan and the distribution implied by the average allocation among all participants in the same plan. Most participants preferred the average distribution to the one based on their own allocation. Since most participants have portfolios that are, almost by definition, more extreme than the average

allocation, Benartzi and Thaler characterize this result as an example of an aversion to "extremeness." Such results call into question whether most participants are choosing an allocation that could be called optimal in an economic framework.

Perhaps the most disturbing aspect of 401(k) participants' asset allocation choices is the large fraction of balances invested in employer stock. About half of all 401(k) plans (by assets) offer participants the opportunity to invest in company stock. Some plans even require that all matching contributions be held in company stock, at least for some period of time. Because this asset class is both very volatile (since it consists of only a single stock) and highly correlated with the labor earnings of employees, holding company stock is certainly a poor diversification strategy for participants. Nevertheless, a significant fraction of plan assets are held in company stock. For firms that offer company stock in their plans, Holden, VanDerHei, and Quick (2000) find that about 33 percent of plan assets are held in this asset class. Among all firms, including those that do not offer company stock, this fraction is 18 percent.

While this level of holdings itself seems high, the manner in which participants decide to invest in company stock is also troubling. Benartzi (2001) finds that *current contributions* to company stock are heavily influenced by the returns earned by that stock over the preceding ten years. These findings are corroborated in Choi et al. (2004b). It seems that naive diversification is combined with naive extrapolation of past returns and an apparent lack of concern for the risk consequences of company stock investment. Indeed, a first-order improvement in diversification could be gained by the simple elimination of company stock from 401(k) plans.

Interestingly, ERISA restricts the investments of defined benefit pension plans in the stock or real estate of the employer to 10% of total assets. 401(k) plans, however, are exempt from this rule. The recent collapse of Enron has publicly highlighted the diversification danger of company stock in 401(k) plans. With several bills now pending before Congress to address the diversification problems created by 401(k) investments in company stock, the current policy question has changed from one of whether restrictions on 401(k) investments in company stock are warranted to what type of restrictions are warranted (and are politically feasible). While Enron is at the center of the public controversy, class-action lawsuits have been filed by 401(k) participants at several companies in the wake of dramatic declines in the value of company stock. Even absent legislative reforms, these lawsuits are prompting many other companies to reconsider the emphasis on company stock in their 401(k) plans. While some companies are

reevaluating whether they should match in company stock, others are addressing whether to eliminate company stock as an investment option altogether.

III.7 Financial Education at the Workplace

Recognizing that many employees are ill-equipped to make well-informed retirement savings decisions, particularly with respect to asset allocation, many employers have turned to various forms of financial education provision to help their employees meet the challenges of planning for an economically secure retirement. These efforts, which vary widely across employers, run the gamut and include paycheck stuffers, newsletters, summary plan descriptions, seminars, individual consultations with financial planners, and more recently, access to Internet-based education and planning tools.

The previous literature on the effects of financial education on savings behavior has found rather consistent evidence that financial education positively impacts savings behavior, although the inadequacy of the data in many of these studies makes their conclusions somewhat speculative. There are two broad strands in the literature. The first is case studies of the impact of financial education at specific companies or organizations. These studies typically evaluate the effect of a particular financial education initiative, often financial education seminars, on either savings behavior or measures of financial well being (Kratzer et al. 1998; HR Focus 2000; DeVaney et al. 1995; McCarthy and McWhirter 2000; Jacobius 2000). While all of these studies conclude that financial education motivates improvements in savings behavior, these conclusions are often based on dramatic changes in what participants plan to do with respect to retirement saving without actually verifying that the prophesied changes eventually do take place. Unfortunately, a growing body of both theoretical and empirical evidence, including the survey results reported in Section II of this paper, suggests that despite the best intentions of employees, retirement saving is one area in which individuals excel at delay (Madrian and Shea 2001a; O'Donoghue and Rabin 1999; Diamond and Koszegi 2003; Laibson, Repetto and Tobacman 1998). Thus, measures of intended behavior are likely to dramatically overstate the actual effects of financial education.

The second broad category of analyses in the previous literature on financial education has utilized cross-sectional surveys of individuals from across the population, not just from a single company or organization (Bernheim and Garrett 2003; Bernheim, Garrett and Maki 2001;

Milne, Vanderei and Yakaboski 1995), or data from surveys of multiple employers (Bayer, Bernheim and Scholz 1996; Milne, Vanderei and Yakaboski 1996; Murray 1999). This category of studies has the advantages of applying to a general population and utilizing actual savings choices instead of savings intentions.

However, the cross-sectional datasets also pose numerous problems. The greatest drawback to these datasets is that financial education provision and/or utilization may be correlated with other factors that have a strong influence on savings behavior across individuals or organizations (e.g. the structure of the 401(k) plan, the availability of other types of savings and/or pension programs, the level and structure of employee compensation, the corporate culture). To the extent that these confounding factors are not completely observed and controlled for, the measured effects of financial education could be quite biased. The definition of what constitutes "financial education" is also subject to interpretation and is likely to vary from one respondent to another.

The household surveys have the additional disadvantage that survey answers to questions about financial education are likely to be subject to recall bias. This could result, for example, if individuals who participate in and benefit the most from employer-sponsored savings programs find financial education more salient and are thus more likely to remember that such programs were offered. This type of non-random measurement error in the "availability" of financial education will lead to estimates of the effects of financial education that are too large. The employer-based surveys have the additional disadvantage that response rates tend to be quite low, and it is unlikely that the non-response is random. Moreover, it is almost impossible to determine how the selection of the firms into the sample is likely to impact the results.

A recent study by Madrian and Shea (2001b) examines the impact of financial education seminars on savings behavior in Company C, one of the companies discussed in section III.1. Company C enlisted a financial education provider to give one-hour seminars at its various locations throughout the country during 2000. The curriculum at these seminars was general in nature, and covered topics directly related to retirement savings such as setting savings goals to meet retirement income targets and the fundamentals of investing (asset classes, risk, diversification, etc.), in addition to more general financial issues such as managing credit and debt and using insurance to minimize exposure to financial risks.

The financial education data from this company are unique in that seminar attendance was tracked in a way that made it possible to match seminar attendance to administrative data on both previous and subsequent savings behavior. We have data the individuals who attended financial education seminars between January 1 and June 30, 2000, and on the 401(k) savings choices of all employees at this company on December 31, 1999, before any of the seminars were offered, and on June 30, 2000, by which time the seminars had been offered at 42 different locations. One-third of the employees at the company work at these 42 locations, and about 17 percent of employees at these locations attended the financial education seminars.

Table 5 presents some very basic statistics on the planned changes in savings behavior that attendees of the financial education seminars reported, along with the actual changes in savings behavior that were made subsequent to the seminars. The statistics in Table 5 paint a somewhat more muted picture of the impact of financial education on savings behavior than has been estimated in the previous literature. In an evaluation of the financial education seminars given to attendees at the conclusion of the seminar, attendees were asked, "After attending today's presentation, what, if any, action do you plan on taking toward your personal financial affairs?," followed by a list of choices (with multiple responses allowed). 71 percent of those attending the seminars filled out and turned in these evaluation forms.[30]

Of those who filled out the evaluation, 12 percent reported that they intended to start contributing to the 401(k) savings plan. But 88 percent of seminar attendees were already participating in the 401(k) plan, so virtually all of the non-participating seminar attendees planned to enroll in the 401(k) plan. By June 30, 2000, however, only 14 percent of the non-participating seminar attendees had actually joined the plan, and some of these individuals would likely have enrolled in the 401(k) plan without the availability of a financial education seminar (as did 7 percent of the employees who did not attend the seminars).

Of those seminar attendees who were already participating in the plan, 28 percent reported plans to increase their 401(k) contribution rate, 41 percent reported plans to make changes in the selection of their investment choices within the 401(k) plan, and 36 percent reported plans to change the fraction of their money allocated to the various 401(k) investment

[30] The evaluation responses that we have are from all locations offering financial education seminars during 2000, not just those offering the seminars during the January-June 2000 period for which we have savings data. Unfortunately, we do not have the evaluation responses on an individual basis, only the aggregated responses for all attendees. Thus, we cannot ascertain on an individual basis how many seminar attendees actually followed through on the planned behaviors listed on the evaluation form.

choices. By June 30, 2000, however, only 8 percent of 401(k) participants attending the seminars had increased their contribution rate, while 15 percent had made changes to their investment choices and 10 percent had changed their fund allocations. While the fraction of seminar attendees making such changes is slightly higher than the fraction of non-seminar attendees, it is substantially below what the attendees reported they planned on doing. One could certainly argue that the low rate of actual changes relative to planned changes results from the fact that the data used to observe the plan changes is, for employees at some locations, not long after the actual financial education seminars. However, there is relatively little correlation between the fraction of seminar attendees making changes to their 401(k) savings behavior and the length of time between their seminar and June 30, 2000. It appears that seminar attendees either make changes almost immediately or not at all.

Madrian and Shea (2001b) draw similar conclusions when they try to control for differences in the underlying savings propensities of employees who do and do not attend financial education seminars. Their final assessment is that financial education increases savings plan participation and results in greater portfolio diversification, particularly among employees hired under automatic enrollment, but the estimated magnitudes are not particularly large. Overall, while financial education is important, it does not appear to be a powerful mechanism for encouraging 401(k) retirement savings.

IV. Beyond 401(k)s: Implications for Social Security Reform and Private Retirement Accounts

Many of the 401(k) results that we have described are relevant to the optimal design of a private account system within Social Security, a feature of many proposals for Social Security reform. For example, one of the principles set forth by President Bush in the Executive Order establishing the President's Commission to Strengthen Social Security was that "modernization must include individually controlled, voluntary personal retirement accounts, which will augment the Social Security safety net."

One key issue is what kind of defaults should be associated with such a system. Individuals could be given a zero discretionary savings rate default, or they could be automatically enrolled at a positive discretionary savings rate and then given the option to change it. The 401(k) research suggests that the outcome under these two different Social

Security reform scenarios would be radically different. If policymakers want to raise the national savings rate, then automatic enrollment at a positive discretionary savings rate may be an appealing policy choice. For example, all workers could be enrolled with a discretionary contribution of 6% of their income (on top of any non-discretionary contribution to the Social Security system). Employees would be able to opt out or change this discretionary contribution.

The pre-existing work also sheds light on asset allocation issues in a system of private accounts. Poor asset allocation choices are common in 401(k) accounts. As discussed in Section III.6, investors use naïve diversification strategies, don't have strong preferences in favor of the asset allocation they have actually chosen (and indeed, often prefer a different asset allocation when asked), naively extrapolate past returns as an indicator of future performance (particularly in company stock), and overinvest in the fund(s) chosen as a default by their employer due to inertia and a perception of employer endorsement. In addition, Alexander, Jones and Nigro (1998) find that the majority of investors do not know the expense ratio of the funds in which they are invested and did not take the expense ratio into account when making their initial investment decisions.

Cronqvist and Thaler (2004) study the asset allocation choices of participants in the recently privatized Swedish Social Security system and find that the outcomes there are consistent with the general behaviors observed in 401(k) plans. For example, they find that one-third of investments were directed to the default fund following the initial adoption of the privatized system, despite heavy advertising encouraging participants to select their own asset allocation. After the initial roll-out, advertising was much diminished. During this period over 90% of new participants in the system failed to elect their own portfolio.[31] Cronqvist and Thaler also find that the management fees were 61 basis points higher in the portfolios actively selected by investors than in the default portfolio, and they point to suggestive evidence of returns chasing (naïve extrapolation).

Taken together, this body of work suggests that any privatized system should restrict the set of investment options. For example, a privatized (U.S.) Social Security system might begin by constraining all equity and bond investments to be highly diversified mutual funds. Such "eligible" investments might be index funds (or at least funds with low turnover) that have low

[31] Fortunately, the Swedish government selected a well diversified default fund with a low expense ratio. Indeed, Cronqvist and Thaler (2004) suggest that the default fund was better both ex ante and ex post than what investors who opted out of the default fund actually chose on their own.

expense ratios and no loads. Further constraints could prevent account holders from placing too much of their wealth in one asset class.

Default asset allocation would be a valuable component of a (U.S.) privatized system of accounts. As the evidence above suggests, consumers have limited financial sophistication. Hence, defaults for asset allocation are likely to be influential. Of course, picking such default investments is likely to be politically controversial. To mitigate such problems, default investments should be index funds chosen by a government agency using a transparent and competitive bidding process. Mutual funds would compete for such contracts by offering a combination of low fees and bounded index tracking error. Such contracts would be subject to ongoing competitive bidding at periodic intervals.

V. Conclusions

The evidence presented in this paper highlights the importance of passive decision-making. For better or for worse, many households appear to passively accept the status quo. For example, in companies without automatic enrollment, the typical employee takes over a year to enroll in his or her company-sponsored 401(k) retirement plan. In companies with automatic enrollment, employees overwhelmingly accept the automatic enrollment defaults, including default savings rates and default funds. For terminated employees, the key determinant of whether they consume or save their 401(k) balances is whether that balance is above or below the automatic cash distribution threshold of $5,000. Many plan participants allow the menu of investment funds to drive their asset allocation decisions. Most employees feel that they save too little, and many plan to raise their contribution rate in the near future, but few act on these good intentions. By contrast, employees do succeed in raising their contribution rates if they are given a low-effort opportunity to sign up for an *automatic* schedule of increases in their contribution rate.

All of these examples have a common theme: employees often take the path of least resistance. As a result, employers have a large measure of control over the savings choices that their employees make, and employers cannot escape this responsibility. Whatever savings plan an employer creates necessarily advantages certain passive or nearly passive choices over other active choices. Sophisticated employers should choose their plan defaults carefully, since these defaults will strongly influence the retirement preparation of their employees.

Policy-makers should also recognize the role of defaults, since policy-makers can facilitate, with laws and regulations, the socially optimal use of defaults. For example, default contributions to company stock may lead to insufficient diversification. Policymakers could legally cap default investments to such problematic asset categories. Likewise, policymakers could facilitate default contributions to more appropriate investments, like the S&P 500, by giving corporations legal protections for picking such risky but highly diversified default funds.

It is easy to identify dozens of ways that thoughtful regulations can influence passive decision-makers without encroaching on the freedom of active decision-makers to opt out of the defaults and choose in their own (perceived) best interest. However, regulating defaults is a two-edged sword. If one has confidence in the government, then such regulations will serve the common good. If one does not have such confidence, then regulating defaults will open up one more avenue for the misuse of governmental power. Our analysis demonstrates that defaults matter, but our evidence does not reveal who should control them.

Appendix A: Data

This Appendix describes the data for each of the companies analyzed in this paper.

Company A. 1) Cross-sectional survey data from January 2001 for a random sample of employees; 2) Longitudinal 401(k) savings data from January 1996 through April 2001 for all 401(k) participants.

Company B. Cross-sectional 401(k) savings data from December 31 of 1998 through 2002 for all active employees (both 401(k) participants and non-participants) and non-employee 401(k) plan participants.

Company C. 1) Cross-sectional 401(k) savings data from June 1, 1997; December 31, 1997; June 30, 1998; December 30, 1998; March 31, 1999; June 30, 1999; September 30, 1999; December 31, 1999; March 31, 2000; June 30, 2000, and December 31, 2001 for all active employees; 2) Financial education seminar attendees from January 1, 2000 through June 30, 2000.

Company D. Cross-sectional 401(k) savings data from December 31 of 11998 through 2002 for all 401(k) plan participants (employee and non-employee), and from December 31, 2000 through 2002 for all active employees (both 401(k) participants and non-participants) and non-employee 401(k) plan participants.

Company E. 1) Cross-sectional 401(k) savings data from December 31 of 1998, 1999 and 2000 for all active employees (both 401(k) participants and non-participants) and non-employee 401(k) plan participants; 2) Longitudinal 401(k) savings data from March, 1996 through March, 2000.

Company F. Cross-sectional 401(k) savings data from December 31 of 1998 through 2001 for all active employees (both 401(k) participants and non-participants) and non-employee 401(k) plan participants.

Company G. Cross-sectional 401(k) savings data from December 31, 1999 for all active employees (both 401(k) participants and non-participants) and non-employee 401(k) plan participants.

Company H. Cross-sectional 401(k) savings data from December 31 of 1998, 1999 and 2002 for all active employees (both 401(k) participants and non-participants) and non-employee 401(k) plan participants.

Company I. Cross-sectional 401(k) savings data from December 31 of 1998, 1999 and 2000 for all active employees (both 401(k) participants and non-participants) and non-employee 401(k) plan participants.

Company J. Cross-sectional 401(k) savings data from December 31 of 1998, 1999 and 2000 for all active employees (both 401(k) participants and non-participants) and non-employee 401(k) plan participants.

Company K. Cross-sectional 401(k) savings data from December 31 of 1998, 1999 and 2000 for all active employees (both 401(k) participants and non-participants) and non-employee 401(k) plan participants.

The cross-sectional data available for these various companies include basic demographic information (age, hire date, gender, income), as well as point-in-time information on 401(k) saving such as participation status, contribution rate, account balances, and asset allocation.

The longitudinal data includes daily information on the 401(k) contribution rate, account balances, and asset allocation of 401(k) plan participants. It does not include demographic information or information on non-participating employees.

Appendix B: 401(k) plan Participant Satisfaction Survey Questions

Section I

1. Which of the following statements describes your current participation in the XXX Company, Inc. 401(k) Plan?

☐ I am currently contributing to the plan
☐ I am not currently contributing to the plan, but I have previously contributed to the plan
☐ I am not currently contributing to the plan, and I have never contributed to the plan

2. For each of the following questions, please indicate how strongly you agree or disagree with respect to the XXX Company, Inc. 401(k) plan. To indicate your level of agreement, please use the following scale (if you have no experience with a given item, please respond with "have no opinion").

Strongly agree
Somewhat agree
Neither agree nor disagree
Somewhat disagree
Strongly disagree
Have no opinion

a. I have a good understanding of the 401(k) savings plan overall

b. I have a good understanding of the 401(k) savings plan investment fund choices

c. I think the 401(k) plan meets my needs

d. The XXX Company, Inc. 401(k) plan is better than plans offered by other companies

3. For each of the following questions, please indicate how satisfied you are with that aspect of the XXX Company, Inc. 401(k) plan. To indicate your level of satisfaction, please use the following scale (if you have no experience with a given item, please respond with "have no opinion").

Very satisfied
Somewhat satisfied
Neither satisfied nor dissatisfied
Somewhat dissatisfied
Very dissatisfied
Have no opinion

a. Convenience of payroll deductions for savings

b. Number of investment options

c. Variety of investment options

d. Account Statements

e. Internet access to your 401(k) plan

f. Loans

Please use the space provided to fill in your response to the following question:

4. What, if anything, could your company do differently in terms of the XXX Company, Inc. 401(k) plan that would increase your satisfaction level, relating to any of the items listed above?

_____

_____

Section II

Please check the appropriate box for each of the following questions:

5. How would you describe yourself as an Internet user?

☐ Very experienced
☐ Somewhat experienced
☐ Not too experienced
☐ Not at all experienced

6. Do you have access to the Internet at home?

☐ Yes
☐ No

7. How would you describe your level of financial knowledge?

☐ Very knowledgeable
☐ Somewhat knowledgeable
☐ Not too knowledgeable
☐ Not at all knowledgeable

8. Which of the following best describes your job?

☐ Management
☐ Other salaried position
☐ Hourly
☐ Other

9. Which of the following best describes your level of education?

☐ High school or less
☐ Some college
☐ College graduate
☐ Graduate school

Section III

These next few questions discuss retirement savings. Please check the appropriate box(es) for each of the following questions, and/or fill in the blanks, as appropriate:

10. First, based on anything you may have heard or read, what percent of your income do you think you should *ideally* be saving for retirement?

☐ 5 percent of income or less
☐ Between 5 percent and 9 percent of income
☐ Between 10 percent and 14 percent of income
☐ Between 15 percent and 19 percent of income
☐ Between 20 percent and 24 percent of income
☐ At least 25 percent of income

11. Think about how much you are *actually* currently saving for retirement. Compare your *actual* saving rate to your *ideal* saving rate. Right now, your *actual* retirement saving rate is:

☐ Far too low
☐ A little too low
☐ About right
☐ A little too high
☐ Far too high

IF YOU ARE CURRENTLY CONTRIBUTING TO YOUR COMPANY 401(K) PLAN, PLEASE ANSWER QUESTIONS 12 THROUGH 17.

IF YOU ARE NOT CURRENTLY CONTRIBUTING TO YOUR COMPANY 401(K) PLAN, PLEASE SKIP TO QUESTION 18.

12. Are you contributing currently at the maximum 401(k) savings rate?

☐ Yes
☐ No

13. Which one of the following statements best describes your 401(k) contribution plans over the next few months?

☐ I plan to *raise* my contribution rate.
☐ I plan to *lower* my contribution rate.
☐ I don't plan to make any changes.

IF YOU ARE NOT PLANNING TO MAKE ANY CONTRIBUTION CHANGES, PLEASE SKIP TO QUESTION 15.

14. What percent of your salary are you planning to contribute?

15. Which one of the following statements best describes your 401(k) fund allocation plans over the next few months?

☐ I am considering selecting different funds.
☐ I am considering rebalancing among the funds I currently have.
☐ I am not planning to make any changes in regard to my fund allocations.
☐ I am considering both selecting different funds and rebalancing among the funds I currently have

16. When do you next plan to make changes in your 401(k) plan?

☐ In the next few days
☐ In the next week
☐ In the next two weeks
☐ In the next three weeks
☐ Sometime in the next month
☐ Sometime in the next two months
☐ Other: _____

17. What company resources will you use to make changes to your 401(k) plan? Check all that apply.

☐ Speak to benefit center representative or use phone-based "Benefits Express"
☐ Use the 401(k) web site: *Your Benefits Resources* (including advice and education resources, e.g., mPower and 401Kafe)
☐ Consult the new hire kit (given to all new employees)
☐ Other: Please specify: _____

IF YOU ARE CURRENTLY CONTRIBUTING TO YOUR COMPANY 401(K) PLAN, PLEASE SKIP TO QUESTION 21.

IF YOU ARE NOT CURRENTLY CONTRIBUTING TO YOUR COMPANY 401(K) PLAN, PLEASE ANSWER QUESTIONS 18 TO 20.

18. When you enroll/re-enroll in the XXX Company, Inc. 401(k) plan, what percent of your salary do you expect to contribute to the plan?

☐ Between 0 percent and 3 percent of income
☐ Between 4 percent and 6 percent of income
☐ Between 7 percent and 9 percent of income
☐ Between 10 percent and 12 percent of income
☐ Between 13 percent and 15 percent of income

19. When do you plan to enroll/re-enroll in the 401(k) plan?

☐ In the next few days
☐ In the next week
☐ In the next two weeks
☐ In the next three weeks
☐ Sometime in the next month
☐ Sometime in the next two months
☐ Other: _____

20. What company resources will you use to enroll in the 401(k) plan? Check all that apply.

☐ Speak to benefits center representative
☐ Use the 401(k) web site
☐ Consult the new hire kit (given to all new employees)
☐ Other. Please specify: _____

Thank you for your participation in this survey.

For more information on the XXX Company, Inc. 401(k) plan, click here: URL.

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TABLE 1. Companies and Their 401(k) Plan Changes or Other Interventions

Company	Industry	Size[a]	Plan Change / Intervention	Date of Change/ Intervention
A	Food	10,000	Savings survey	January 2001
B	Office equipment	30,000	Adopted automatic enrollment	January 1997
			Eliminated automatic enrollment	January 2001
C	Insurance	30,000	Adopted automatic enrollment	April 1998
			Financial education seminars	January-December 2000
			Changed automatic enrollment defaults	May 2001
D	Food	20,000	Adopted automatic enrollment	January 1998
			Increased default contribution rate	January 2001
E	Utility	10,000	Increased match threshold	January 1997
F	Consumer packaged goods	40,000	Change eligibility	July 1998
			Instituted employer match	October 2000
G	Insurance	50,000	Change eligibility	January 1997
H	Manufacturing		Adopted automatic enrollment	January 2001
I	Retail	130,000	None	NA
J	Financial Services	50,000	None	NA
K	Pharmaceutical	10,000	Change eligibility	January 1996

[a] Number of employees (rounded to the nearest 10,000) on December 31, 1998 (Company K), December 31, 2000 (Companies A, B, D, E, F, G, I and J), June 30, 2000 (Company C) or December 31, 2001 (Company H).

TABLE 2: Self-reported Retirement Savings Adequacy and the Distribution of Actual 401(k) Contribution Rates (Company A)

	Distribution of 401(k) Contribution Rates as a Fraction of Income		
	0%-4%	5%-8%	9%-12%
Respondents who describe their savings rate as "too low"	36%	36%	27%
Respondents who describe their savings rate as "about right"	12%	15%	73%

See question 11 from the survey in Appendix B. We aggregate the categories "far too low" and "a little too low" into one category ('too low").

TABLE 3. Fraction of 401(k) Participants with Balances in the Automatic Enrollment Default Fund(s)

	Fraction of participants with any balances in the automatic enrollment default fund(s)	Fraction of participants with all balances in the automatic enrollment default fund(s)
Company B		
Hired before automatic enrollment	43.9	12.7
Hired during automatic enrollment	71.6	59.6
Hired after automatic enrollment	27.7	6.8
Company C (partitioned on the basis of differences in the default contribution rate under automatic enrollment)		
Hired before automatic enrollment	17.7	5.2
Hired during automatic enrollment (3% default)	88.5	73.5
Hired during automatic enrollment (3% initial default, 6% at 1 year)	89.4	73.5
Company C (partitioned on the basis of differences in the default investment fund under automatic enrollment)		
Hired before automatic enrollment	17.7	5.2
Hired during automatic enrollment (Money market fund default)	88.7	73.7
Hired during automatic enrollment (Lifestyle fund default)	96.5	90.1
Company D		
Hired before automatic enrollment	36.4	14.2
Hired during automatic enrollment (3% default)	65.9	53.8
Hired during automatic enrollment (4% default)	70.1	61.5
Company H		
Hired before automatic enrollment	3.7	2.5
Hired during automatic enrollment	50.8	45.8

The sample for Companies B, C and H is 401(k)-eligible employees. The sample for Company D is 401(k)-eligible employees aged 40+ at the time of hire. For Company D, the data for those hired before automatic enrollment includes only employees not yet subject to automatic enrollment when it was applied to previously hired non-participants.

TABLE 4. Employer Matching and 401(k) Participation		
Independent Variable	Company E (Hazard ratio)	Company F (Hazard ratio)
Female	0.8964 (-1.21)	0.9890 (0.25)
Age	1.1376** (3.54)	1.1238** (6.53)
Age^2	0.9985** (-3.25)	0.9987** (-5.89)
Threshold change	0.7976 (-1.69)	--
Match introduction	--	1.2711** (5.12)

Coefficients estimated from a Cox proportional hazard model of 401(k) participation with time-varying covariates. For Company E, the sample is employees hired during 1996 or 1997 and still employed at year-end 1998, 1999 or 2000. For Company F, the sample is employees hired on or after January 1, 1998 and still employed at year-end 1998, 1999, 2000 or 2001. In Company E, the variable *Threshold change* is a dummy variable that equals 1 after the match threshold was raised in Company G (on January 1, 1997). In Company F, *Match introduction* is a dummy variable that equals 1 after the company match was announced to employees (on July 1, 2000). The reported coefficients are hazard ratios, with corresponding z-statistics in parentheses. ** indicates that the coefficient is significantly different from unity at the 1 percent level.

TABLE 5. Financial Education and Actual vs. Planned Savings Changes (Company C)

	Seminar Attendees		Non-Attendees
Planned Action	Planned Change	Actual Change	Actual Change
Non-participants			
Enroll in 401(k) plan	100%	14%	7%
401(k) participants			
Increase contribution rate	28%	8%	5%
Change fund selection	47%	15%	10%
Change fund allocation	36%	10%	6%

The sample is active 401(k)-eligible employees at company locations that offered financial education seminars from January-June 2000. Actual changes in savings behavior are measured over the period from December 31, 1999 through June 30, 2000. Planned changes are those reported by seminar attendees in an evaluation of the financial education seminars at the conclusion of the seminar. The planned changes from surveys responses of attendees have been scaled to reflect the 401(k) participation rate of seminar attendees.

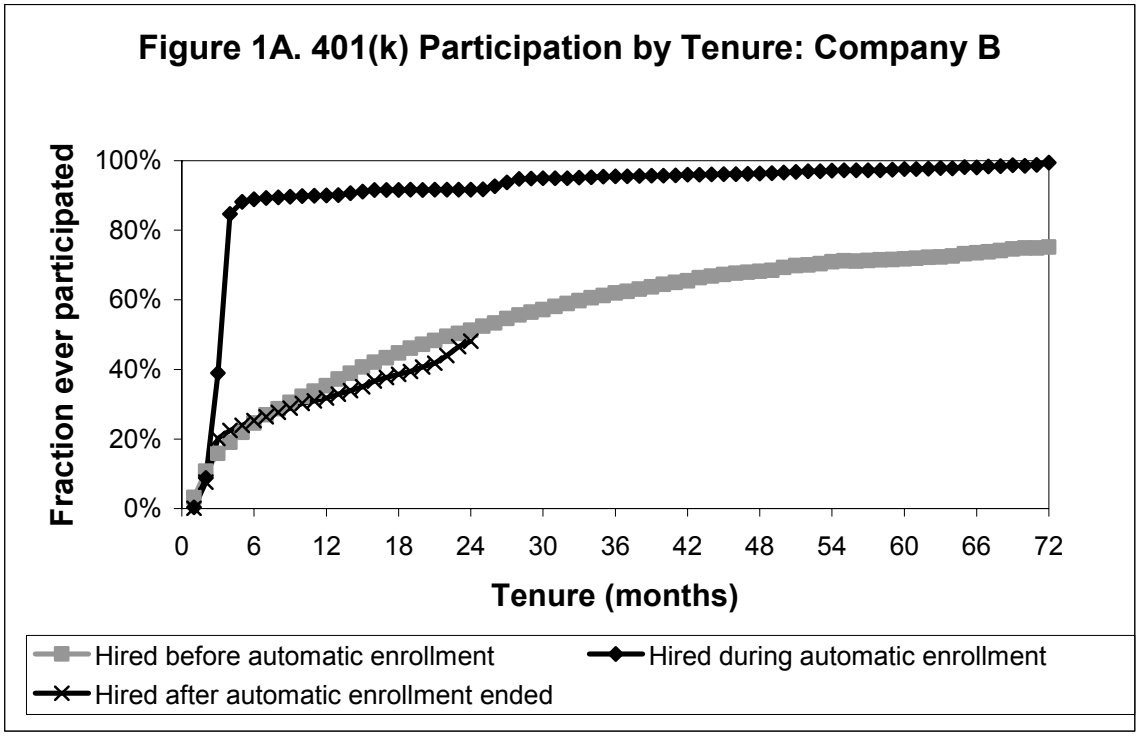


Figure 1A. 401(k) Participation by Tenure: Company B
Fraction ever participated
100%
80%
60%
40%
20%
0%
0
6
12
18
24
30
36
42
48
54
60
66
72
Tenure (months)
Hired before automatic enrollment
Hired during automatic enrollment
Hired after automatic enrollment ended

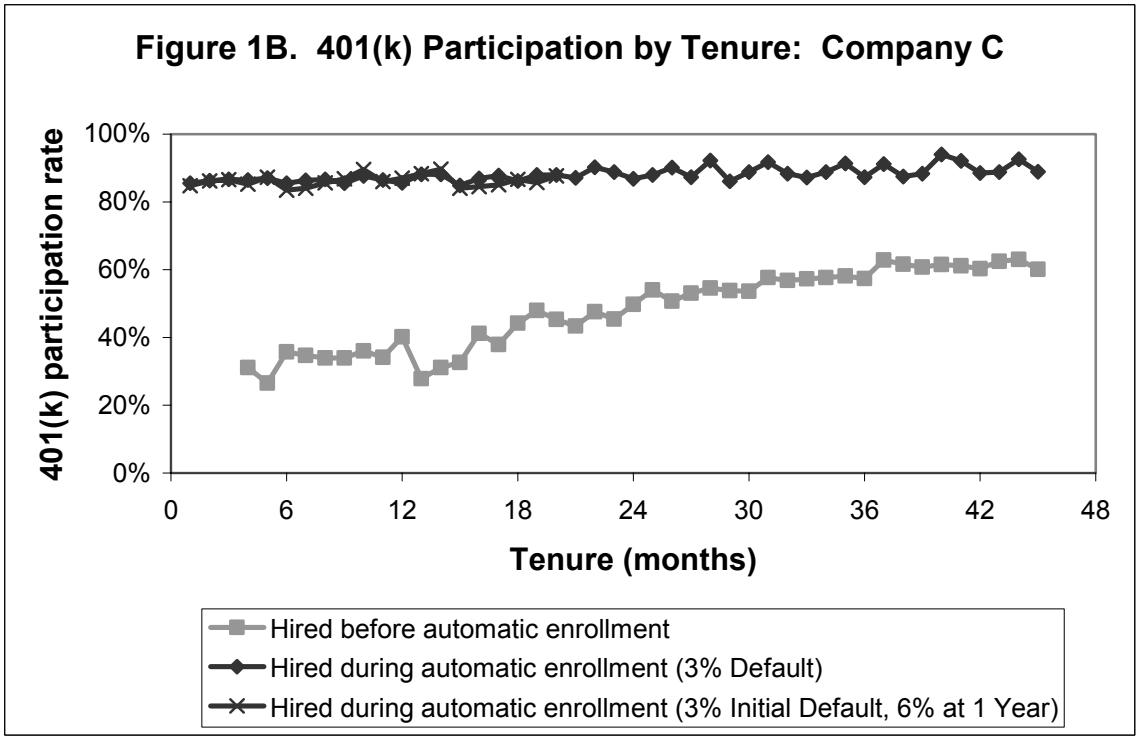


Figure 1B. 401(k) Participation by Tenure: Company C
401(k) participation rate
100%
80%
60%
40%
20%
0%
0
6
12
18
24
30
36
42
48
Tenure (months)
Hired before automatic enrollment
Hired during automatic enrollment (3% Default)
Hired during automatic enrollment (3% Initial Default, 6% at 1 Year)

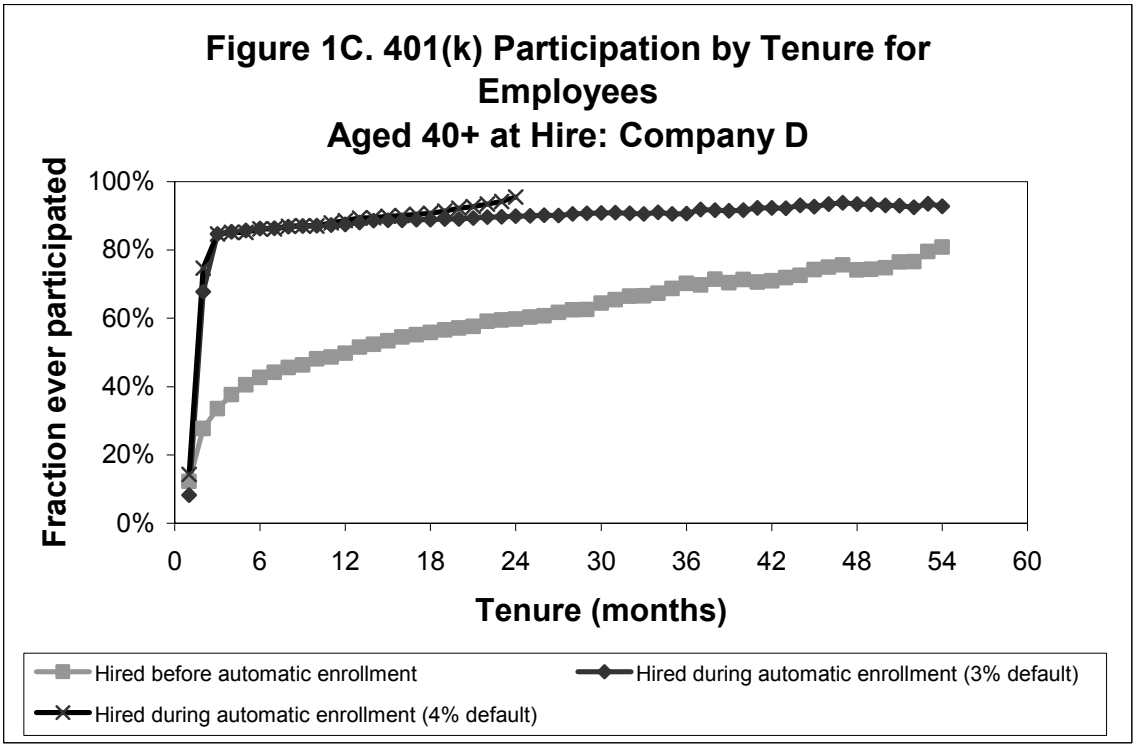


Figure 1C. 401(k) Participation by Tenure for Employees
Aged 40+ at Hire: Company D
Fraction ever participated
100%
80%
60%
40%
20%
0%
0
6
12
18
24
30
36
42
48
54
60
Tenure (months)
Hired before automatic enrollment
Hired during automatic enrollment (3% default)
Hired during automatic enrollment (4% default)

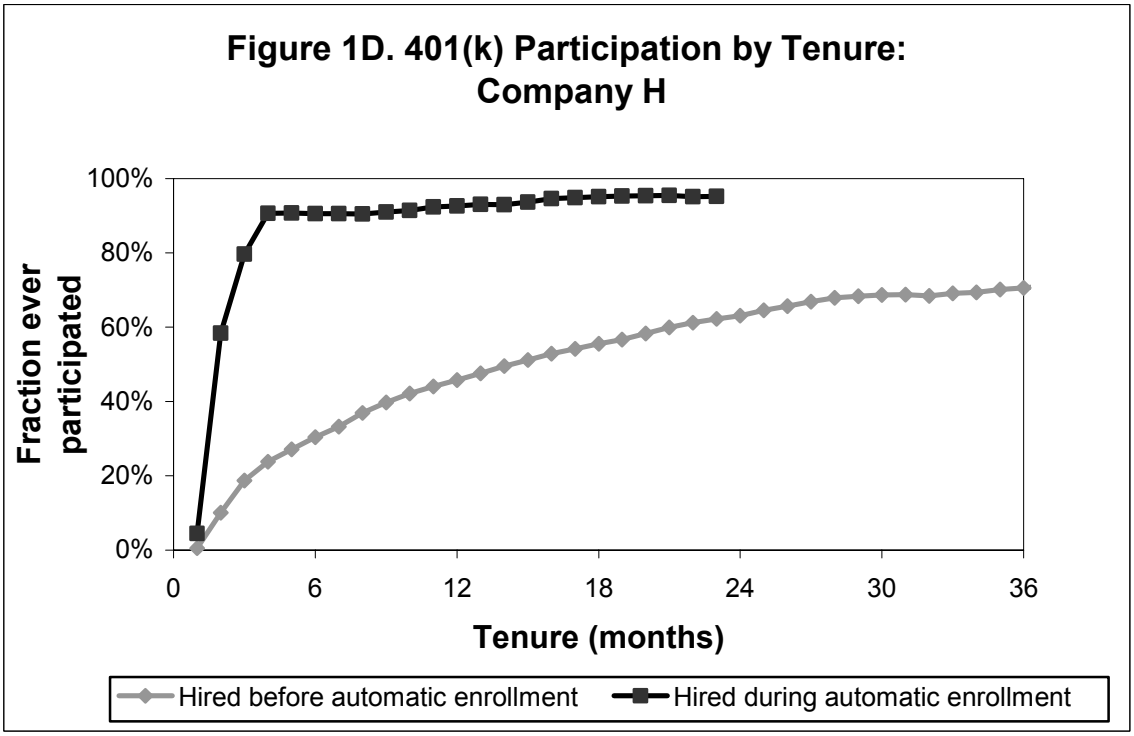


Figure 1D. 401(k) Participation by Tenure:
Company H
Fraction ever participated
100%
80%
60%
40%
20%
0%
0
6
12
18
24
30
36
Tenure (months)
Hired before automatic enrollment
Hired during automatic enrollment

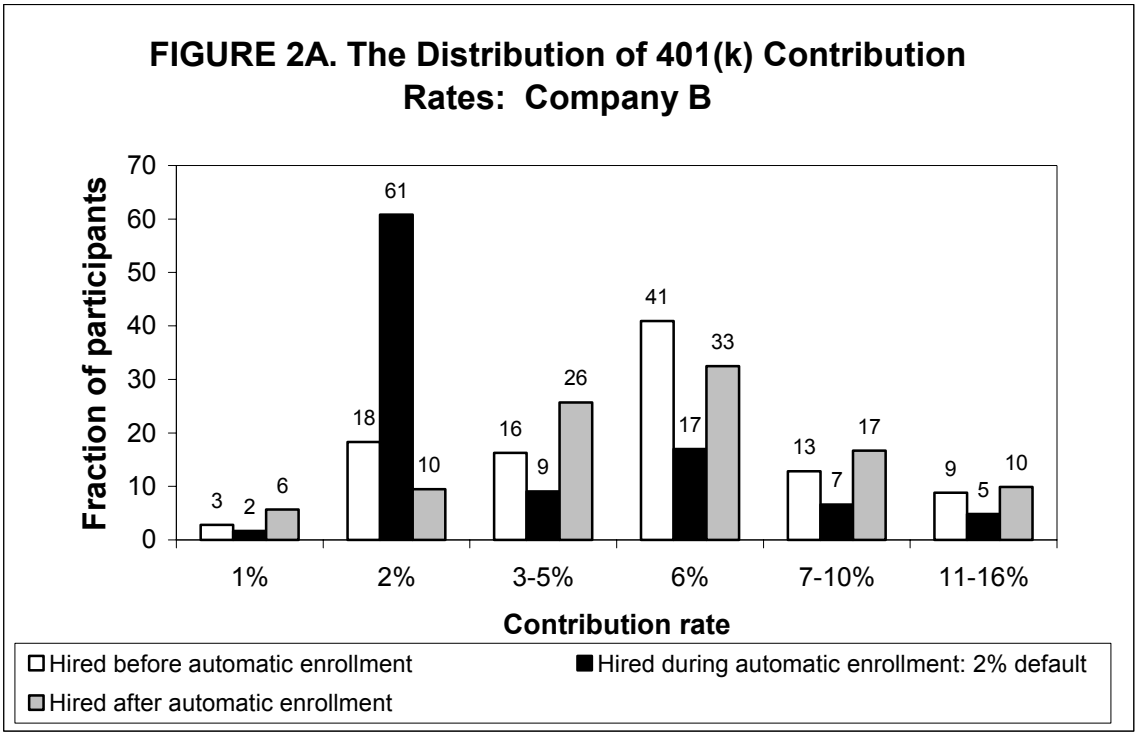


FIGURE 2A. The Distribution of 401(k) Contribution Rates: Company B
Fraction of participants
70
60
50
40
30
20
10
0
3
2
6
18
61
10
16
9
26
41
17
33
13
7
17
9
5
10
1%
2%
3-5%
6%
7-10%
11-16%
Contribution rate
Hired before automatic enrollment
Hired during automatic enrollment: 2% default
Hired after automatic enrollment

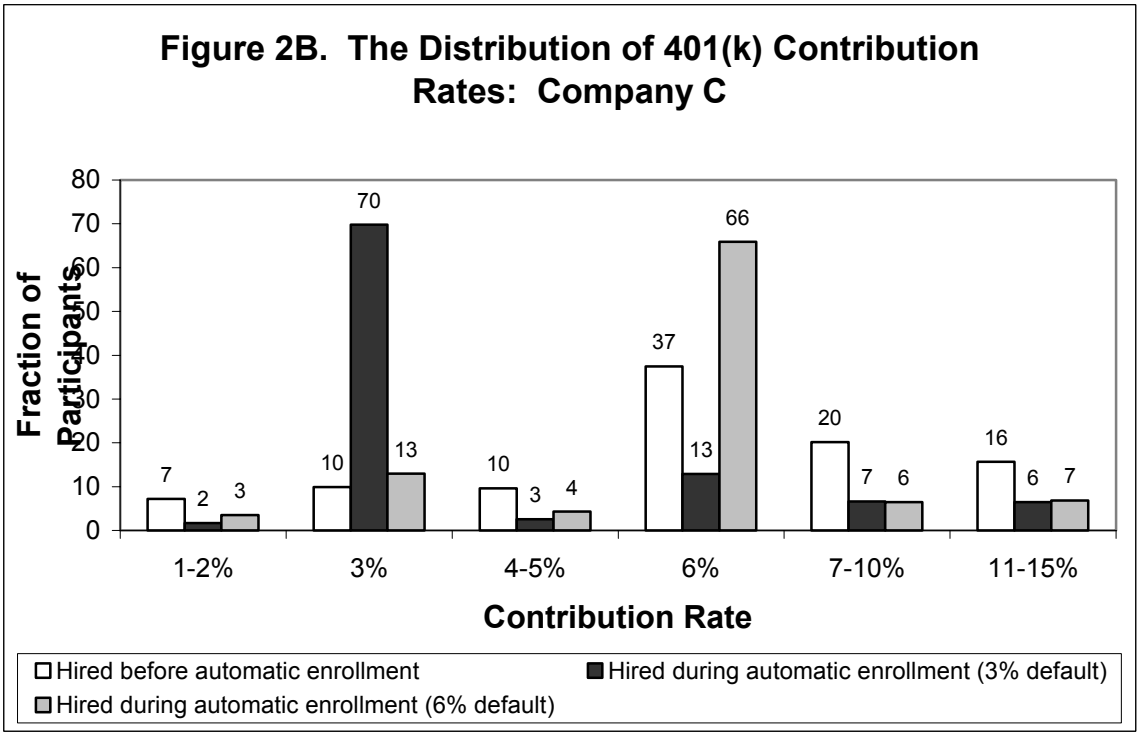


Figure 2B. The Distribution of 401(k) Contribution Rates: Company C
Fraction of Participants
80
70
60
50
40
30
20
10
0
7
2
3
10
70
13
10
3
4
37
13
66
20
7
6
16
6
7
1-2%
3%
4-5%
6%
7-10%
11-15%
Contribution Rate
Hired before automatic enrollment
Hired during automatic enrollment (3% default)
Hired during automatic enrollment (6% default)

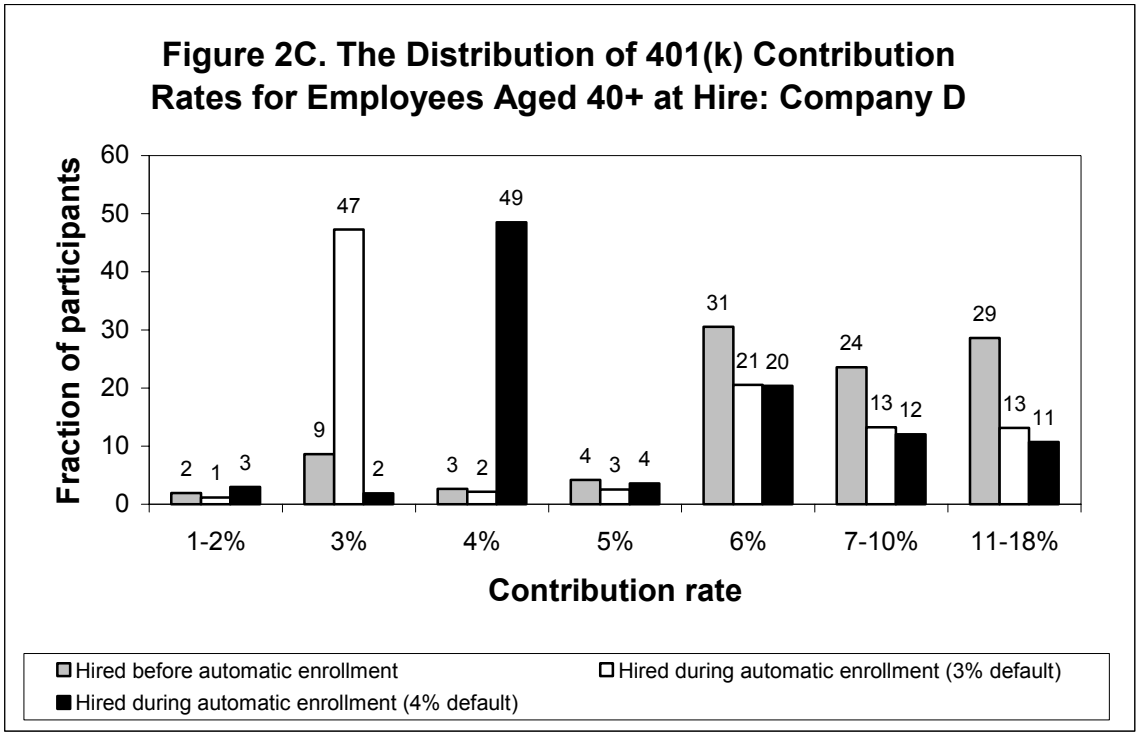


Figure 2C. The Distribution of 401(k) Contribution Rates for Employees Aged 40+ at Hire: Company D
Fraction of participants
60
50
40
30
20
10
0
2
1
3
9
47
2
3
2
49
4
3
4
31
21
20
24
13
12
29
13
11
1-2%
3%
4%
5%
6%
7-10%
11-18%
Contribution rate
Hired before automatic enrollment
Hired during automatic enrollment (3% default)
Hired during automatic enrollment (4% default)

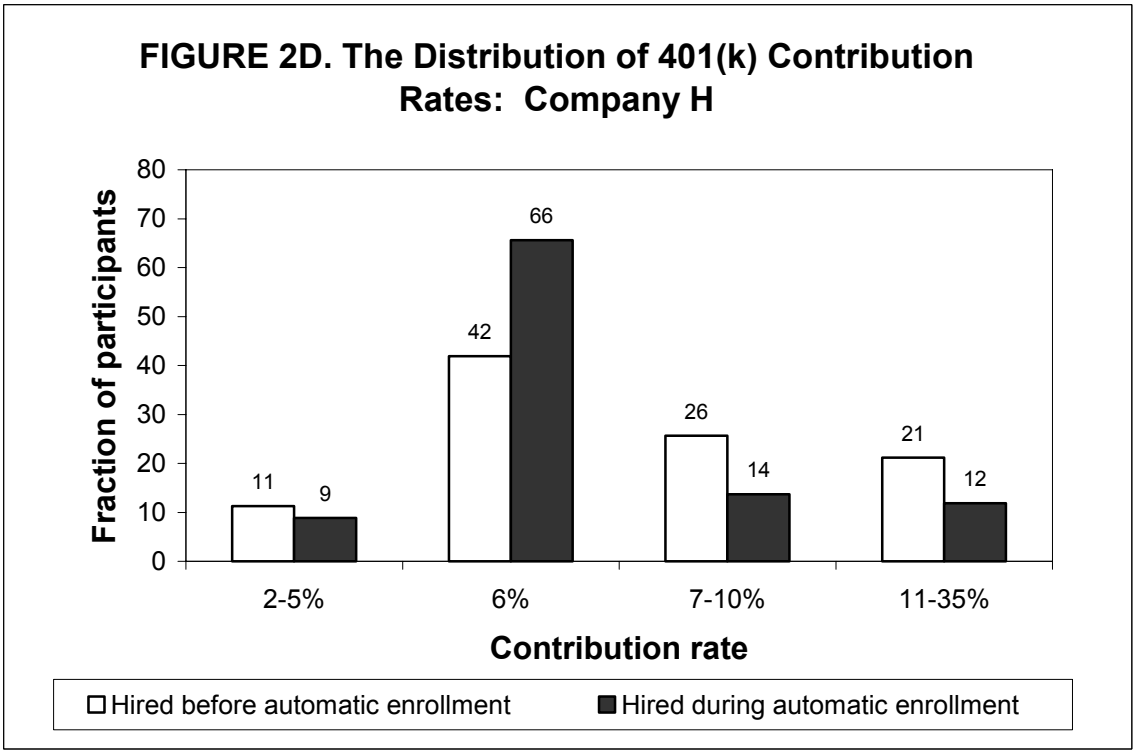


FIGURE 2D. The Distribution of 401(k) Contribution Rates: Company H
Fraction of participants
80
70
60
50
40
30
20
10
0
11
9
42
66
26
14
21
12
2-5%
6%
7-10%
11-35%
Contribution rate
Hired before automatic enrollment
Hired during automatic enrollment

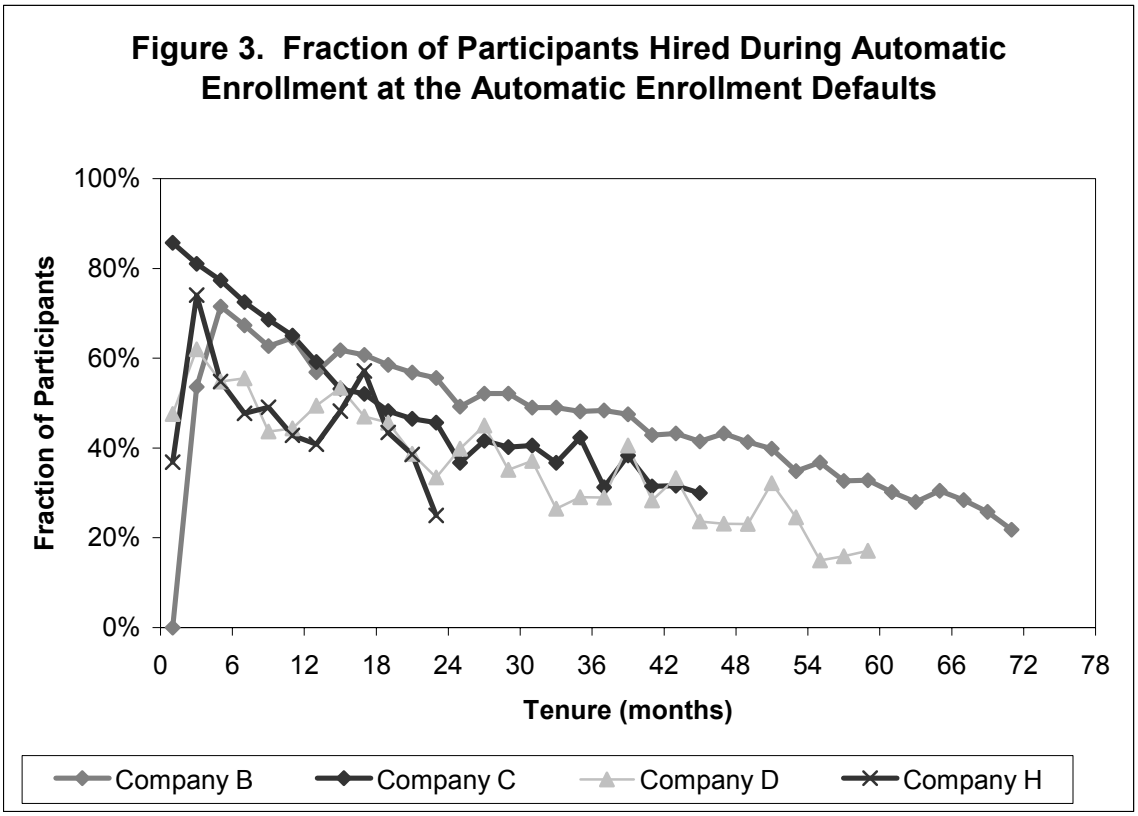


Figure 3. Fraction of Participants Hired During Automatic Enrollment at the Automatic Enrollment Defaults
100%
80%
60%
40%
20%
0%
Fraction of Participants
0
6
12
18
24
30
36
42
48
54
60
66
72
78
Tenure (months)
Company B
Company C
Company D
Company H

Figure 4A. Balances and the Probability of a Cash Distribution: Company B

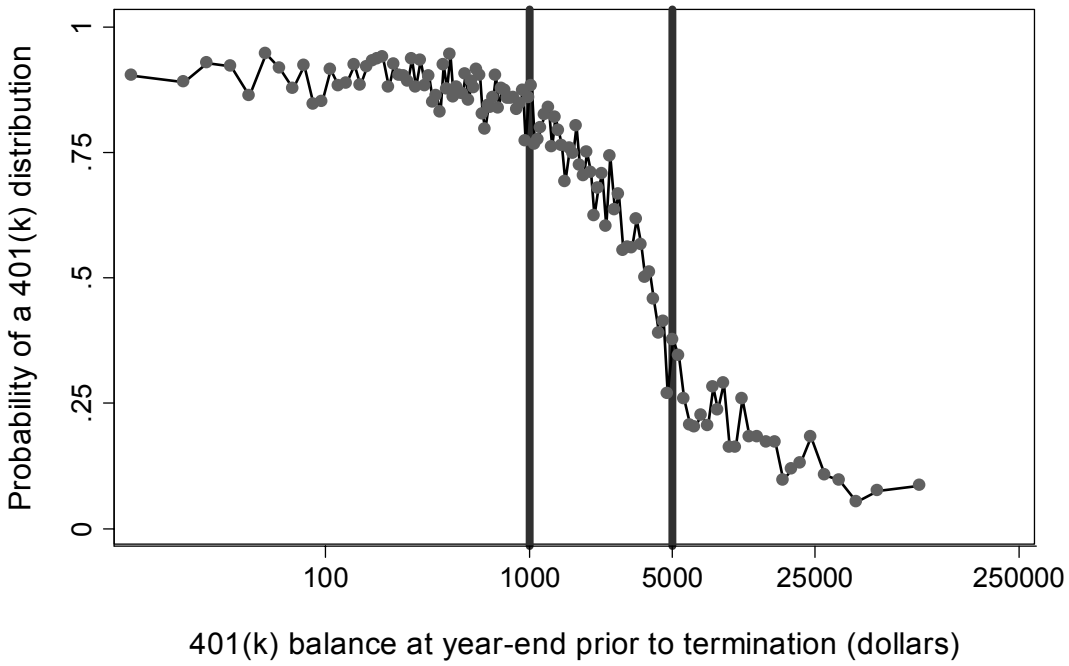


Figure 4B. Balances and the Probability of a Cash Distribution: Company D

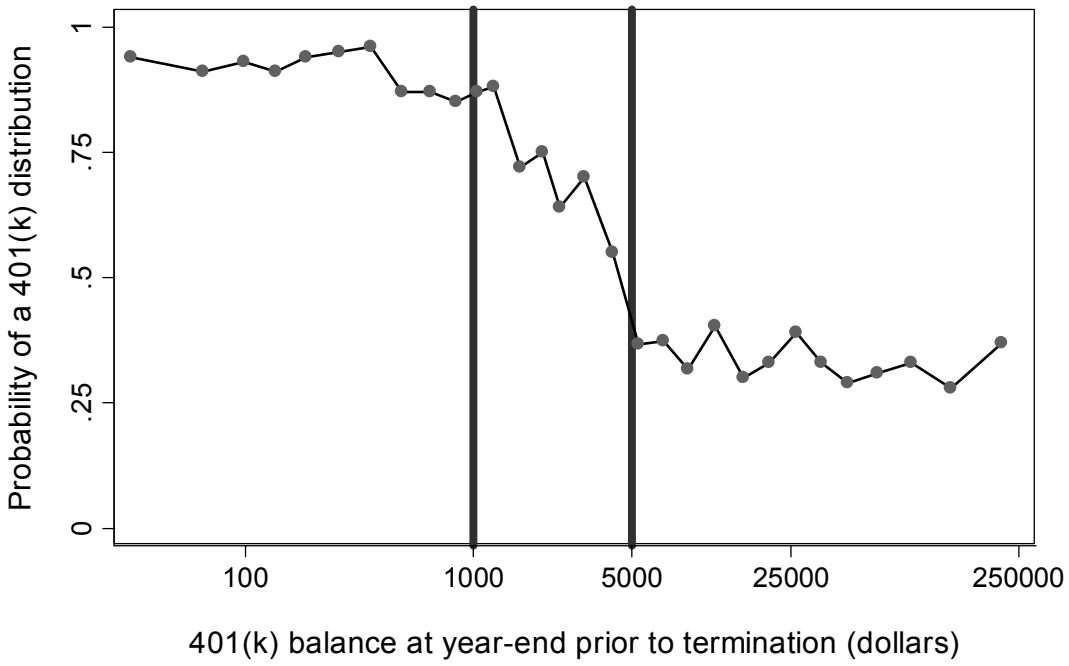


Figure 4C. Balances and the Probability of a Cash Distribution: Company I

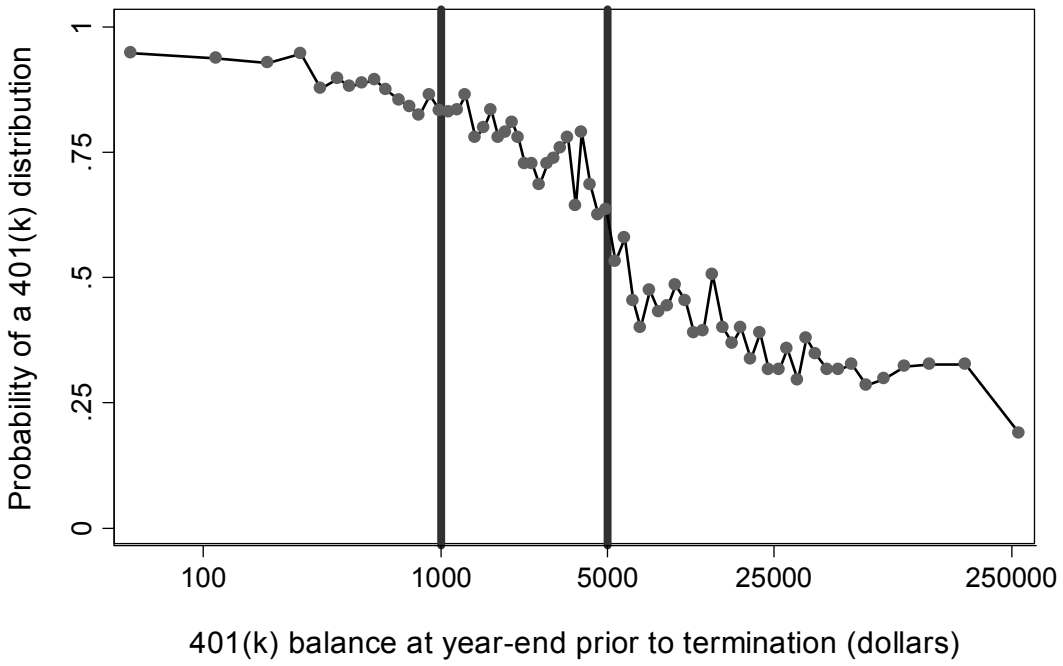
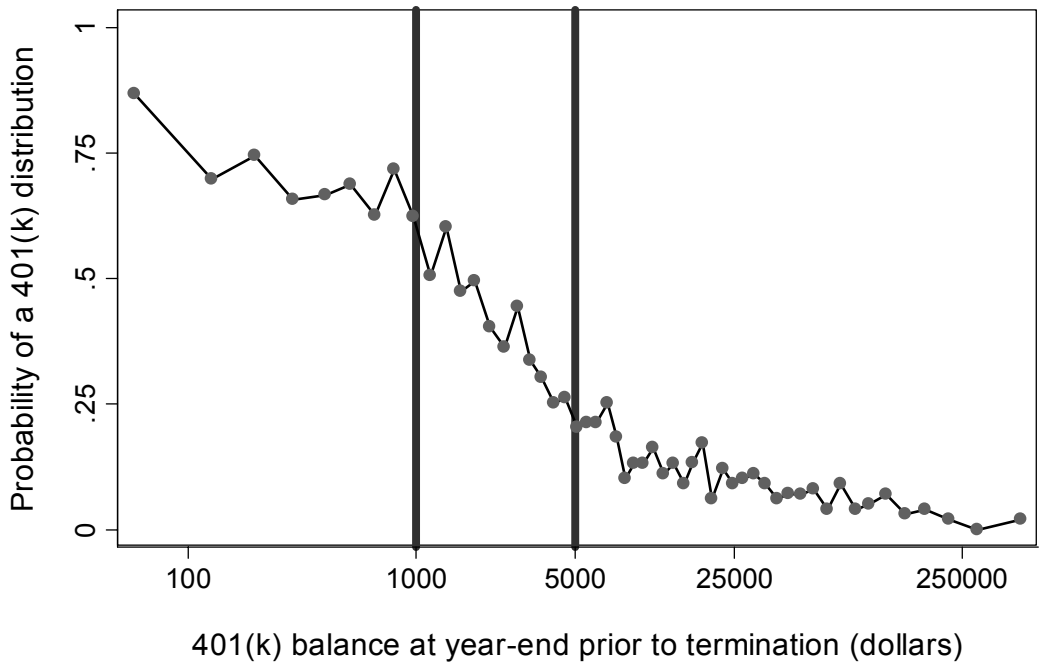


Figure 4D. Balances and the Probability of a Cash Distribution: Company J



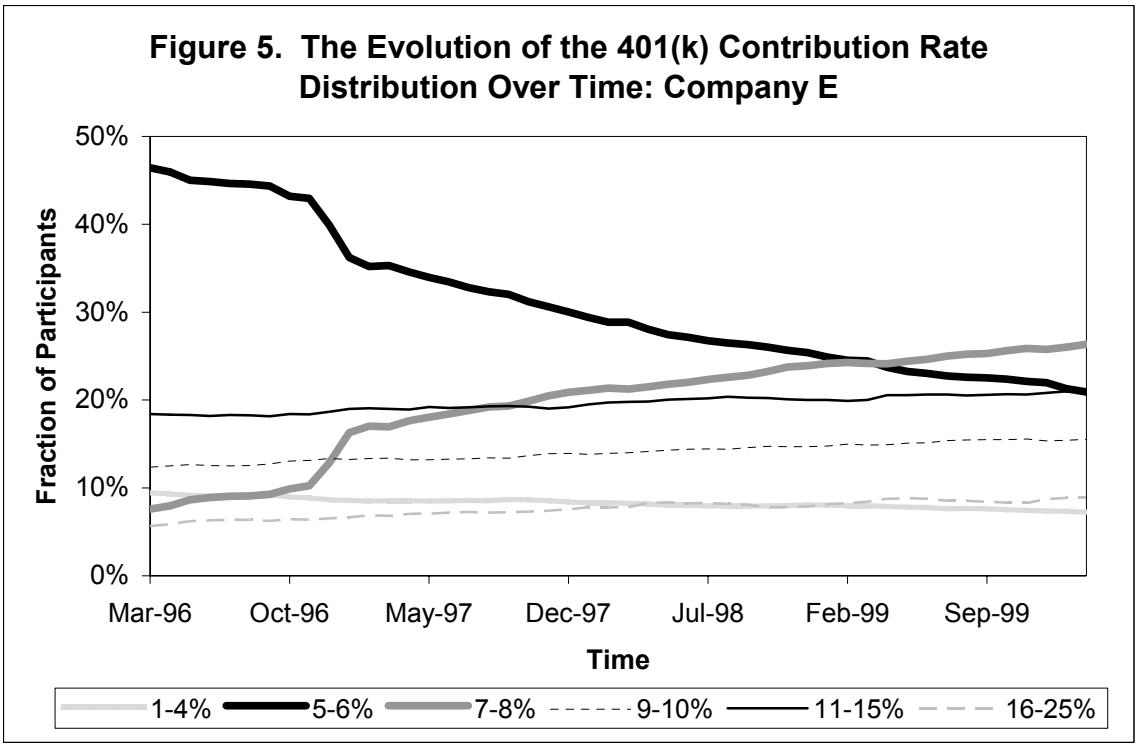


Figure 5. The Evolution of the 401(k) Contribution Rate Distribution Over Time: Company E
50%
40%
30%
20%
10%
0%
Fraction of Participants
Mar-96
Oct-96
May-97
Dec-97
Jul-98
Feb-99
Sep-99
Time
1-4%
5-6%
7-8%
9-10%
11-15%
16-25%

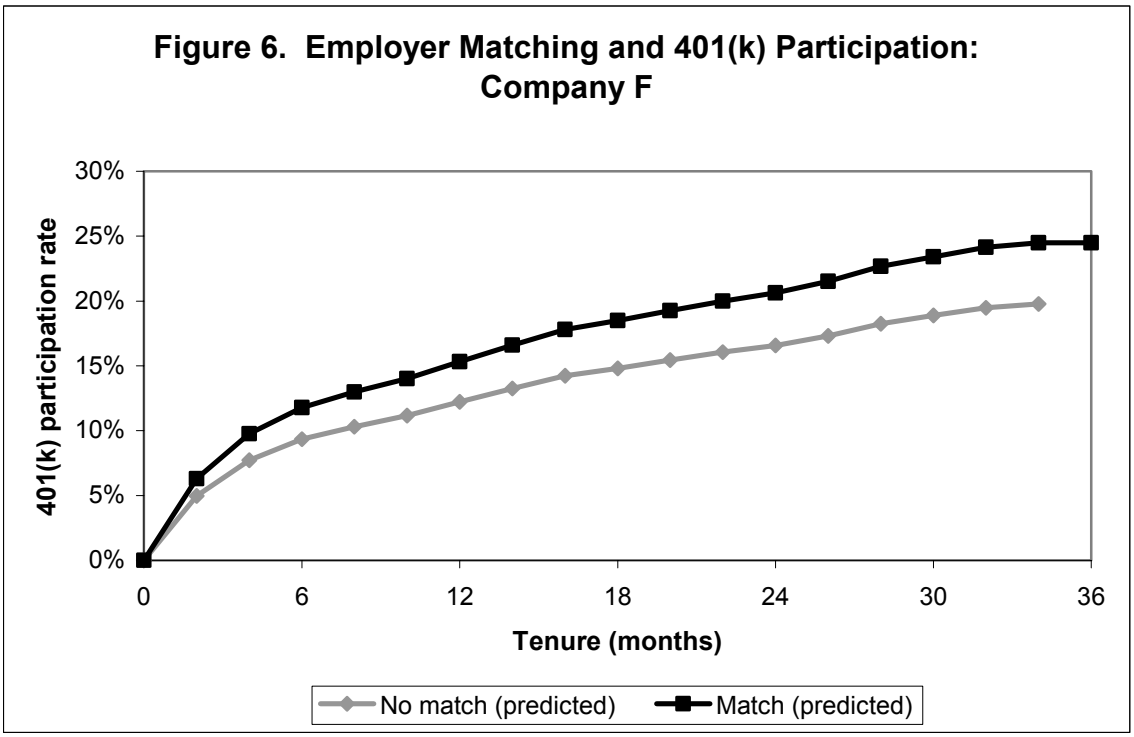


Figure 6. Employer Matching and 401(k) Participation: Company F
401(k) participation rate
30%
25%
20%
15%
10%
5%
0%
0
6
12
18
24
30
36
Tenure (months)
No match (predicted)
Match (predicted)

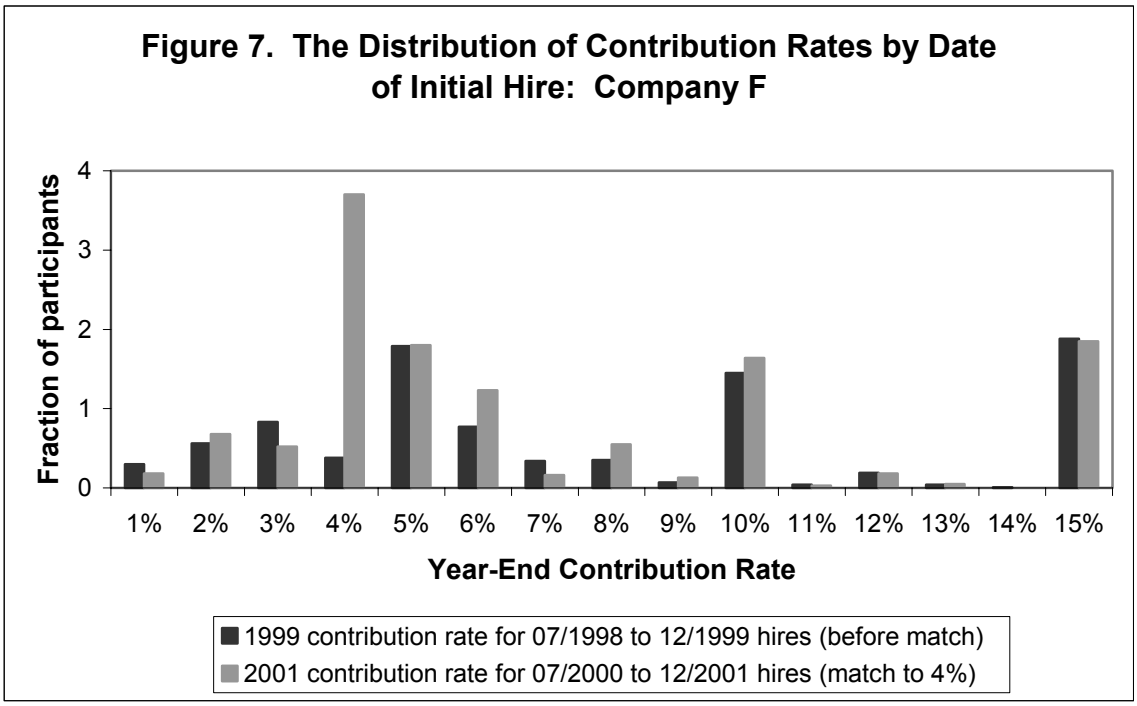


Figure 7. The Distribution of Contribution Rates by Date of Initial Hire: Company F
Fraction of participants
4
3
2
1
0
1%
2%
3%
4%
5%
6%
7%
8%
9%
10%
11%
12%
13%
14%
15%
Year-End Contribution Rate
1999 contribution rate for 07/1998 to 12/1999 hires (before match)
2001 contribution rate for 07/2000 to 12/2001 hires (match to 4%)

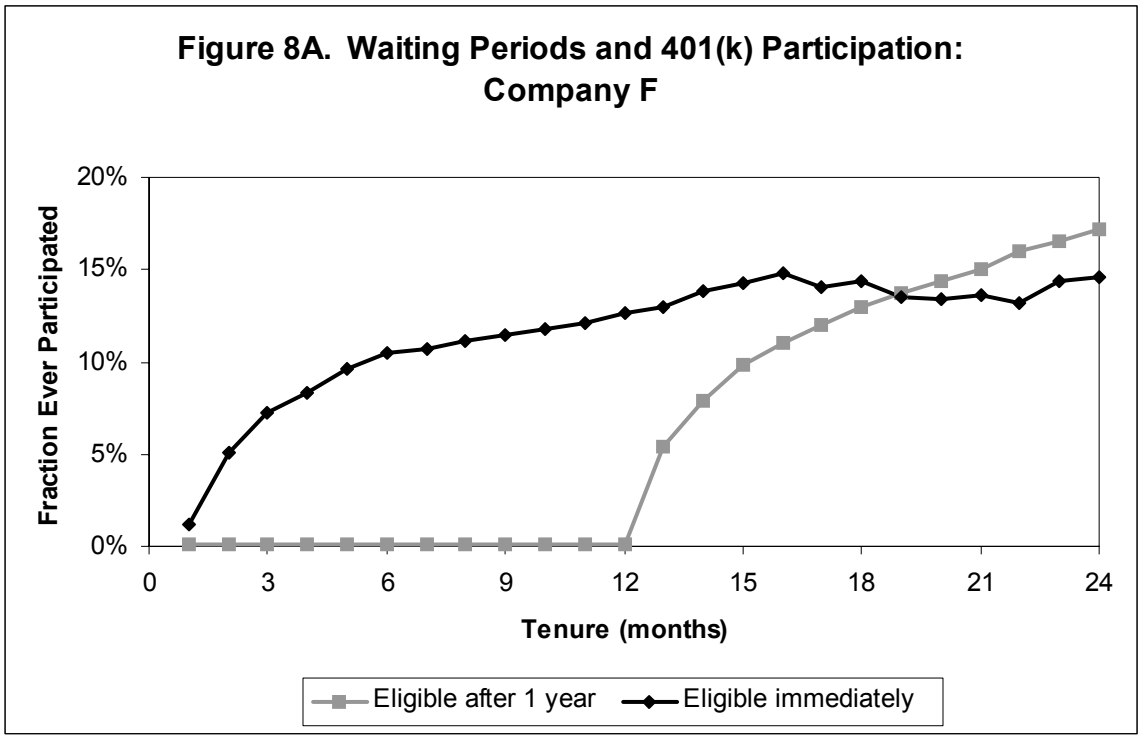


Figure 8A. Waiting Periods and 401(k) Participation: Company F
Fraction Ever Participated
20%
15%
10%
5%
0%
0
3
6
9
12
15
18
21
24
Tenure (months)
Eligible after 1 year
Eligible immediately

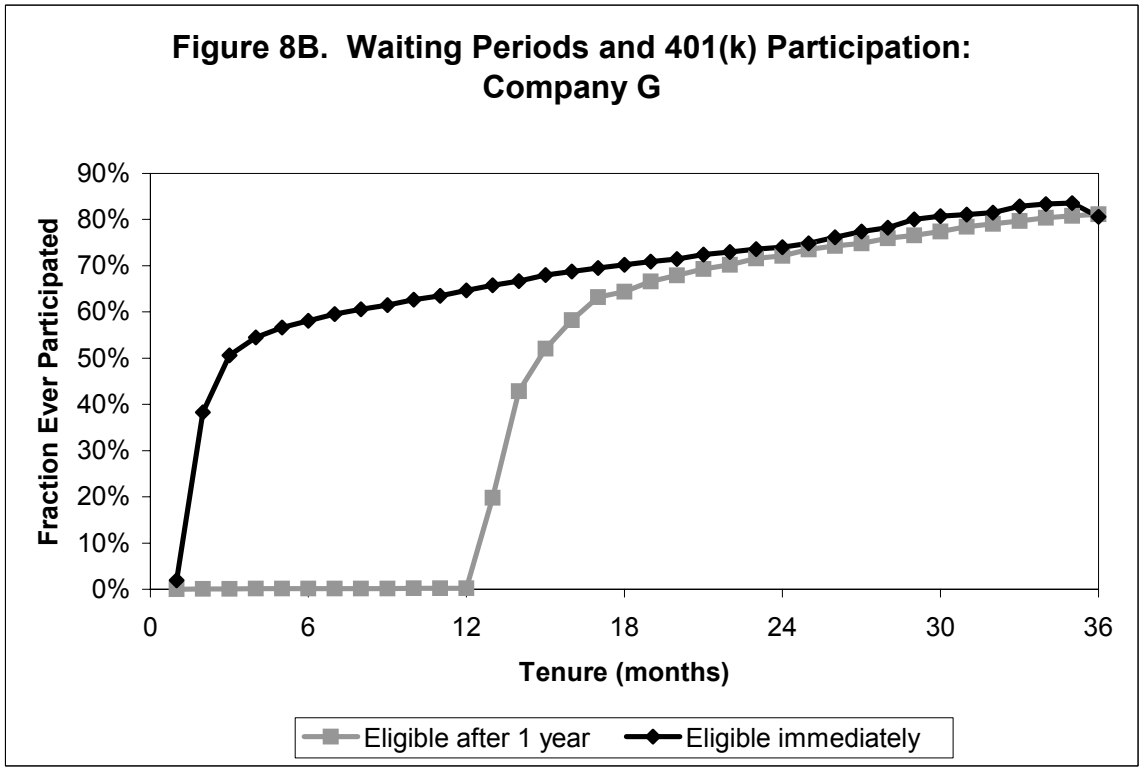


Figure 8B. Waiting Periods and 401(k) Participation: Company G
Fraction Ever Participated
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
6
12
18
24
30
36
Tenure (months)
Eligible after 1 year
Eligible immediately

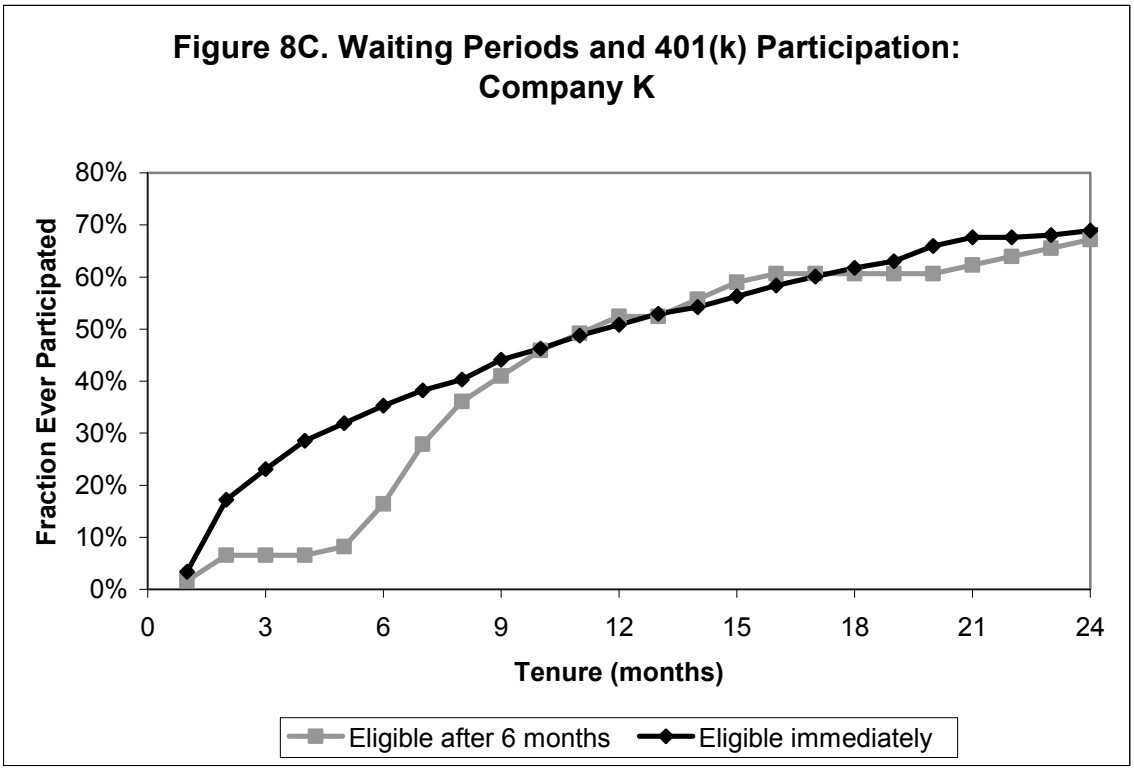


Figure 8C. Waiting Periods and 401(k) Participation:
Company K
Fraction Ever Participated
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
3
6
9
12
15
18
21
24
Tenure (months)
Eligible after 6 months
Eligible immediately