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PLAN DESIGN AND 401(k) SAVINGS OUTCOMES

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**ABSTRACT**

We assess the impact of 401(k) plan design on four different 401(k) savings outcomes: participation in the 401(k) plan, the distribution of employee contribution rates, asset allocation, and cash distributions. We show that plan design can have an important effect on all of these savings outcomes. This suggests an important role for both employers in determining how to structure their 401(k) plans and government regulators in creating institutions that encourage or discourage particular aspects of 401(k) plan design.

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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 (Employee Benefit Research Institute 2000). Because of the favorable tax benefits afforded to saving through employer sponsored pension plans, it is important to understand how these plans actually affect the “desired” outcomes for which the tax benefits are given.<sup>1</sup>

The growth of 401(k)-type savings plans and the associated displacement of defined benefit plans has generated concerns about the adequacy of employee retirement 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 savings outcomes. In this paper, we assess the impact of 401(k) plan design on four different 401(k) savings outcomes: participation in the 401(k) plan, the distribution of employee contribution rates, asset allocation, and cash distributions. We show that plan design can have an important effect on all of these different savings outcomes. This suggests an important role for both employers in determining how to structure their 401(k) plans and government regulators in creating institutions that encourage or discourage particular aspects of 401(k) plan design.

## **II. Plan Design and 401(k) Participation**

The 401(k) plan is only a useful tool for helping employees save for retirement to the extent that employees actually participate in their employer-sponsored 401(k) plan. Recent research suggests that when it comes to participation in the 401(k) plan, the key behavioral question is not

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<sup>1</sup> The annual tax expenditure association with employer-provided pension plans is estimated at \$116 billion in 2004, about equally split between defined benefit and 401(k) plans (Employee Benefit Research Institute 2004).

*whether or not* employees participate in the 401(k) plan, but *how long it takes* before employees are actually enrolled, and the enrollment protocol adopted by the firm is a significant determinant in the answer to this question.

### *Automatic Enrollment and 401(k) Participation*

In most companies, the 401(k) plan requires an active election on the part of employees to initiate participation. That is, if the employee does nothing, the default is that the employee will not be enrolled in the 401(k) plan. Because this is the most widely used 401(k) enrollment protocol, we term this the “standard enrollment” approach to 401(K) participation. An alternative but less widely used approach is to automatically enroll employees in the 401(k) plan, requiring an active election on the part of employees in order to opt out of 401(k) participation.<sup>2</sup>

To examine the impact of automatic enrollment on 401(k) participation, we analyze the administrative data on 401(k) participation at three large companies that adopted automatic enrollment during the 1990s. Table 1 gives some basic characteristics (industry, firm size) on these and other companies analyzed in this paper.

Figure 1, extending the analysis in Choi et al. (2002) and (2004), shows the dramatic impact that the choice between these two different 401(k) enrollment protocols has on 401(k) participation for three different companies that switched from a standard enrollment regime to automatic enrollment between 1997 and 1998.<sup>3,4</sup> Under a standard enrollment regime, 401(k) participation is low initially and increases with employee tenure at a decreasing rate. Under automatic enrollment, however, participation jumps to between 86% and 96% of employees once it takes effect (between one and two months after hire in these companies) and increases only slightly thereafter. At low levels of tenure, the difference in participation rates under the standard enrollment and automatic enrollment regimes is substantial, with a difference of more than 50 percentage points at all three companies at 6 months of tenure. As participation increases with tenure under standard enrollment, these differences diminish but remain sizeable even after considerable periods of time. For example, at all three companies shown in Figure 1, employees

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<sup>2</sup> In a recent survey, Hewitt Associates (2001) reports that 14 percent of companies utilized automatic enrollment in 2001, up from 7 percent in 1999.

<sup>3</sup> The data for Company C are restricted to employees over the age of 40. This is because the eligibility requirement for employees under the age of 40 was changed at the same time that automatic enrollment was implemented.

<sup>4</sup> The experience of company B is also discussed in Madrian and Shea (2001). Figure 1 essentially replicates the analysis vis-à-vis participation in these earlier studies, but uses updated data allowing for a longer term analysis of the impact of automatic enrollment.

hired under automatic enrollment with 36 months of tenure have participation rates at least 30 percentage points higher than employees hired under standard enrollment with the same tenure.

Although we have shown evidence here for only three companies' experiences with automatic enrollment, Vanguard (2001) also documents large increases in 401(k) participation following the switch from standard enrollment to automatic enrollment at fifteen different client companies. The Vanguard results are not directly comparable, since its study analyzes only the impact of automatic enrollment on company-wide participation rates rather than the impact by tenure as we do here. However, its general findings are broadly consistent with those presented here and in Madrian and Shea (2001) and Choi et al. (2004).<sup>5</sup> Choi et al. also document similar effects on 401(k) participation rates when automatic enrollment is applied to previously hired but non-participating employees as well as to newly hired employees going forward.

#### *Requiring an Active Decision and 401(k) Participation*

Choi et al. (2003c) discuss a third approach to 401(k) enrollment that they call "active decision." This approach avoids the default implicit in both the standard enrollment (default of non-participation) and automatic enrollment (default of participation) protocols by requiring employees to actively indicate their 401(k) participation decision by a specific date, *regardless* of whether they want to enroll or not. Passively accepting a default is not an option. Choi et al. (2003c) analyze the experience of one company that switched from using active decision to standard enrollment in 1997. In this particular firm, Company D, the deadline for making a 401(k) participation decision was the 30th day of employment. Figure 2 shows the relationship between tenure and 401(k) participation rates under these two different enrollment regimes.

Under active decision, there is a marked increase in 401(k) participation rates relative to standard enrollment as employee election forms are processed between 2 and 3 months of tenure. At three months after hire, 401(k) participation is 28 percentage points higher for employees

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<sup>5</sup> When looking at overall 401(k) participation rates, Vanguard finds that automatic enrollment increases participation rates by 9 to 17 percentage points, depending on whether automatic enrollment applies to only newly eligible employees or to all non-participating employees as well. While these magnitudes are smaller than the effects documented here, they are not inconsistent with what we find. In most of the Vanguard companies, automatic enrollment was applied only to newly hired employees and was implemented within only a few years of the Vanguard study. The participation rates reported by Vanguard do not differentiate between employees hired before and after the adoption of automatic enrollment as we do here. Rather, the participation rates are calculated across all employees, and the figures reported for companies with automatic enrollment include both employees who were subject to automatic enrollment (primarily low tenure employees), and those who were not. The Vanguard study does note the limitations of this type of analysis.

required to make an active choice. While we do not know how automatic enrollment would have affected participation rates in this particular company, our guess is that automatic enrollment will generally lead to higher participation rates than active decision. This is because procrastination causes employees who do not want to be in the plan to delay opting out of 401(k) participation under automatic enrollment, whereas this non-enrollment preference is acted upon quickly under active decision.<sup>6</sup>

Automatic enrollment, active decision, and standard enrollment are three general approaches to enrolling employees in the 401(k) plan. Another plan design parameter that directly affects 401(k) participation is plan eligibility. Figure 3 shows the relationship between tenure and 401(k) participation rates for employees at three different companies who switched from either a 1-year or a 6-month waiting period to immediate eligibility.<sup>7</sup> Obviously, employees hired with immediate eligibility will have higher participation rates at low tenure levels than those employees hired with a waiting period.<sup>8</sup> This gap, however, closes within a few months after the waiting period expires at all three companies.

### *The Employer Match and 401(k) Participation*

Enrollment protocols and eligibility requirements affect participation rates directly by determining who can participate in the plan and the process required to enroll. There are several other plan features that act upon 401(k) participation rates indirectly, either by making the plan more attractive or by making the participation decision less complicated. The plan feature in this vein that has received the most attention is the employer match, which many companies have adopted specifically as an incentive to increase 401(k) participation.

Several studies have used cross-sectional data to document a positive correlation between the availability of an employer match and 401(k) participation, including Andrews (1992), GAO (1997), Bassett, Fleming and Rodrigues (1998), Papke and Poterba (1995), Papke (1995), Even and Macpherson (2003b), Engelhardt and Kumar (2003), and Huberman, Iyengar and Jiang (2003). Several studies have also documented a positive correlation between the *level* of the

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<sup>6</sup> We should note, however, that the fraction of employees opting out under automatic enrollment does not appear to increase much over time. Most employees who do not want to be in the 401(k) plan opt out right away (Madrian and Shea (2001) and Choi et al. (2004)).

<sup>7</sup> Two of these three companies, D and E, are analyzed in Choi et al. (2002).

<sup>8</sup> In the data, we observe a small fraction of employees enrolling prior to the date when they would seemingly be eligible to participate. We believe these employees left the company and then were rehired with previous tenure credited towards eligibility.

employer match and 401(k) participation, including Papke and Poterba (1995), Engelhardt and Kumar (2003), Huberman, Iyengar, Jiang (2003), Mundell, Sunden and Taylor (2000), and Clark and Schieber (1998). A limitation of many of these studies is that with cross-sectional data, they cannot control for the correlation between the employer match and other unobserved factors that affect 401(k) savings behavior.

The results on the relationship between the match rate and 401(k) participation are more varied in the studies that explicitly attempt to account for the potential correlation between the employer match and other unobserved factors that may affect savings. Even and Macpherson (2003b) 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.

Another approach to dealing with the potential correlation between the match rate that employees face and unobserved factors that also affect 401(k) savings is to exploit changes in the match rate that individuals receive while employed at a particular firm. This approach will be valid if other unobserved factors do not change discretely at the time of the match rate change. By using 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 disappears, 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 and their potential correlation with job security make it difficult to extrapolate these results to the permanent match changes that most companies are likely to consider.

Choi et al. (2002) study a company that introduced a permanent match where there was none previously. In contrast to the previous literature, which has focused on firm-level participation rates or binary indicators of individual-level participation at a point in time, Choi et al. (2002) model participation using a hazard model. Given the participation-tenure profiles in Figures 1

and 2, this is a more sensible approach to modeling the 401(k) participation decision. Although their results are difficult to generalize because they are estimated from only one company, they find that having a match leads to earlier 401(k) participation.<sup>9</sup> Moreover, the magnitude of the estimated effect is quite large, with a 25% match leading to roughly a 40% increase in tenure-specific participation rates.<sup>10</sup>

Overall, our assessment of the literature on the relationship between the employer match and 401(k) participation rates is that having a match increases the probability of 401(k) plan participation, although the magnitude of this effect has not been decisively estimated. There is less certainty about the extent to which increasing an already positive match rate leads to further increases in 401(k) participation.

#### *The Menu of Funds Offered and 401(k) Participation*

A plan feature with a somewhat paradoxical effect on participation is the degree of investment choice available to plan participants. Papke (2004) finds that having the ability to direct the asset allocation of contributions to an employer-sponsored savings plan leads to a large 36 percentage point increase in the probability of participating. By extension, one might think that having a *greater* number of funds available should make participation in the 401(k) plan *even more* attractive. Iyengar, Huberman and Jiang (2003), however, document a strong *negative* relationship between the number of funds offered in a 401(k) plan and average participation rates; increasing the number of funds offered by 10 leads to a 1.5 to 2.0 percentage point decline in the firm-level average 401(k) participation rate. The explanation offered is that increasing the number of options available to participants overwhelms them. Not only the number of funds, but the types of funds available in the fund menu have the potential to affect 401(k) participation. Huberman, Iyengar and Jiang (2003) find a 2.5 percentage point higher probability of 401(k) participation in firms for which company stock is an investment option. While intriguing, these results share the same problem as much of the matching literature: in cross-sectional data, it is

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<sup>9</sup> The company examined in Choi et al. (2002) implemented a match of \$0.25 per dollar contributed on the first 4% of contributions.

<sup>10</sup> Choi et al. (2002) also examine the impact increasing the match threshold at a specific firm (Firm G in Figure 5) has on the 401(k) participation hazard. As one might expect for a change that does not affect the marginal incentives to participate in the 401(k) plan, they find that this increase in the match threshold has no significant effect on participation.



difficult to control adequately for correlation between the fund menu and other unobserved characteristics that also affect 401(k) participation.

#### *Loans and 401(k) Participation*

A final 401(k) plan feature designed to make participation more attractive is the option for participants to take out a loan against their plan balances. To our knowledge, the only study that has examined the relationship between loan availability and 401(k) participation is a GAO study (1997). Using cross-sectional firm-level data, the GAO finds that participation rates in plans that allow for loans are 6 percentage points higher than in plans that do not allow for loans. The same caveat applies to this study as to many others already discussed: there is a potential correlation between loan availability and other unobserved plan or individual characteristics that also affect 401(k) participation.

#### *Defined Benefit Pension Plans and 401(k) Participation*

While not an explicit feature of 401(k) plan design, the availability of a defined benefit pension plan could also be relevant to the 401(k) participation decision. The empirical evidence, however, on the relationship between defined benefit pension plan coverage and 401(k) participation is mixed. Andrews (1992), Bernheim and Garrett (2003) and Papke (1995) all find that individuals covered by another non-401(k) pension plan are less likely to participate in a 401(k) plan. Similarly, Munnell, Sunden, and Taylor (2000) estimate a negative relationship between defined benefit pension wealth and the probability of participation in a 401(k) plan, while Clark and Shieber (1998) find that having a more generous defined-benefit pension plan is negatively correlated with the probability of participating in a 401(k) plan (although the estimated effect is small in magnitude). In contrast, Huberman, Iyengar and Jiang (2003) show that mean 401(k) participation rates are much lower for employees working in firms that offer a defined benefit pensions plan than in firms that do not (68% vs. 76%), but that this difference in 401(k) participation probabilities is completely eliminated once other observable individual and plan-level attributes are controlled for. Even and Macpherson (2003b) find that the probability of 401(k) participation is actually *higher* for those employees covered by a defined benefit pension plan or another type of defined contribution plan. They conjecture that participation in another

non-401(k) pension or savings plan proxies for a strong unobserved taste for saving which carries over into higher 401(k) participation probabilities.

*Summary: 401(k) Plan Design and 401(k) Participation*

If the goal of either employers or government regulators is to achieve the highest possible 401(k) participation rate, the single most effective intervention is automatic enrollment. Automatic enrollment, however, is far from being ubiquitous. There are two primary concerns employers have about automatic enrollment. First, many firms worry about the potential legal liability associated with automatic enrollment, despite the fact that the U.S. Treasury Department has issued a series of opinion letters supporting the use of automatic enrollment.<sup>11</sup> Second, the key reason behind automatic enrollment's success at increasing participation rates—making participation the default—is also its greatest drawback: employees tend to stick with the default contribution rate and asset allocation chosen by the employer (Madrian and Shea, 2001; Choi et al. 2004).

Although the empirical research on the active decision approach to 401(k) enrollment is, at this point, largely a case study, this approach does appear to achieve most of the participation gains associated with automatic enrollment without the drawbacks. Employees do not face an employer-selected default contribution rate and asset allocation, and consequently end up choosing for themselves. Choi et al. (2003a, 2003b, and 2003c) provide a theoretical framework for thinking about the tradeoffs in the adoption of automatic enrollment, standard enrollment, or active decision. In particular, Choi et al. (2003c) discuss the circumstances in which each of these approaches is likely to be optimal from the perspective of a benevolent employer interested in maximizing employee welfare within the 401(k) plan.

Other plan features, such as instituting or increasing an employer match, offering 401(k) loans, or limiting the number of funds available, also have the potential to increase 401(k) participation rates. However, the participation effects from these interventions are decidedly smaller than those that can be obtained by focusing directly on facilitating enrollment.

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<sup>11</sup> See IRS Revenue Rulings 98-30 (Internal Revenue Service 1998) and 2000-8 (Internal Revenue Service 2000a). See also Revenue Rulings 2000-33 and 2000-35 (both Internal Revenue Service 2000b).

### III. Plan Design and 401(k) Contribution Rates

Once employees have initiated participation in the 401(k) plan, the choice that has the greatest direct impact on asset accumulation is how much is contributed to the plan. There are four key elements of 401(k) plan design that affect employee contribution choices: the default contribution rate, the match threshold, the maximum contribution rate, and the legal limit on total dollars contributed. The first three of these are parameters over which employers have a large amount of discretion, while the last is dictated to employers by the government (although employers can choose to have a maximum contribution amount that is lower than the government limit). There is a large literature examining the impact of the employer match rate on contributions, but little attention has been given to these other features of plan design.

#### *Automatic Enrollment and 401(k) Contribution Rates*

The most powerful instrument for affecting employee contributions is the default contribution rate. The dashed lines in Figure 4 show the relationship between tenure and the fraction of 401(k) participants at the automatic enrollment default contribution rate in the three automatic enrollment companies previously shown in Figure 1.<sup>12</sup> (We will discuss the solid gray and black lines in Section IV.) At all of these companies, the default contribution rate is low (either 2 or 3%) and well below the match threshold (6% at all three). The thicker dashed lines give the profiles for employees who were hired under automatic enrollment and thus directly affected by the automatic enrollment default. The thinner dashed lines give the profiles for employees hired before automatic enrollment and who voluntarily chose a contribution rate equal to the automatic enrollment default.

At low levels of tenure, over 70% of participants at all three of these companies contribute at the default. The fraction of participants at the default decreases with tenure as participants gradually move to a different (usually higher) contribution rate. Nonetheless, a large fraction of participants remains at the default contribution rate even after 3 or 4 years. This stands in marked contrast to the contribution rates chosen by participants at these same companies prior to automatic enrollment. The lower dashed lines in Figure 4 show that very few participants not

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<sup>12</sup> The lines in Figure 4C display much more variability than the lines in Figures 4A and 4B. This is because the sample in Company C is restricted to employees over the age of 40 and hence smaller. The lines in Figure 4B do not exhibit the sharp increase in months 2-3 seen for Companies A and C because the opt-out period in Company B was shorter than in Companies A and C and the participation status for employees at Company B is not observed before the opt-out period ends. See Choi et al. (2004) for more discussion of these patterns.

subject to automatic enrollment selected the automatic enrollment default contribution rate. Rather, the modal contribution rate for these employees was the 6% match threshold. (This is not shown by the lines in Figure 4.) Madrian and Shea (2001) and Choi et al. (2004) show that the prominence of the default contribution rate under automatic enrollment arises both from moving employees from a zero contribution rate to the default contribution rate (the participation effect discussed in Section II) and from moving employees who would have been at a different (typically higher) positive contribution rate to the default.

#### *Automatic Contribution Rate Escalators and 401(k) Contribution Rates*

Another 401(k) plan feature designed explicitly to increase employee contribution rates is an automatic contribution rate escalator. The prototypical implementation of this type of escalator is the “Save More Tomorrow” (SMarT) plan developed by Shlomo Benartzi and Richard Thaler (Benartzi and Thaler, 2004). Under SMarT, participants consent to allow their contribution rate to increase in the future if they take no further action; in other words, they opt into a default of rising contributions. The striking results of the first experiment with the SMarT plan, in which employees signed up for future contribution rate increases of 3 percentage points per year, are reported in Benartzi and Thaler (2004). At the company studied, employees who elected to participate in the SMarT plan saw their 401(k) contributions increase by 8.1 percentage points over 3 years, from 3.5 to 11.6% of pay. In contrast, employees who elected not to participate in the SMarT plan had higher initial contribution rates but increased their 401(k) contributions by only 4.3 percentage points over 3 years, from 4.4 to 8.7% of pay. These results show that an automatic contribution rate escalator can have an enormous impact on contribution rates.

#### *The Employer Match and 401(k) Contribution Rates*

The empirical evidence on matching and 401(k) contribution rates is even less decisive than that on 401(k) participation. This may be because in theory, the effects of a match are less straightforward as well, a point that has not been recognized in much of the literature. While introducing an employer match where there was none 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 are similar for increasing the match rate

while maintaining the same match threshold. The effect of increasing an existing non-zero match threshold while keeping the match rate constant should vary with the initial contribution rate. For those employees contributing below the old threshold, an increase in the match threshold should have no effect; for those at the old threshold, contribution rates should increase (a substitution effect); for those above the old threshold but below the new threshold, the change in contribution rates is theoretically ambiguous (opposing income and substitution effects); and for those initially contributing above the old threshold, contribution rates should decrease (an income effect).

The empirical literature 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), Even and Macpherson (1997), and Kusko, Poterba, and Wilcox (1998) find a positive relationship. Papke (1995) finds a positive effect of the match rate on total employee contributions at low match rates but a negative effect at higher match rates. Huberman, Iyengar and Jiang (2003) find a positive relationship between the match rate and the average employee contribution to the 401(k) plan, but attribute most of this effect to the increase in participation induced by a higher match; among participants, they find that higher match rates actually reduce contributions except for those with very high income. Similarly, Cunningham and Engelhardt (2002) find little relationship between the match rate on the first dollar of employee contributions and total 401(k) contributions. Although somewhat disconcerting, the disparate results from these studies are not so surprising given that theory has little to say about the impact of the match rate on average 401(k) contributions.

The two papers that have tried to analyze the impact of the employer match on 401(k) contributions in a manner consistent with the economic theory outlined above are Choi et al. (2002) and Engelhardt and Kumar (2003). These two papers, however, take very different empirical approaches.

Engelhardt and Kumar (2003) use non-linear budget constraint methods to estimate how much employees contribute to the 401(k) plan. This methodology explicitly incorporates both the match rate and the match threshold in the employees' optimization problem. They find that

401(k) contributions do increase with a higher match rate, both on the participation margin and the contribution margin conditional on plan participation.

Choi et al. (2002) use participant-level data combined with plan-level information on match rates and thresholds. They show how the distribution of contribution rates responds to a change in the structure of the 401(k) match at two different companies. In Figure 5A, the distribution of contribution rates is shown for two sets of 401(k) employees at Company E: those who were hired from July 1998 through December 1999 (before the company offered a match), and those who were hired from July 2000 through December 2001 (after the company implemented a 25% match on the first 4% of pay contributed to the plan).<sup>13</sup> Before the employer match, the most frequently chosen contribution rates of plan participants were 5%, 10%, and 15%.<sup>14</sup> After the employer match, there was a large increase in the fraction of employees with a 4% contribution rate—the new match threshold—relative to the older cohort at the same level of tenure. This is consistent with the economic incentive employees face to contribute at the match threshold, and also with the hypothesis that the match threshold serves as a powerful focal point for employees' contribution rate choices. Note that the increase in the fraction of employees at the 4% contribution rate does not appear to be offset by a decrease in the fraction of employees at other contribution rates; rather, it appears to be driven by increased participation in the plan (as discussed in Section II).

Figure 5B shows the impact of changing the match threshold in Company G, where there was a pre-existing match (also documented in Choi et al. 2002).<sup>15</sup> Before 1997, union workers received a 50% match on the first 5% of income contributed to the 401(k) plan, while management received a 50% match on the first 6% of income. Employees were free to invest their match money in any of the funds in the 401(k) menu. On January 1, 1997, the match threshold for union employees increased to 7%, while that for management increased to 8%.

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<sup>13</sup> Because this implementation of a match affected participation in the 401(k) plan as discussed in Section II (and as the theory described above would predict), the distribution of employees at the various contribution rates in Figure 5A is based on the full sample of employees, not just plan participants. We have, however, excluded the non-contributors (those at a 0% contribution rate) from the graph because they constitute a large fraction of the sample, and including them obscures the variation in contribution rates across the contributing population. As a result, the distribution of contribution rates in Figure 5A does not sum to 100%.

<sup>14</sup> Anecdotally, contributions rates that are a multiple of 5 are quite common in companies without a match and among employees who are saving well above the match threshold in companies that have a match.

<sup>15</sup> As noted in footnote 10, Choi et al. (2002) document that the increase in the match threshold at this company does not increase 401(k) participation. The comparison of the two cohorts in Figure 5B is thus not contaminated by a selection effect, as is the case with the *de novo* adoption of a match in Figure 5A.

Contributions up to the new threshold were still matched at 50%, but the match on the incremental 2% was invested in employer stock.

The black bars in Figure 5B show the distribution of initial contribution rates for workers who enrolled in the plan from April to December 1996, when the lower (5 or 6%) match threshold was still in effect. The distribution for workers who initiated participation from April to December 1997 after the higher (7 or 8%) match threshold was adopted is shown by the gray bars. The switch from the old threshold to the new threshold is clearly apparent, with a substantial fraction of participants choosing whatever the relevant match threshold was (33% at the higher threshold, and 43% at the lower threshold). Figure 5B also shows the importance of contribution rates that are multiples of 5 for employees who choose to save at a rate above the match threshold.

Overall, our assessment of the relationship between the 401(k) match and contribution rates is that the match matters: both a higher match rate and a higher match threshold lead to higher contribution rates. The widely divergent empirical results in the literature on matching appear to result from empirical analysis that does not carefully account for the effect of both the match rate and the match threshold on employee contribution rates.

#### *The Menu of Funds Offered and 401(k) Contributions*

The impact of investment options on contribution rates has only recently been examined in the literature, and the results are limited. Papke (2004) finds that the ability to exercise choice over investment allocations in defined contribution plans increases contribution rates by one to three percentage points relative to the contribution rate that would be chosen in the absence of participant direction. Similarly, Cunningham and Engelhardt (2002) find that having investment discretion increases contribution amounts by 27 percent. On the other hand, consistent their results on fund options and participation discussed in Section II, Huberman, Iyengar and Jiang (2003) find that increasing the number of fund options results in lower contribution rates. In contrast to their results on participation, they find no systematic effect on contributions of the availability of company stock in the fund menu.

### *Loans and 401(k) Contributions*

There is little literature examining the impact of loan provisions in 401(k) plans on contribution levels. Two of the three studies we are aware of suggest that giving employees the option to borrow from their 401(k) accounts increases contribution rates. Specifically, the GAO (1997) uses cross-sectional firm-level data and finds that average annual employee contributions in 401(k) plans with loan provisions are 35% higher than in plans that do not offer loans. Similarly, Holden and VanDerhei (2001) analyze participant-level data and find that on average, a participant in a plan offering loans contributes 0.6 percentage points more of his or her salary to the plan than a participant in a plan without loans. In contrast, Cunningham and Engelhardt (2002) find only mixed evidence that access to 401(k) savings through loans or hardship withdrawals has any impact on employee contributions.

### *Defined Benefit Pension Plans and 401(k) Contributions*

As with the empirical evidence on defined benefit pension plan coverage and 401(k) participation, the empirical evidence on the impact of defined benefit pensions on 401(k) contributions is also mixed. Cunningham and Engelhardt (2002) find that non-401(k) pension coverage is associated with substantial reductions (22 to 44%) in 401(k) contributions. Munnell, Sunden, and Taylor (2000) find that conditional on participation, the level of wealth in a defined benefit plan has a negative but insignificant impact on 401(k) contribution rates. Similarly, Clark and Shieber (1998) find no difference between the 401(k) contribution rates of participants that do and do not have a defined benefit pension plan. In contrast, Huberman, Iyengar and Jiang (2003) find that those covered by a defined benefit pension plan contribute slightly more on average to their 401(k) plan.

### *Summary: 401(k) Plan Design and 401(k) Contributions*

401(k) plan design clearly has an important impact on 401(k) contribution rates. Employees tend to save at contribution rates that are either multiples of 5 or that serve some specific purpose in the 401(k) plan—the default contribution rate, the match threshold, or the maximum contribution rate. This suggests that employers can have a tremendous impact on how much employees save for retirement simply by changing the design of their 401(k) plan. Companies can easily increase the amount that employees save in their 401(k) plan by increasing the default



contribution rate, setting a higher match threshold, or increasing the maximum contribution limit (although different employees will be affected by changes to these different contribution rate parameters). Companies can also increase the amount that employees save by making automatic contribution rate escalators available or the default. Other aspects of plan design, such as the match rate or 401(k) loan availability, have some effect on employee contributions, but these effects are small relative to the effects of explicitly changing the contribution rates that serve a plan design purpose or incorporating automatic escalators into the plan design.

#### **IV. Plan Design and the Allocation of 401(k) Assets**

The impact of plan design on 401(k) savings also includes the allocation of assets within an employee's 401(k) account. For this aspect of savings, the plan features that matter most are whether or not participants have investment discretion and the menu of funds available.

##### *Participant Choice and 401(k) Asset Allocation*

Obviously, if the employer chooses how plan assets are allocated and participants have no investment discretion, then asset allocation is completely determined by plan design. The impact of participant discretion on asset allocation then turns on how individuals invest differently from their employers. Papke (2004) finds that for participants with investment choice, the share of assets allocated to equities is 13 percentage points higher than for participants with no investment choice.<sup>16</sup> Conditional on choice being available, however, offering investors more options in their menu of funds appears to have the opposite effect on asset allocation. Iyengar and Jiang (2003) find that an increase in the number of funds available to participants is correlated with a shift in asset allocation out of equities and into less risky money market and bond funds. They speculate that this effect arises because having more funds from which to choose increases the loss aversion associated with the asset allocation decision, leading investors to favor more conservative assets such as money market funds.

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<sup>16</sup> Papke (2003) finds that profit-sharing plans, where employers often allocate contributions to company stock, are an exception to this result. In these plans, participant choice actually results in a lower fraction of assets being held in equities, presumably because participants who are given a choice diversify out of company stock.

### *The Menu of Funds Available and 401(k) Asset Allocation*

Another important aspect of plan design is what kinds of funds are available to plan participants. Benartzi and Thaler (2001) study the relationship between the menu of investment choices and asset holdings across different asset 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 data on plan-level asset allocation, Benartzi and Thaler (2001) find a positive relationship between the fraction of equity funds offered by a plan and the fraction of the overall plan portfolio invested in equities.

### *Company Stock and 401(k) Asset Allocation*

Perhaps the most economically important plan feature influencing asset allocation is whether or not company stock is included as an investment option, and if so, whether or not the employer match is invested in company stock. Several recent papers have documented the excess risk that employees face when company stock comprises a large fraction of their 401(k) portfolio.<sup>17</sup> Interestingly, ERISA restricts defined benefit pension plans' investment in the stock or real estate of the employer to 10% of total assets. 401(k) plans, however, are exempt from this rule. As a result, many companies have 401(k) plans in which company stock is not only available as an investment option, but it is the predominant investment choice.

Holden and VanDerhei (2001) and VanDerhei (2002) report that across all 401(k) plans—both those with and without company stock as an investment option—19% of assets are held in company stock. Among those plans that do include company stock as an investment option, the fraction of assets held in company stock is obviously much higher. These plans can be further categorized into plans where participants have full discretion over their investments and plans where participants have discretion over their own contributions but the employer match is invested in company stock. In the latter type of plans, some companies allow participants to immediately trade out of company stock, while others impose holding requirements.<sup>18</sup> Holden and VanDerhei (2001) and VanDerhei (2002) report that in plans offering company stock as an

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<sup>17</sup> See for example Muelbroek (2002), Poterba (2003), and Even and MacPherson (2003).

<sup>18</sup> There are government regulations requiring that employees in 401(k) plans be given the right to diversify out of company stock upon reaching age 55. If company stock in a 401(k) plan is held through an ESOP, employees must be allowed to diversify up to 25% of the company stock in their accounts once they reach age 55 and have 10 years of participation in the plan. At age 60, the fraction rises to 50%.

investment option but not matching in company stock, 29% of assets are held in company stock; in plans where the employer match is directed into company stock, a much larger fraction of assets, 53%, is held in company stock. While these numbers are simply averages across plans and do not control for differences in other investment options and plan participant demographics, they nonetheless suggest that plan design greatly influences the risk that employees face in their 401(k) portfolio through potentially excessive holdings of company stock. They are also consistent with the evidence presented in sections II and III on the impact of defaults on 401(k) participation and contribution rates; defaulting employer matching contributions into company stock will greatly affect asset allocation, even if employees are able to immediately diversify out.

#### *Automatic Enrollment and 401(k) Asset Allocation*

Automatic enrollment defaults affect not only participation status and contribution rates, but also asset allocation. Figure 4 shows the relationship between tenure and the fraction of participants who are 100% invested in the default fund (the gray lines) or who are 100% invested in the default fund and also contribute at the default contribution rate (the solid black lines). The thicker lines give the profile for employees who were hired under automatic enrollment and are thus directly affected by the automatic enrollment default. The thinner lines give the profile for employees hired before automatic enrollment and who voluntarily chose an asset allocation equal to the automatic enrollment default. The difference in asset allocation between the two regimes is just as dramatic as the difference in contribution rates, and the persistence of the default asset allocation is similar to that of the default contribution rate.

The economic significance of automatic enrollment's impact on asset allocation depends on which default fund employers choose. Empirically, most companies with automatic enrollment have chosen a conservative default—either a money market fund or a stable value fund.<sup>19</sup> In these companies, automatic enrollment results in a more conservative 401(k) portfolio.

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<sup>19</sup> A recent Profit Sharing/401(k) Council of America (2001) survey reports that 76% of automatic enrollment companies have a stable value or money market default fund. These findings are echoed in a report on Vanguard client experiences with automatic enrollment: 53% have a stable value or money market default fund (Vanguard 2001).

### *Other Plan Features and 401(k) Asset Allocation*

There are two other plan features that could potentially affect asset allocation but on which little actual evidence is available. The first is automatic rebalancing. This is typically a voluntary program (although it could be made the default) where participants select an asset allocation that the plan maintains by periodically rebalancing. This is designed to keep asset allocations from becoming too heavily weighted towards asset classes that have done well in the recent past. Another interesting plan feature is the inclusion of a managed investment option, where a professional money manager chooses the allocation of investments. Recent research by Benartzi and Thaler (2002) suggests that many participants would prefer an investment allocation chosen by others to the investment allocation that they themselves choose. It is unclear at this point, however, how the inclusion of such an option would affect asset allocations in a plan. The answer depends upon the popularity of such an option (if it were not the default) and the difference between the investment manager's choices and what participants in the program would have chosen for themselves.

### **V. Plan Design and Cash Distributions Following Termination**

A final aspect of plan design that has the potential to greatly affect long-run retirement asset accumulation is the treatment of the 401(k) balances of former employees. When an employee leaves a firm, he or she may 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. Anecdotally, most employers exercise this option. There are, however, other choices available. For example, the firm could elect to maintain the balances of all former employees, regardless of whether the accumulations exceed \$5,000, unless directed to do otherwise. Alternatively, the employer could automatically roll over the balances of terminated employees into an IRA unless directed to do otherwise.<sup>20</sup>

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<sup>20</sup> As with automatic enrollment in 401(k) plans, default rollovers have also been sanctioned by the IRS (IRS Revenue Rulings 2000-36, Internal Revenue Service 2000b).

Choi et al. (2002) document the important relationship between balance size and the likelihood that a terminated employee receives a distribution from a 401(k) plan in two companies, A and C. In Figure 6, we extend their analysis to consider the cash distribution patterns at two additional companies, H and I. The sample for all four companies is 401(k) participants whose employment terminated any time between January 1999 and August 2000. We sort the employees by the size of their 401(k) 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.<sup>21</sup> Note that 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, A, C and H, 88 to 91% of terminated participants with prior year-end balances less than \$1,000 receive a cash distribution subsequent to termination. In Company I, this fraction is lower—about 70% on average. (Interestingly, Company I is a financial services firm.) In contrast, the fraction of terminated participants with balances over \$5,000 prior to termination who receive a cash distribution is much lower. In Companies C and H, about one-third receive a cash distribution, while in companies A and I, the fraction lower still—less than 20%. Between \$1,000 and \$5,000 in prior year-end balances, the fraction of terminated participants receiving a distribution falls steadily and substantially at all four firms. This reflects the decreasing likelihood that terminated participants will have a final balance less than \$5,000.

Of course, even in the case of an automatic cash distribution, former employees have the option to roll their account balances over into an IRA or the 401(k) plan of another employer. But previous research suggests that the probability of receiving a cash distribution and rolling it

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<sup>21</sup> 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.

over into an IRA or another 401(k) plan is very low when the distribution is small. Instead, these small distributions tend to be consumed.<sup>22</sup>

The treatment of small account balances following termination is one aspect of plan design that is likely to change as new government regulations take effect. Under the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA), if the account balance of a former employee is between \$1,000 and \$5,000, employers will no longer be able to compel a cash distribution if a former employee does not request a rollover; rather, employers will be required to establish an IRA on behalf of participants if they do not wish to maintain these accounts (Watson Wyatt Worldwide 2001). This provision of the law is scheduled to take effect after the Department of Labor issues final regulations regarding implementation, something that is slated to happen during 2004.

## **VI. Conclusion**

This paper has surveyed the growing literature on how 401(k) savings are affected by a myriad of different plan features. The results clearly indicate that plan design affects many important facets of 401(k) savings behavior. Employers have a large measure of control over how quickly employees sign up for the 401(k) plan through the enrollment protocol that they adopt. Employers significantly influence the fraction of salary that employees choose to save through their choice of the default contribution rate and match threshold. Employers can sway the asset allocation of employees with the size and composition of the plan's fund menu. And employers can facilitate long-term retirement savings by not compelling cash distributions for employees who terminate with small account balances.

The central finding that plan design matters in economically significant ways places a tremendous responsibility on both employers and government regulators. Whatever plan design an employer chooses will favor certain outcomes over others. Employers can try to escape making tough decisions about how and how much employees ought to be saving for retirement by giving employees choices and letting them decide for themselves. However, even this type of laissez-faire plan design will itself influence outcomes relative to other design choices that could

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<sup>22</sup> Poterba, Venti and Wise (1998) report that the probability that a cash distribution is rolled over into an IRA or another employer's plan is only 5 to 16% for distributions of less than \$5,000. 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%.

have been made. In short, there is no escape. Policymakers should also recognize the importance of plan design, as they can legislatively encourage and facilitate employer adoption of particular 401(k) designs that foster better retirement savings outcomes for employees.

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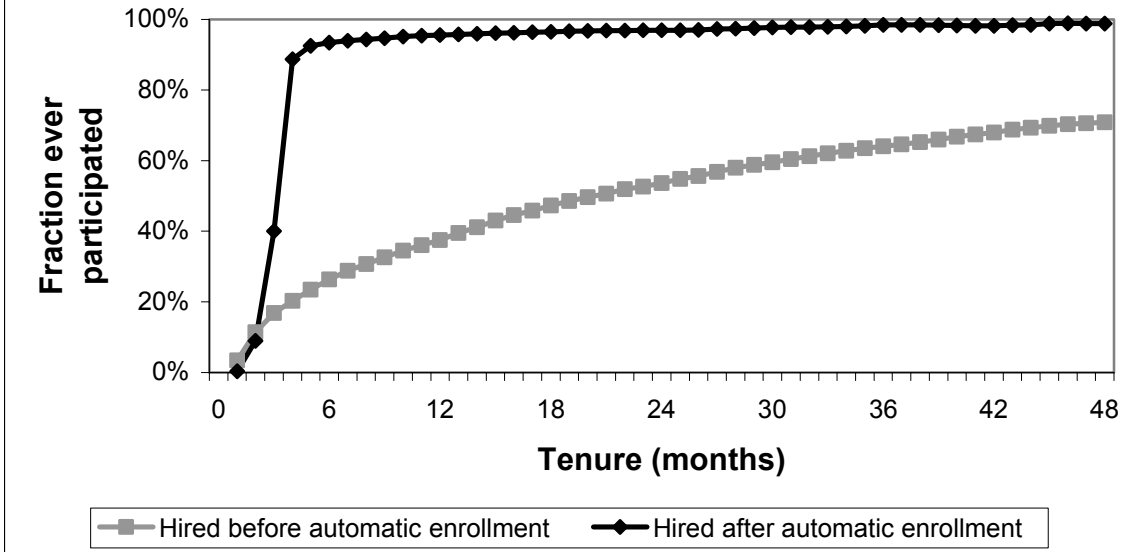
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**TABLE 1. Companies and Their 401(k) Plan Changes or Other Interventions**

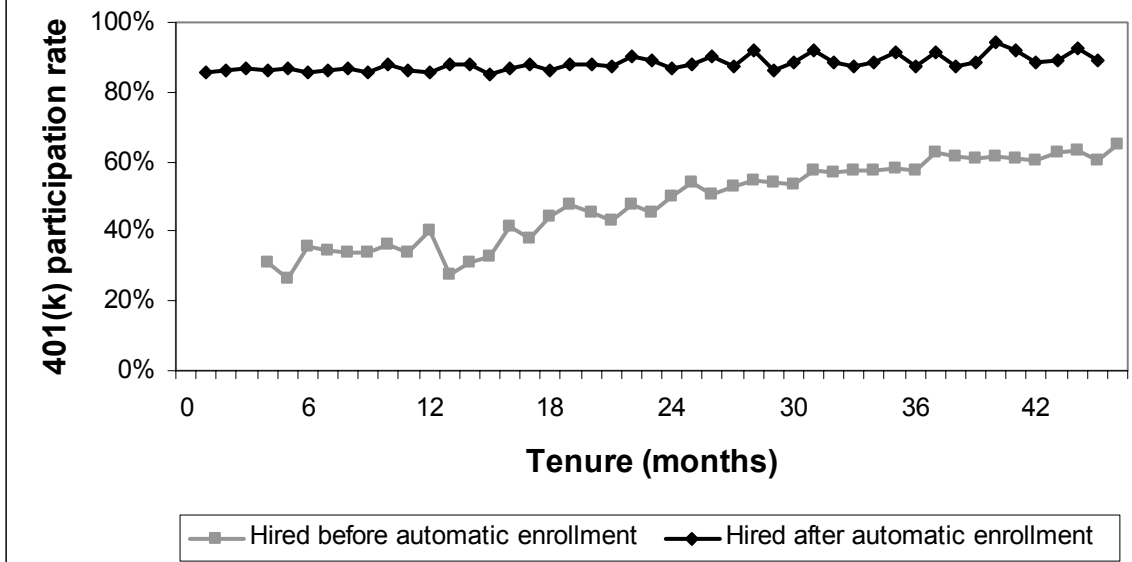
Company	Industry	Size <sup>a</sup>	Plan Change/ Intervention	Date of Change/ Intervention
A	Office equipment	30,000	Automatic enrollment	January 1997
B	Insurance	30,000	Automatic enrollment	April 1998
C	Food	20,000	Automatic enrollment	January 1998
D	Insurance	40,000	Change eligibility Eliminate active decision	January 1997 November 1997
E	Consumer packaged goods	40,000	Change eligibility Instituted employer match	July 1998 October 2000
F	Pharmaceutical	10,000	Change eligibility	January 1996
G	Utility	10,000	Increased match threshold	January 1997
H	Retail	130,000	None	NA
I	Financial Services	50,000	None	NA

<sup>a</sup> Number of employees (rounded to the nearest 10,000) on December 31, 2000 (Companies A, C, D, E, H, I), June 30, 2000 (Company B), or December 31, 1998 (Companies F, G).

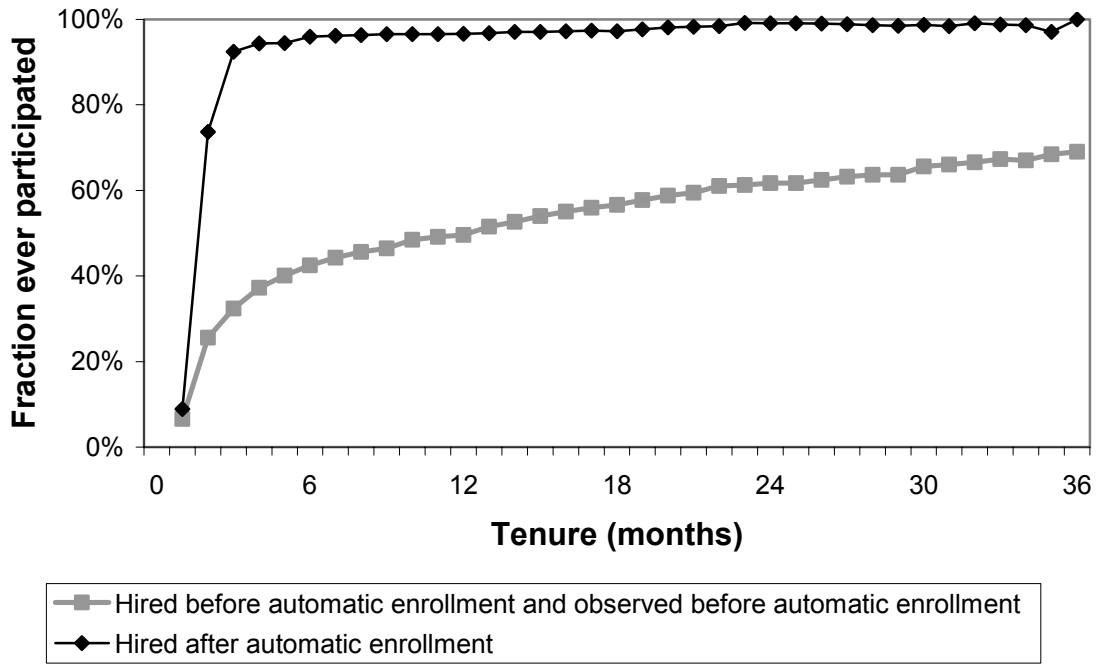
**FIGURE 1A. 401(k) Participation by Tenure:  
Company A**



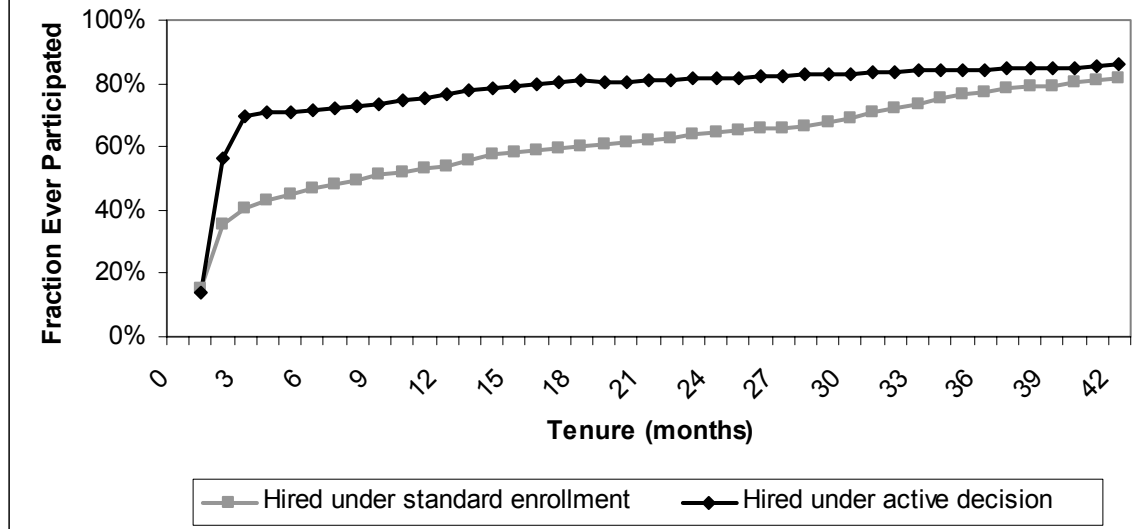
**FIGURE 1B. 401(k) Participation by Tenure:  
Company B**



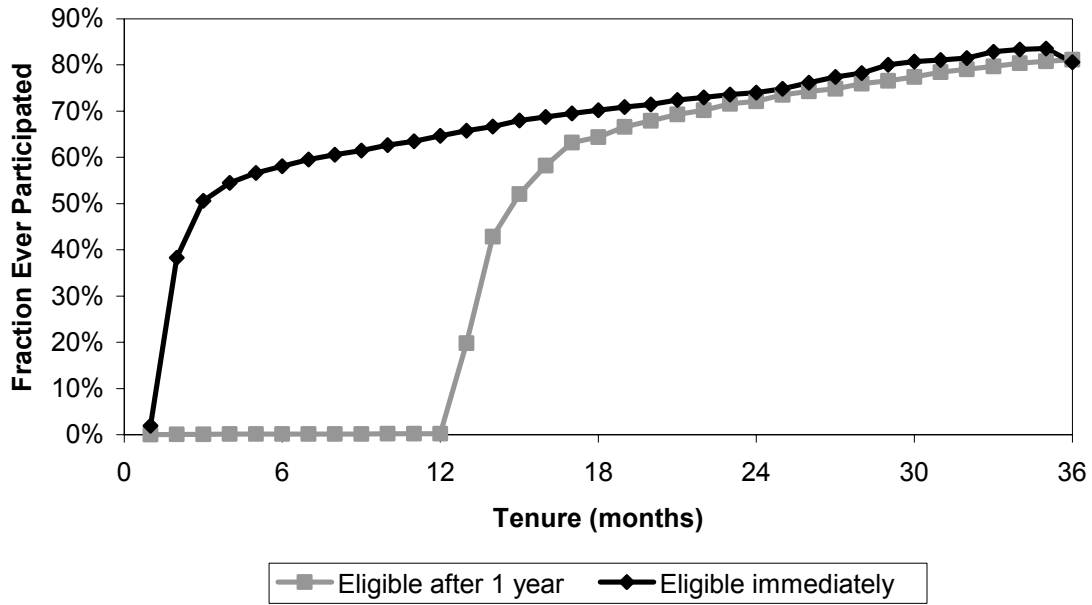
**FIGURE 1C. 401(k) Participation by Tenure for Employees Aged 40+ at Hire: Company C**



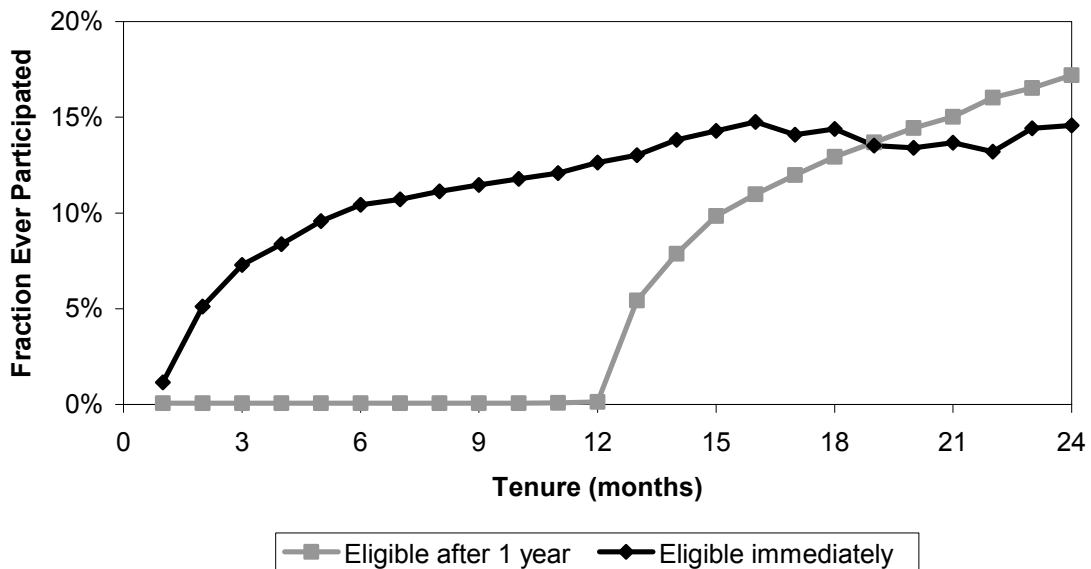
**FIGURE 2. Fraction of Employees Ever Participating in the 401(k) Plan by Tenure: Company D**



**FIGURE 3A. Waiting Periods and 401(k) Participation:  
Company D**

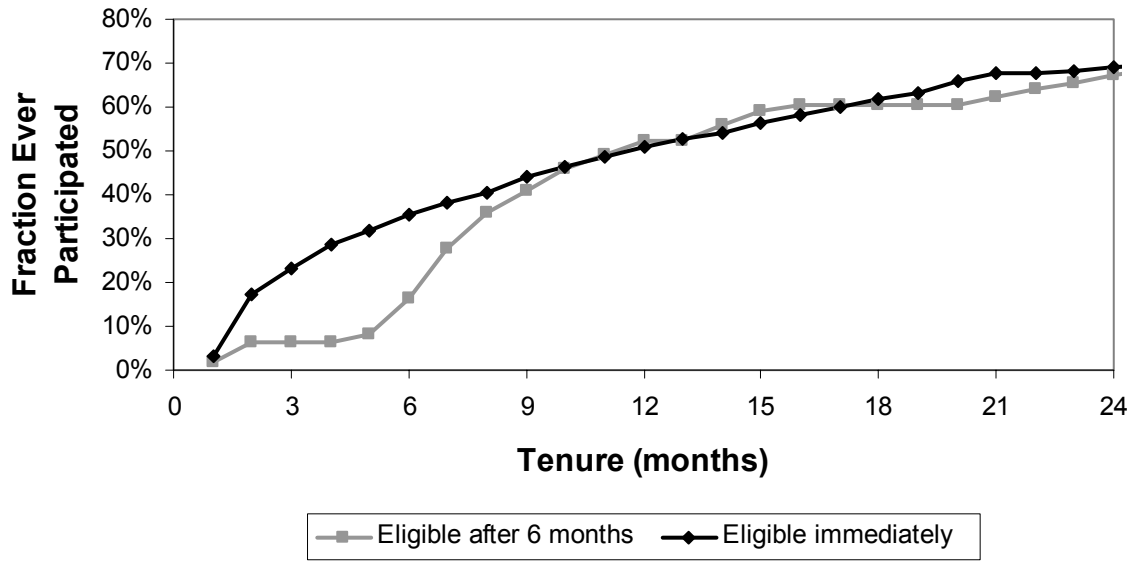


**FIGURE 3B. Waiting Periods and 401(k) Participation:  
Company E**

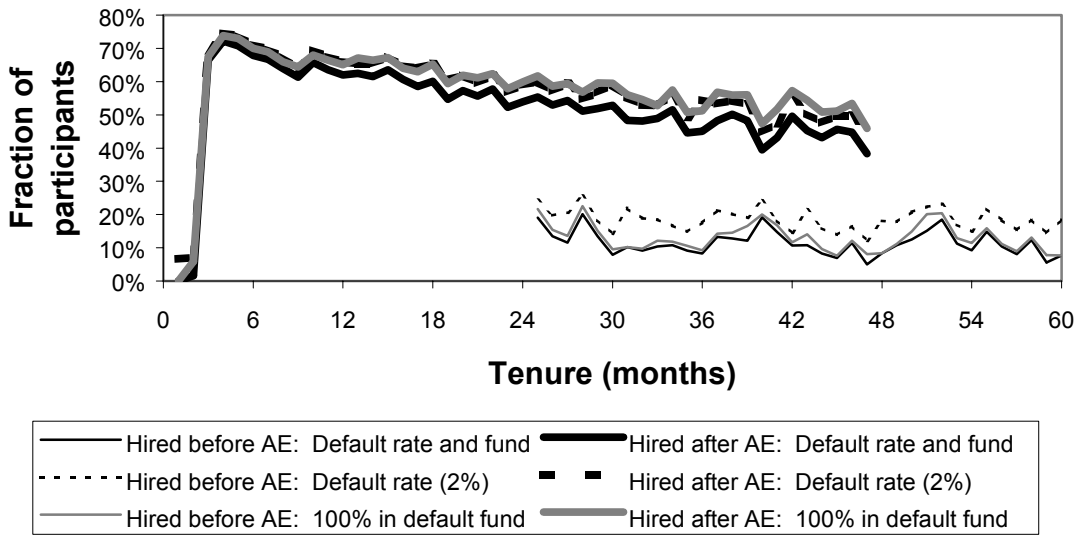




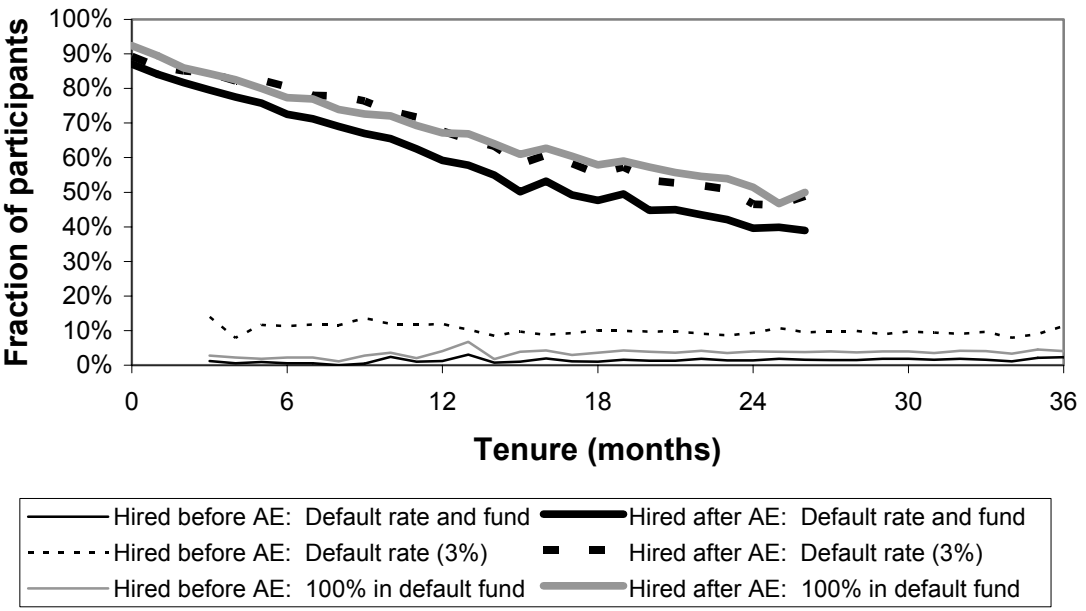
**FIGURE 3C. Waiting Periods and 401(k) Participation:  
Company F**



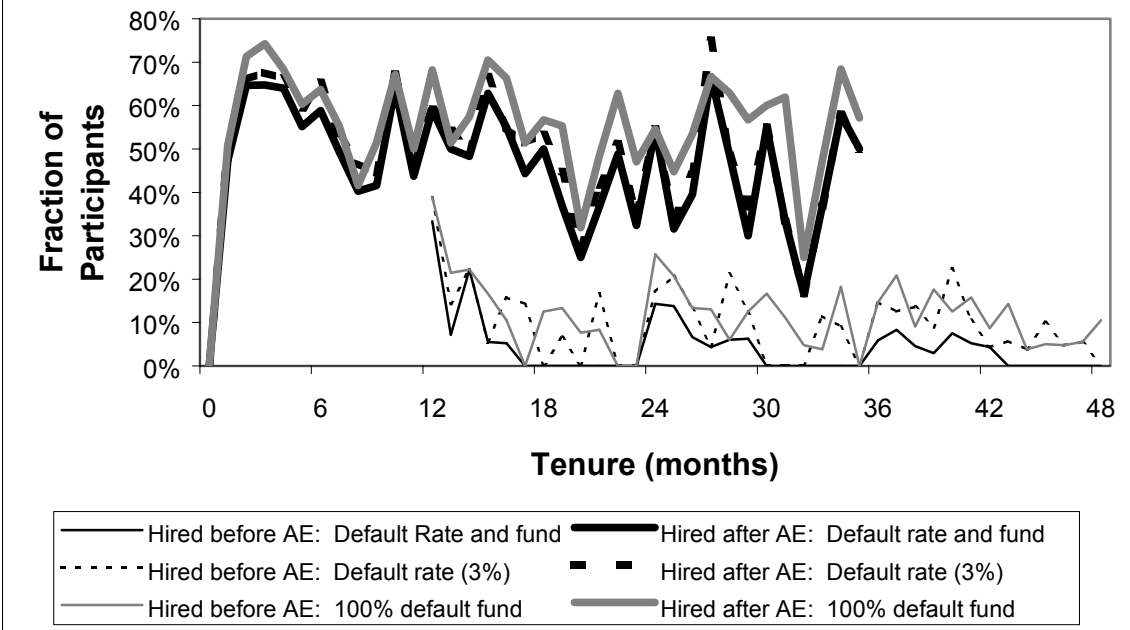
**FIGURE 4A. Default Savings Behavior and Tenure:  
Company A**



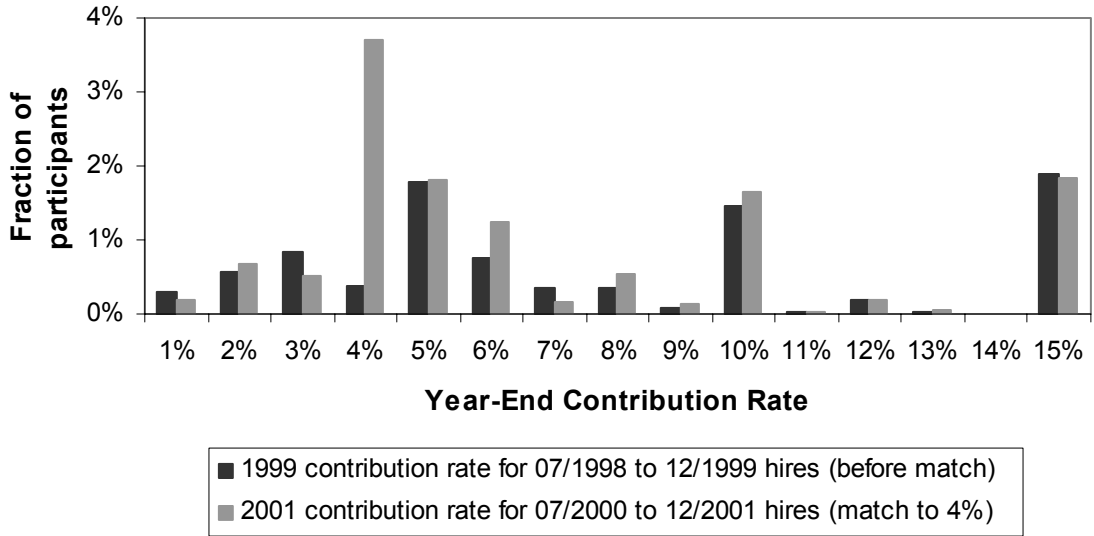
**FIGURE 4B. Default Savings Behavior and Tenure:  
Company B**



**FIGURE 4C. Default Savings Behavior and Tenure of Employees Aged 40+ at Hire: Company C**



**FIGURE 5A. The Distribution of Contribution Rates by Date of Initial Hire: Company E**



**FIGURE 5B. The Distribution of Initial Contribution Rates by Date of Initial Participation: Company G**

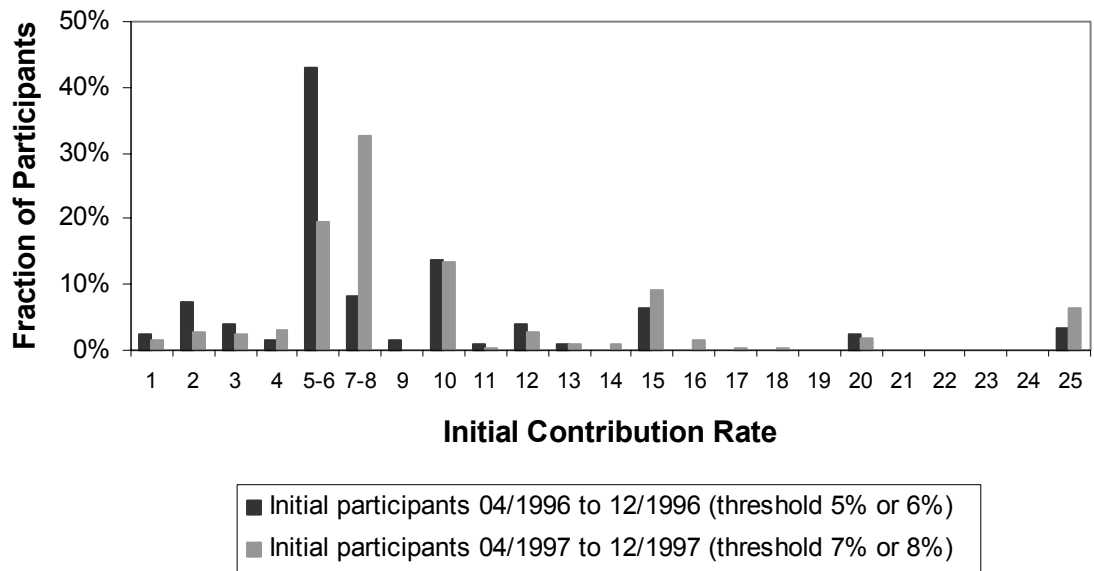


FIGURE 6A. Balances and the Probability of a Cash Distribution: Company A

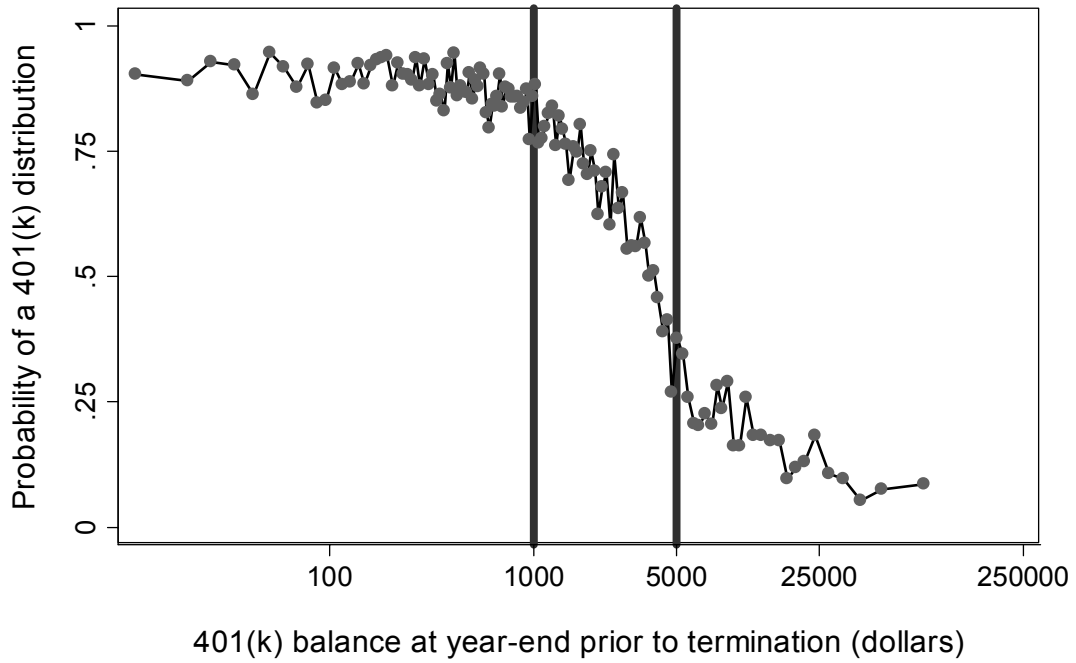


FIGURE 6B. Balances and the Probability of a Cash Distribution: Company C

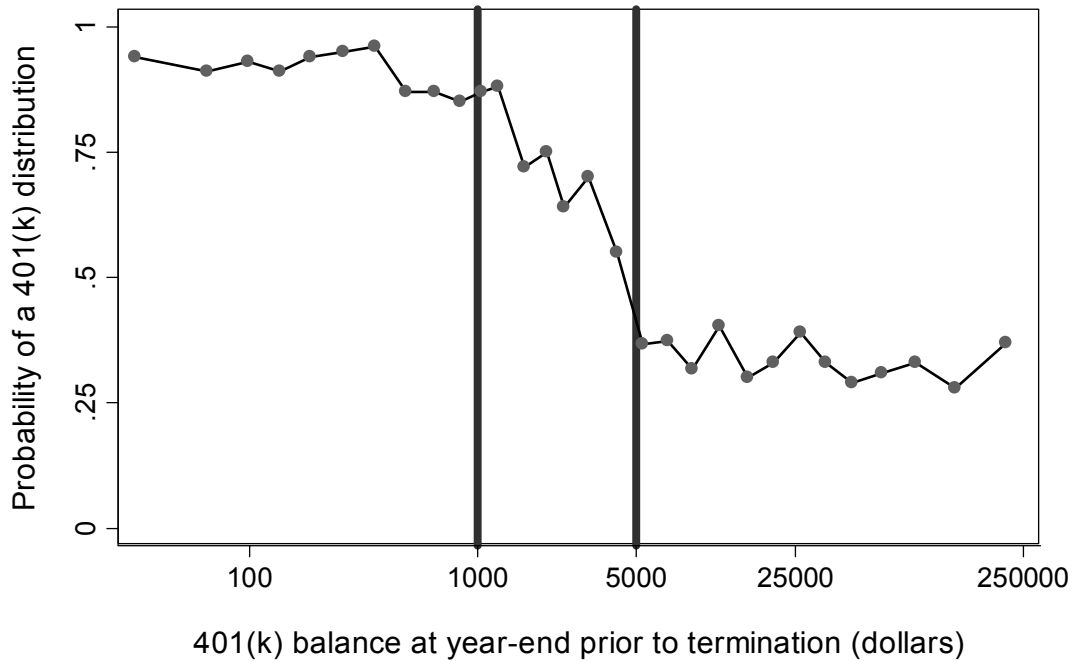


FIGURE 6C. Balances and the Probability of a Cash Distribution: Company H

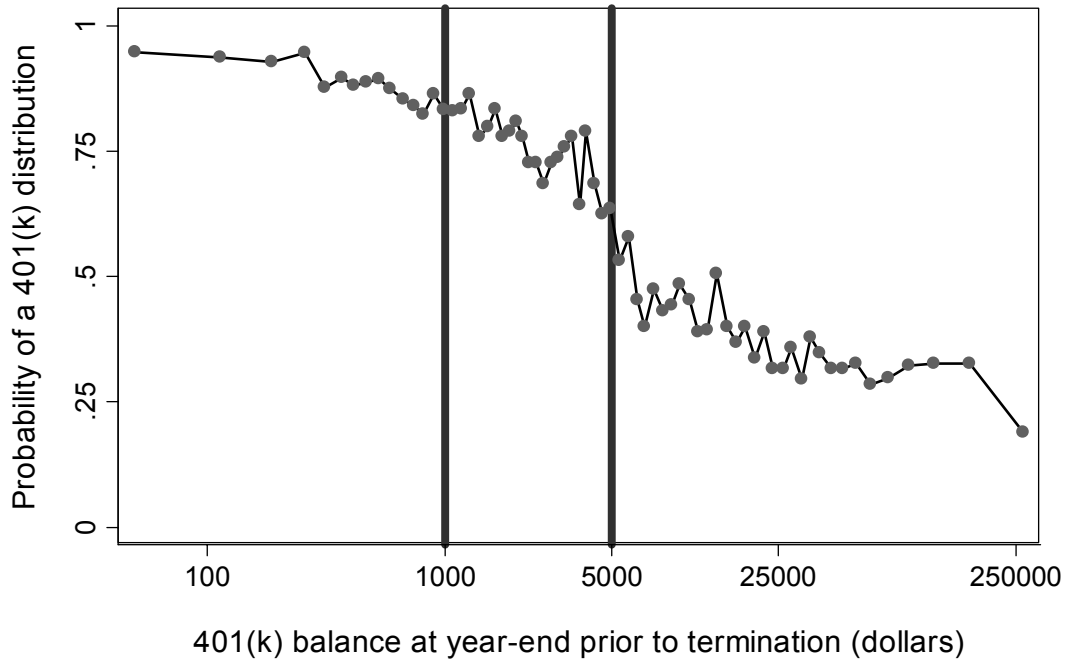


FIGURE 6D. Balances and the Probability of a Cash Distribution: Company I

