

Are Empowerment and Education Enough? Under-Diversification in 401(k) Plans

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Abstract: The collapse of Enron, WorldCom, and Global Crossing wiped out much of their employees' 401(k) savings which had been heavily invested in the employer's stock. In response, many bills have been proposed in Congress that would empower and educate: give employees the right to sell the employer stock in their 401(k), and require companies to educate their workers about the risks of not doing so. This paper finds that these approaches are unlikely to significantly reduce 401(k) employer stock holding. We study natural experiments at five firms where employer stock holding requirements were relaxed and observe only a modest response. We also find that the publicity surrounding the 401(k) meltdowns at Enron, WorldCom, and Global Crossing had little effect on the employer stock holdings in a large sample of workers from *other* firms. Real-life lessons about under-diversification risks do not seem to translate well into action. We conclude with a discussion of alternative legislative approaches that *are* likely to reduce employer stock holdings substantially. We also discuss general implications for savings policies and pension regulation.

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At year-end 2000, current and former employees of the energy trading company Enron held \$2.1 billion in the firm's 401(k) plan. Sixty-two percent of that money was invested in Enron stock, which was then trading at \$83 per share. In October 2001, Enron began to unravel in a shocking series of accounting scandals. Enron stock plummeted over the next several weeks, and on December 2, 2001, the company declared bankruptcy, rendering all its shares worthless. Four thousand Enron employees lost their jobs as they simultaneously watched a large fraction of their retirement wealth vanish.

Although the 401(k) savings debacle of Enron employees was highly publicized, Enron was neither the first nor the last company whose collapse decimated its workers' 401(k) accounts. Over the past few years, a similar fate has befallen the employees of Polaroid, WorldCom, Kmart, Lucent, Providian, and Global Crossing, among others. In these companies, employees had at least a third of their 401(k) balances invested in employer stock before the stock price collapsed.

In response, many bills have been proposed in Congress that would regulate employer stock holdings within 401(k) plans. Relative to *defined benefit* pension laws, which strictly limit plans from holding more than 10% of their assets in employer securities, most of the proposed regulations for *defined contribution* plans appear mild. Common themes in these proposals are empowerment and education: give employees the right to sell the employer stock in their 401(k) and inform them about the risks of not doing so.

For example, one of only two bills that have been up for a vote, the Pension Security Act (see Table 1), has two key regulations relating to employer stock.¹ First, it prohibits employers from requiring employees to invest their own contributions in employer stock. Second, it requires that employers *allow* 401(k) participants to sell their shares of employer stock three years after receiving those shares. Other proposed legislation has included notification requirements if the fraction of assets invested in employer stock exceeds a certain threshold (e.g. 20%), a requirement that companies offer a certain number of alternatives to employer stock if it is made an investment option, and requirements that companies educate plan participants about the risks of not diversifying their assets.

¹ The Pension Security Act, sponsored by Representative Boehner from Ohio, was passed by the House in both 2002 and 2003, but never voted on in the Senate.

This paper assesses how effective the “empower and educate” regulatory approach will be at reducing 401(k) employer stock holdings. We begin by studying five natural experiments in which employees experience a relaxation of employer stock diversification restrictions, either because employees cross an age or tenure threshold above which they are allowed to diversify their holdings, or because the company changed its rules enabling all employees to diversify their investments. We find only a modest employee response to any of these changes in diversification restrictions. Merely allowing diversification does not cause it to happen.

We then consider whether educational efforts might motivate employees to diversify out of employer stock. Although many studies have concluded that financial education affects subsequent choices, those which randomly assign education and use administrative data to measure actions (Duflo and Saez 2003, Choi, Laibson, and Madrian 2005a) have found the magnitude of the effects to be remarkably small.

In this paper, we evaluate a different form of education: witnessing the real-life experience of others. Specifically, we estimate how media coverage of the financial collapse of Enron, WorldCom, and Global Crossing affected employer stock holdings in a large sample employees at *other* firms. We want to know how American workers in general responded to the blizzard of media stories that illustrated the dangers of putting all of one’s retirement nest egg in employer stock.

We chose to examine the media coverage of Enron, WorldCom and Global Crossing because the bankruptcies at these companies—and the associated accounting scandals—received so much attention from so many media outlets. For example, the New York Times ran 1364 stories on Enron during the last fourth quarter of 2001 and the first quarter of 2002, with 112 of those stories running on the front page. Even less elite media outlets caught this wave. For example, USA Today ran 398 stories on Enron during the same time period, of which 25 were on the front page.

We find that this media barrage had a surprisingly modest impact on employer stock holdings in 401(k) plans, reducing the fraction of assets held in employer stock by no more than 2 percentage points from an initial level of 35% of balances. We present evidence that this small reaction is not due to diversification restrictions. In addition, we show that workers in Texas, who were likely to have been disproportionately exposed to Enron-related news, do not reduce their investment in employer stock any more than workers outside of Texas. Even in Houston—

Enron's headquarters—where the Houston Chronicle ran 1122 stories on Enron in the six months surrounding the firm's collapse, employees do not learn the lesson of Enron.

This paper raises broad questions about national savings policies. The current analysis supports convergent evidence that many employees end up with suboptimal savings rates and asset allocations. Households typically behave passively and follow the path of least resistance, which often translates into acceptance of defaults even when those defaults are demonstrably suboptimal (Madrian and Shea 2001, Choi et al 2002, Choi et al 2005a). Two policy solutions present themselves. First, society can identify and adopt “optimal” financial defaults (Choi et al 2003). However, it is not always obvious what such optimal advice would be. Moreover, one default is rarely right for every employee, since employees have different demographic characteristics. Second, society can adopt default-free systems that do not advantage one default over another (Choi et al 2005, Choi, Laibson and Madrian 2005b). However, default-free systems only work when employees are likely to make good decisions in the absence of a default. We conclude the paper by discussing these broader policy debates both in the narrow context of employer stock and in the broader context of national savings and pensions policies.

The remainder of the paper is structured as follows. We begin in Section I with a brief summary of the current regulation of employer stock in 401(k) plans. In Section II, we then summarize prior research on employer stock balances in 401(k) plans and how 401(k) outcomes are affected by plan features. In Section III, we describe the employee-level 401(k) data we have at six companies used in our analysis. In Section IV, we present results from six natural experiments on relaxing diversification restrictions. In Section V, we examine the impact of the Enron, WorldCom, and Global Crossing crises on employer stock holdings for a large sample of employees at other firms. The paper concludes in Section VI by discussing alternative legislative approaches that *are* likely to decrease employer stock holdings substantially and implications for savings policies more generally.

I. Regulation of Employer Stock Holding in 401(k) Plans

As is the case for defined benefit pension plans, 401(k) plans are primarily regulated by ERISA. Under ERISA, plan fiduciaries have four responsibilities: i) act for the exclusive benefit of plan participants and beneficiaries (the “exclusive purpose rule”), ii) act with the care, skill, prudence and diligence that a prudent person acting in a similar capacity would use (the

“prudent man rule”), iii) diversify plan assets across different types of investments, geographic areas, industrial sectors and dates of maturity to reduce the chance of large losses (the “diversification rule”), and iv) act in accordance with plan documents.

At the time ERISA was passed, defined benefit pension plans were the primary employer-sponsored mechanism for providing income to individuals in retirement. To help safeguard defined benefit pension plan assets, ERISA explicitly limits the holdings of employer stock to no more than 10% of total assets. Defined contribution plans, however, face no such limit. 401(k) plans did not even exist when ERISA was enacted, and defined contribution plans consisted mainly of profit-sharing plans to which employers made variable contributions based on company earnings, and employee stock ownership plans (ESOPs), which were explicitly intended to encourage employer ownership of employer stock. ERISA provides these plans with an exemption to the diversification requirements in the case of employer securities.

When 401(k) plans were first authorized in 1978, it was never envisioned that they would supplant defined benefit pension plans as the primary source of employee income in retirement, and Congress did not extend the 10% limit on employer stock holdings for defined benefit plans to 401(k) plans. Employers thus face a wide degree of latitude in the amount of employer stock that can be held in their 401(k) plans.

A common way of holding employer stock in a 401(k) plan is through an ESOP (this combination of a 401(k) plan and ESOP is sometimes referred to as a KSOP). Many companies, however, have employer stock in their 401(k) plan without an ESOP, and many companies also operate an ESOP that is separate from the 401(k) plan. An ESOP within a 401(k) plan serves two purposes: a savings plan for the benefit of the firm’s employees, and a corporate finance mechanism that encourages employee ownership. The dual purposes of an ESOP may result in conflict as to whose interests would be best served by a particular course of action—the plan beneficiaries, or the employer. As a result, the regulations that companies face vis-à-vis employer stock are different for 401(k) plans with an ESOP than for those without an ESOP.

In the case of a plan without an ESOP, the 401(k) plan may not require that more than 10% of the employee’s *own* contributions be held in employer stock. In the case of an ESOP, which is specifically designed to promote employee stock ownership, this requirement does not hold. Neither plans with or without an ESOP are limited in the amount of *matching* contributions that may be directed into employer stock. Assets within an ESOP, however, are subject to a set of

explicit diversification requirements: employees with 10 years of tenure must be allowed to diversify 25% of their employer stock holdings once they reach age 55, increasing to 50% of holdings once they reach age 50. These diversification requirements do not apply to employer stock holdings outside of an ESOP. We should note, however, that companies can, and do, adopt diversification allowances more generous than those proscribed by ERISA. Finally, in the case of a lawsuit, the fiduciary standards of prudence and exclusive purpose are lower for a 401(k) plan with an ESOP than for a 401(k) plan without an ESOP due to the dual purposes of the former (Tucker and Huss, 2005; Reish and Faucher, 2002).

II. Previous Research on Employer Stock in 401(k) Plans

Mitchell and Utkus (2002), citing Holden and VanDerhei (2001) and VanDerhei (2002), report that averaging across all 401(k) plans—including those without employer stock as an investment option—19% of plan assets are held in employer stock. This statistic understates the diversification problem since *most* participants do not have employer stock as an investment option. Only about 10% of companies offer employer stock in their 401(k) investment menu. Because the companies that offer employer stock tend to be larger firms, 35% of participants are in 401(k) plans that include employer stock (Even and Macpherson, 2004). These employees often have 401(k) portfolios that are heavily concentrated in employer stock. Even and Macpherson (2004) calculate that 50% of assets in plans offering employer stock were held in employer stock in 1998.

Plans offering employer stock can be further divided into those in which the employee must choose an investment allocation for the employer match and those in which the employer match is directed into employer stock. In 2001, two-thirds of those plans directing the match into employer stock allowed participants to immediately trade out of employer stock, while the rest imposed a holding requirement (Fidelity Investments, 2002). Holden and VanDerhei (2001) and VanDerhei (2002) report that in plans that offer employer stock as an investment option but that do not direct the matching into employer stock, 22% of assets are held in employer stock; in

plans in which the employer match is directed into employer stock, a much larger fraction of assets, 53%, is held in employer stock.²

The Enron bankruptcy highlighted two major risks associated with concentrated investments in employer stock. First, investing in a single security is riskier than investing in a diversified portfolio such as a mutual fund. Poterba (2003), Meulbroek (2003), and Brennan and Torous (1999) estimate that a single-stock portfolio is worth less than half the equivalent amount invested in a diversified portfolio. Secondly, the value of employer stock may be positively correlated with employees' labor income; many Enron employees simultaneously lost their jobs *and* their retirement savings.

Benartzi et al. (2004) identify some benefits to employees from holding employer stock in their 401(k) plan, but they note that the magnitude of these benefits is small relative to the substantial costs of non-diversification.³ Why then do so many employees invest their 401(k) portfolios so heavily in employer stock? A number of psychological factors may contribute to apparently excessive employer stock holdings.

Employees may underestimate employer stock risk due to a "familiarity bias." The John Hancock Financial Services Defined Contribution Plan Survey (2002) finds that participants on average rate employer stock as less risky than an equity mutual fund.⁴ Similarly, Benartzi et al. (2004) find that only 33% of participants believe that their employer stock is more risky than a diversified stock fund, while 39% believe it has an equivalent level of risk and 25% believe it is a safer investment. Furthermore, 20% of respondents said they would prefer \$1,000 in employer stock that they could *not* diversify until age 50 to \$1,000 to invest at their own discretion (Benartzi et al., 2004).

Cohen (2005) argues that loyalty to one's employer motivates workers to hold employer stock. Employees of standalone firms hold 10 percentage points more employer stock in their 401(k) plans than conglomerate employees. When a division is spun off from a conglomerate, those employees subsequently increase their employer stock holding, whereas employees

² Holden and VanDerhei (2001) and VanDerhei (2002) use administrative data to calculate the fraction of assets held in employer stock, while Even and Macpherson use IRS Form 5500 (tax reporting) data. The numbers in the two sources are not directly comparable.

³ See also Brown, Liang and Weisbenner (2005) for a discussion of the costs and benefits to firms and workers of employer stock in the 401(k) plan.

⁴ Interestingly, the perceived risk of employer stock in the John Hancock (2002) survey has not changed much over time, even following the Enron scandal.

decrease their employer stock holdings following a merger. There is no evidence that employees have superior information about future employer stock returns.

Benartzi (2001), Choi et al. (2004b), and Huberman and Sengmuller (2004) find that current contributions to employer stock are increasing in the stock's past returns. If employees think high past returns predict high future returns, then the high volatility of employer stock relative to mutual funds and the inability to short-sell securities in the 401(k) will jointly lead to overweighting of employer stock in the average 401(k) portfolio. Intuitively, employer stock is likely to be in both the upper tail and the lower tail of the 401(k) asset return distribution. Upper tail outcomes have a greater impact on asset allocation than lower tail outcomes because of the short-sales constraint. Like Cohen (2005), Benartzi (2001) finds no correlation between employee allocations to employer stock and the stock's future returns.

Benartzi and Thaler (2001) suggest that naïve diversification strategies across investment options cause many investors to allocate part of their contributions to employer stock simply because it is available in the 401(k) menu. Liang and Weisbenner (2002) report evidence consistent with this hypothesis specifically for employer stock. The presence of employer stock in the 401(k) fund menu may also be perceived by employees as an endorsement by the employer that its stock is a worthwhile investment option. Benartzi (2001), Holden and Vanderhei (2001), and Brown, Liang and Weisbenner (2005) find that discretionary contributions to employer stock *increase* when the employer elects to invest matching contributions in employer stock.

These investment menu effects are consistent with a growing body of literature that finds that 401(k) savings choices are strongly affected by plan features, even when those features do not explicitly restrict employee choices. Madrian and Shea (2001) and Choi et al. (2002, 2004a) document the tendency of participants to passively accept 401(k) enrollment, contribution, and investment fund defaults. This type of inertia suggests that employer matching contributions made in employer stock will stay in employer stock, even if participants are able to immediately diversify out.

Choi et al. (2005) show that requiring employees to explicitly state their 401(k) savings preferences within a month of hire (thus removing the option to passively accept a default outcome) raises the initial 401(k) participation rate by 28 percentage points and the average contribution rate by 1.2 percentage points relative to a standard opt-in enrollment procedure.

This “active decision” mechanism has a similarly large effect for employer stock allocation in 401(k) plans. Choi, Laibson, and Madrian (2005b) find that when one company directed its employer match into employer stock, 99% of the employer match stayed invested in employer stock, even though employees were free to fully diversify after the employer contribution was made. Once the company began allowing employees to redirect the match to a different asset allocation, the fraction of the employer matching contributions invested in employer stock fell from 99% to less than 40%.

III. Employee-Level 401(k) Data Description

The employee-level data that we use to examine the holding of employer stock in 401(k) plans come from Hewitt Associates, a large benefits administration and consulting firm. We will use two different types of administrative data. The first is a series of repeated year-end cross-sections on all individuals employed at the company at the time of the data snapshot. These cross-sections contain demographic information such as birth date, hire date, and compensation. The cross-sections also contain point-in-time information on the worker’s 401(k), including participation status in the plan, date of first participation, total balances in the plan, and the allocation of assets among the available funds. The second type of data we have is a complete history of every transaction made in the plan by every employee since Hewitt began administration of the plan. We have this longitudinal data for two of the companies we will study in this paper (Companies D and F). Tables 2 and 3 summarize the demographic and 401(k) plan characteristics of the seven firms we will study in this paper.

IV. Empowerment: The Effect of Relaxing Diversification Restrictions

As noted above in Section I, current 401(k) regulations require only limited diversification in the case of employer stock. Many of the proposed 401(k) regulations under Congressional would greatly curtail the ability of employers to require that 401(k) balances be held in employer stock: 18 of the 21 proposals listed in Table 1 would require employers to permit employees to divest employer stock in their 401(k) accounts after a certain period of time (ranging from 90 days to 5 years).

In this section of the paper, we address whether relaxing holding requirements will significantly reduce employer stock holdings by studying two different types of natural

experiments at five companies, all of which direct the employer match into employer stock. The first type of natural experiment arises from age and tenure-based diversification restrictions. At some companies, only employees above a certain age are allowed to diversify their employer match contributions. We ask whether employees who have cleared the applicable age or tenure hurdles have divested themselves of employer stock. The second type of natural experiment arises from company-wide rule changes that relax holding requirements. We examine how much employer stock holdings fall following such regime shifts.

A. Allowing Older Employees to Diversify Out of Employer Stock

We begin with Company D which holds the employer stock in its 401(k) plan in an ESOP and is thus subject to the ESOP diversification requirements described in Section I (for employees with 10 years of tenure, 25% diversification is allowed at age 55 and 50% at age 60). We show the effect on employer stock holdings of being allowed to diversify once these age thresholds are met in Figure 1. This figure plots the relationship between age and the fraction of employer match balances held in employer stock for those employees with 10+ years of tenure in 2001 when the company was adhering to the ESOP diversification requirements (Company D subsequently lifted all of its diversification restrictions, a change that we analyze below in Section IV.B). The thick black line shows the fraction of balances in employer stock that is consistent with the maximum possible diversification available to employees of a given age. The gray line shows the average participant-weighted fraction of balances held in employer stock (that is, the average of each participant's own fraction of balances held in employer stock). The dotted black line shows the average dollar-weighted fraction of balances held in employer stock (that is, total employer stock balances divided by total balances across all employees of a given age).

DISCUSS FIGURE 1

As noted above in Section I, some companies have employer stock diversification policies that are more generous than what is legally required.⁵ One of these is Company A which, like company D, also has an ESOP as part of the 401(k) plan. Although this firm is

⁵ Anecdotally, many firms have voluntarily relaxed their diversification restrictions following the collapse of Enron on the negative publicity surrounding employer stock diversification restrictions.

subject to the same ESOP diversification requirements analyzed above for Company D, in 2002 it began allowing employees to diversify their employer match balances at younger ages than legally required: employees can diversify up to 25% of their employer stock balances at age 45, 50% when they reach age 50, and 100% when they reach age 55.

Figure 2 plots the relationship between age and the fraction of employer match balances held in employer stock at year-end 2003, approximately 18 months after the relaxation of the Company A diversification restrictions. Between ages 45 and 50, the average fraction of assets held in employer stock falls by 7 percentage points when each person is equally weighted. This is less than a third of the diversification available to these employees. By age 55, employer stock holdings fall further to 85% of total balances, also representing about one-third of the actual diversification available. At age 56, the fraction of balances held in employer stock falls to 76% of total balances, about one-quarter of the actual available diversification, and the proportion does not drop below 64% through age 65. Dollar-weighted averages show a slightly larger fall, indicating that richer employees are more eager to divest themselves of employer stock, but even the dollar-weighted line is far from the maximum allowed diversification.

Two other companies that have age/tenure-based diversification rules—Companies B and C—have lifecycle diversification patterns that are similar to those of Company A. Company B allows participants with at least 10 years of service at the company to diversify 25% starting at age 50, 50% starting at age 55, and 75% starting at age 60. Figure 3 shows the fraction of employer match balances held in employer stock at Company B at year-end 2003 for employees with at least 10 years at the company. The person-weighted average seldom dips below 90% for workers between 50 and 65. Dollar-weighting the average yields similar results, although as for Company A in Figure 2, this series usually lies slightly below the person-weighted average.

Company C has somewhat more complicated diversification rules. Employees between the ages of 20 and 55 can diversify up to 50% of employer stock balances if they have 10 years of plan participation; employees aged 55-59 can diversify also diversify up to 50% of employer stock balances, but need have only 5 years of plan participation to do so; employees between the ages of 60 and 70.5 can diversify 100% of employer stock balances if they have 5 years of plan participation; and employees over age 70.5 can completely diversify out of employer stock regardless of the length of plan participation.

Figure 4 shows the average employer stock holdings at Company C for employees aged 20-55 by their level of tenure in the plan (these employees can diversify up to 50% of balances upon reaching 10 years of tenure). Figure 5 shows the average employer stock holdings at Company C for employees aged 55-70 who have at least 5 years of tenure in the plan by their age (these employees can diversify 50% of employer stock holding until age 60, and 100% thereafter). It is apparent that despite greatly relaxed holding constraints, most employees hold more than 80% of their match balances in employer stock, even years after they have become eligible to diversify.

B. Rule Changes that Relax Diversification Restrictions for All Employees

Although Figures 1-5 suggest that allowing employees to diversify once they reach a certain threshold has only a modest impact on diversification, the fact that there are restrictions on *any* employees coupled with the complexity of the diversification schedules may result in some confusion on the part of employees about the extent to which they can in fact diversify out of employer stock. The effects of allowing diversification may therefore be different (and in particular greater) in companies that place no restrictions on any of their employees.

To assess whether having no diversification restrictions seems to matter we examine two companies who completely eliminated employer stock diversification restrictions. The first, Company D, adhered to the standard ESOP diversification requirements (this was analyzed above in Figure 1) until early 2002 when it completely eliminated all diversification restrictions. The match, however, continued to be directed to employer stock following this plan change, so that employees who wanted to completely diversify out of employer stock would have to initiate trades on an ongoing basis after new matching contributions were made.

Figure 6 shows the fraction of assets in the employer match accounts that are held in employer stock from January 1998 through November 2003. Before the plan change, almost all employer match balances stayed in employer stock. This is not surprising because few employees (6.6%) met the standard ESOP age and tenure requirements for diversification. After the 2002 rule change, the allocation to employer stock falls, but very slowly. At year-end 2003, almost two years after the diversification restrictions were lifted, 84% of match balances are still in employer stock.

Company E eliminated all diversification restrictions in mid-2002. It too continued to direct employer match contributions to employer stock. Unfortunately, we do not have the time series data on asset allocation available for Company E that we have for Company D that would enable tracking employer stock balances over time as in Figure 6. Instead, we show the actual level of diversification by age at year-end 2003, approximately 18 months after the pre-existing diversification restrictions were lifted. At this time, the average participant under the age of 50 still had 90% of his employer match balances in employer stock, while older employees continued to hold over 80% of their match balances in employer stock. As has been the case in most of the other companies analyzed, there is more diversification on a dollar-weighted basis, especially among older participants.

The six case studies presented here paint a consistent picture: relaxing diversification requirements does decrease employer stock holding, however, the amount of that reduction is modest, especially for younger employees.

V. Education: The Effect of Enron, WorldCom, and Global Crossing

If giving employees the ability to diversify does not prompt them to do so, perhaps educating them on the perils of not diversifying will spur them to action. 6 of the 21 proposed bills in Table 1 include an educational provision. Previous work—reviewed above—has found that financial education alone generates only small changes in 401(k) outcomes. However, nobody to our knowledge has formally studied the effect of witnessing the consequences of others' financial foolishness.

In this section, we examine whether the media coverage of the plight of employees at Enron, WorldCom, and Global Crossing—the three companies frequently mentioned together in news stories on the perils of holding too much employer stock in one's 401(k) account—caused employees at *other* companies to reduce their employer stock holdings. The key component of our analysis is a series of variables that we have constructed to capture the amount of news activity surrounding the financial collapse of Enron, WorldCom and Global Crossing. On December 31, 2000, before any of these firms entered serious financial distress, 62%, 32% and 29% of 401(k) assets were held in employer stock at Enron, WorldCom, and Global Crossing respectively, according to Form 5500 and SEC 11-K filings. Figure 8 gives a brief timeline of the key events leading up to the demise of these companies. For the purposes of our analysis, the

first “Enron event” was the October 16, 2001 \$1.2 billion reduction in shareholder equity. We use this event to date the post-Enron time period in our analysis.

We construct four versions of a news index variable designed to capture the amount of media attention surrounding the financial collapse of Enron, WorldCom, and Global Crossing on date t . This variable is based on the number of news stories published each day after October 16, 2001 about Enron, WorldCom, and Global Crossing, N_p , where p denotes publication date. The first version of our news index is based on the number of stories published in five major newspapers: the *New York Times*, *Wall Street Journal*, *Washington Post*, *Los Angeles Times*, and *Chicago Tribune*. We used Lexis/Nexis and Factiva to search these publications, excluding republished news, recurring pricing and market data, obituaries, sports, and calendars. We went through the resulting list of stories by hand and deleted results that appeared to be duplicates as well as stories less than 100 words long (paragraph teasers pointing to stories elsewhere in the paper). The second version of our news index includes both newspaper stories and stories found in Lexis/Nexis transcripts of television news programs on ABC, NBC, and CBS.⁶ Overall, there were 12,047 relevant newspaper stories and 1,927 relevant television stories from October 16, 2001 to November 4, 2003. The third and fourth versions of our news index take the previously described two versions and exclude all stories that do not include the word “401(k).” This reduces the total number of stories to 761 for the newspapers-only variable and 905 for the television-plus-newspapers variable. Table 4 gives a count of the number of stories from each of the media sources for all four version of the news index variable. Naturally, our constructed variables serve only as proxies for the *millions* of Enron, WorldCom and Global Crossing stories that appeared in local and national newspapers, magazines, web-based media, radio, and TV.

Using the daily counts of news stories described above, we create four different geometrically discounted news impact variables that capture the salience decay of news and which also implicitly smooth our time series. Each story is assumed to decay by a factor δ each day after its publication or broadcast. We multiply the sum by $(1 - \delta)$ so that the mean value of the *News Impact* variables is invariant to the value of δ . Thus, a story published on January 2 would receive a weight of $(1 - \delta)$ on that day, a weight $\delta(1 - \delta)$ on January 3, a weight $\delta^2(1 - \delta)$

⁶ The transcripts were limited to national news programs (e.g. CBS Evening News, Nightline, 20/20); local news broadcasts were not available.

on January 4, and so on. The impact of all stories on day t (where $t = 0$ on October 16, 2001) is the sum of the geometrically discounted impact of all previous news stories:

$$News\ Impact_t = (1 - \delta) \sum_{p=0}^t \delta^{t-p} N_p .$$

Because we have little theoretical or empirical guidance on the appropriate value of δ , we try a range of different δ values.⁷

Figure 9 shows the time series of relevant newspaper stories published on each day (the gray bars) as well as the value of the *News Impact* variable constructed from the grey bars using a value of $\delta = 0.75$ (note that the scaling of the story counts and the *News Impact* variable are different). The most active news coverage occurred from mid-December 2001 through the end of February 2002, when Enron and Global Crossing filed for bankruptcy. There is another peak in June and July 2002 when WorldCom revealed accounting irregularities and subsequently filed for bankruptcy.

Having created a proxy for media attention, we assess its association with 401(k) employer stockholding in two domains. In Section IV.A, we study its effect on aggregate 401(k) employer stockholding using data on 401(k) participants in several large firms. However, many of these employees may be required to hold employer stock by their companies or may not have employer stock available as a 401(k) investment option. Accordingly, in Section IV.B we analyze two companies that offered employer stock but had no diversification restrictions.

In Section IV.C, we ask whether workers in Texas reacted more to the Enron, Global Crossing and Worldcom bankruptcies than workers outside of Texas. We study Houstonians and other residents of Texas, since these groups were exposed to more Enron media coverage and were more likely to have known people directly affected by the bankruptcy.

A. The Effect of the “Enron” New Impact on Aggregate Employer Stock Holdings

Our aggregate employer stock data come from the “Hewitt 401(k) IndexTM” (hereafter referred to as the Hewitt Index), which measures daily trading activity in a large number of firms that collectively employ 1.5 million participants with nearly \$90 billion in 401(k) assets (Hewitt,

⁷ We have also tried numerous other aggregations of the news stories from various publication outlets; the results described below are substantively similar regardless of which media sources are used in the construction of the news index.

2004a and 2004b).⁸ Our Hewitt Index data run from August 4, 1997 through November 4, 2003 (75 months). Because the set of firms represented in the Hewitt Index changes over time, we restrict our attention to the subset that is in the Index for the entire sample period. This subset holds approximately half the 401(k) assets in the Index.

Figure 10 shows, for companies in the Hewitt Index during the entire sample period, the fraction of total 401(k) assets held in employer stock (the black line) and the fraction of equities held in employer stock (the gray line). The fraction of total 401(k) assets held in employer stock ranges from 26% to 38%, which is higher than the 19% figure calculated by Holden and VanDerhei (2001) and VanDerhei (2002) using the much larger EBRI/ICI database. This discrepancy probably results from the fact that firms in the Hewitt Index tend to be very large firms, and large firms are more likely to offer employer stock as an investment option. The fraction of equities in employer stock ranges from 36% to 51% over the same time period.

The share of all assets in employer stock shows a declining trend from August 1998 through March 2000; an increasing trend from March 2000 through May 2001; relative stability from May 2001 through November 2002; and a declining trend from November 2002 through November 2003. The beginning of that last declining trend coincides with the financial collapse of Enron. On October 15, 2001, the day before Enron's shareholder equity fell by \$1.2 billion, the fraction of total balances in employer stock at Hewitt Index firms was 35.9%. By April 2003, it had reached a low of 25.8%, roughly a 10 percentage point decline. However, a broader stock market decline began around the same time, and this would mechanically reduce the fraction of 401(k) assets held as employer stock even if employees were completely passive.

If the decline in employer stock holdings were completely mechanically driven by a general decline in stock prices, then employer stock as a fraction of equities should not be greatly affected, as both the numerator and the denominator in this fraction would decrease by roughly the same amount. Figure 10 shows that this series is not flat over the post-Enron time period, but the decline is much less pronounced than that for employer stock as a fraction of all balances. Indeed, it is striking that employer-stock as a fraction of equity holdings barely budged in the aftermath of Enron, Global Crossing, and Worldcom. However, the stable ratio of employer stock to equities may *not* be caused by a lack of trading in employer stock. After all, households

⁸ The Hewitt 401(k) Index™ can be found at <http://was4.hewitt.com/hewitt/services/401k/index.htm>. We do not use the Index itself, but inputs into the Index.

could have aggressively sold both employer stock and equities more generally. With such concerns in mind, we now turn to a specific analysis of trading activity in employer stock.

Our dependent variable is the aggregate net dollars traded into or out of employer stock divided by the prior day's aggregate employer stock balances.⁹ This variable will be positive when the total dollars transferred into employer stock exceeds the total dollars transferred out, and negative otherwise. Figure 11 plots the normalized net trading activity over our sample period.¹⁰ Casual visual inspection of the graph indicates that net trading volatility seems to increase following Enron's collapse, but the mean direction of trade does not obviously shift.

To isolate the impact of Enron/Global Crossing/WorldCom on employer stock trading, we regress normalized net employer stock trading on *News Impact*; current and lagged S&P 500 market returns¹¹ (calculated so that the returns are non-overlapping); a set of day-of-the-week dummies; and a cubic polynomial time trend (in annualized trading days). Table 7 reports least-squares regression results using the four different versions of *News Impact* defined above and δ values of 0.25 and 0.75. Newey and West (1987) standard errors with five lags are in parentheses below the point estimates.

The coefficients on *News Impact* are negative across all specifications, indicating trading out of employer stock as a result of the Enron media attention. We calculate the total media-induced decline in employer stock holding as a fraction of 401(k) balances using the formula

$$\sum_{t=0}^{T-1} \beta \cdot \text{News Impact}_t \cdot \text{Employer Stock Percent}_{t-1}, \quad (1)$$

where β is the regression coefficient on *News Impact* and *Employer Stock Percent*_{*t*-1} is the fraction of total balances held in employer stock on day *t*-1, and *T*-1 is the total number of post-Enron trading days in our sample. Table 5 shows the calculated economic magnitudes for each specification. No matter how we define a relevant news story, and regardless of the δ value chosen, none of the specifications show more than a 2.4 percentage point drop in employer stock

⁹ Dollars traded includes only balances that are actively transferred from one investment option to another. It does not include payroll contributions that are invested in employer stock, or withdrawals from employer stock balances.

¹⁰ Occasionally, there were large changes in employer stock balances because certain component companies were missing data on those days, generating outliers in the calculated normalized trading activity. We eliminated such outlier days from our data.

¹¹ The S&P return variables were the return today and the past returns of yesterday, last month, the last 6 months, the last 1 year, 2 years, 3 years, and 4 years. All return windows are non-overlapping.

holding as a fraction of total portfolio due to Enron/WorldCom/Global Crossing news.¹² The coefficients become more negative when all stories are included rather than just 401(k) stories, but they attenuate when we broaden our media sources to include TV. There is no consistent pattern with respect to δ values. The small economic magnitudes hold for other definitions of the story variable (e.g. *New York Times* stories only, Enron stories only) and other values of δ not reported here.

If a large fraction of Hewitt Index firms do not offer employer stock in their 401(k), or if many employees in those firms are unable to diversify because of holding restrictions, then the aggregate results in Table 5 will significantly understate the true effect of media education on employer stock holdings. Unfortunately, we do not know anything about the prevalence of employer stock availability or holding restrictions among the companies in the Hewitt Index. However, a Hewitt Associates survey, which collected data on various aspects of 401(k) plan design from over one-quarter of the firms in the Fortune 500 in 2003, reports that 86% of these firms offered employer stock as an investment option (Hewitt Associates 2003). Of those that offered employer stock, 74% either had no diversification restrictions for matching contributions directed into employer stock or did not match in employer stock. If the Hewitt Index companies are similar to this sample of firms, and if we assume counterfactually that *none* of the employer stock reduction occurred in companies with holding restrictions, and if the specification that yields the most negative *News Impact* coefficient is correct, then the media coverage of Enron/WorldCom/Global Crossing caused employer stock holdings to drop by at most $2.35/(84\% \times 74\%) = 3.78$ percentage points in companies without holding restrictions, which is still a small effect. In reality, most employees at firms with holding restrictions are *not* constrained at the margin by the restrictions because they hold so much employer stock in the accounts over which they have full discretion. Holden and Vanderhei (2001) report that employees with holding requirements invest 33% of their own contributions in employer stock, whereas employees without holding requirements invest 22% of their entire 401(k) portfolio in employer stock. Therefore, 3.78 percentage points is an upper bound on the true effect. This finding is consistent with those of Madrian and Shea (2001b), Choi et al. (2002), Choi, Laibson,

¹² We have also tried to include a post-Enron dummy variable to see if there was a discrete drop in employer stock holdings once the Enron scandal broke. We did not find any statistically significant or economically large coefficients, and the coefficients signs often indicated that the Enron scandal caused a small movement *into* employer stock.

and Madrian (2005a), and Duflo and Saez (2003), who find that financial education motivates only small changes in 401(k) savings behavior.

B. The Effect of the “Enron” News Impact on Companies Offering Employer Stock Without Diversification Restrictions

To further investigate the hypothesis that holding requirements prevented a dramatic aggregate fall in employer stock holdings following the Enron/WorldCom/Global Crossing scandals, we study two large firms offering employer stock for which we have daily trading data. The first firm, Company D, had employer stock holding requirements in the employer match account for most of the sample period.¹³ For this reason, we examine only the employee contribution account for Company D. The second firm, Company F, had employer stock in the 401(k) plan but no holding requirements. In addition, at Company F employer matching contributions were not directed into employer stock; rather, their allocation mirrored the allocation that employees chose for their own contributions.

Figure 12 plots the fraction of employee contribution account balances held in employer stock from 1997 through 2003 for Company D. Employer stock holdings are declining in the immediate post-Enron period (October 2001 through January 2002), but are actually increasing for most of the period after that, including the time period during which there was the most Enron-related media attention (January through March 2002). Overall, Figure 12 does not suggest that the employees of Company D were responsive to the Enron bankruptcy news. In contrast, they do respond to news about their own company’s falling (and increasing) stock price, with the actual movement in employer stock holdings at Company D tracking the stock price at this firm quite closely (this is not shown in Figure 12).

Figure 13 plots Company D’s daily net transfers into or out of employer stock as a fraction of the prior day’s employer stock balance. We begin our regression sample in November 1997 because that is when the plan allowed trading on a daily rather than a monthly basis. Table 6 shows the results of regressing the net transfer series on *News Impact*, and numerous other control variables including those used in Section IV.A.¹⁴ We find that across all specifications, the largest bankruptcy-induced drop in employer stock holdings is a statistically insignificant

¹³ We studied the relaxation of holding requirements at Company D in Section III.B.

¹⁴ We control for employer stock returns in excess of the S&P 500. Like Choi et al. (2004b), we find that excess employer stock returns cause trading out of employer stock.

1.21 percent of employee contribution balances. Since we are studying accounts with no diversification restrictions, we can conclude that passive employee responses occurred *even* in accounts in which employees had every opportunity to respond.¹⁵

Figure 14 plots the fraction of total account balances held in employer stock over time at Company F, which had no holding restrictions on either employee contribution or employer (match) balances. There are two complications with the Company F data. First, Company F allows its participants to allocate 401(k) assets to a self-directed brokerage window in which they can trade securities not offered in the company’s 401(k) investment menu. We do not observe daily balances in the self-directed window and thus cannot include them in the total balances we calculate. Therefore, Figure 14 overstates the fraction of all 401(k) balances allocated to employer stock. Because we do observe total employer stock balances, our trading regression estimates will not be affected by this data issue. Second, our Company F sample does not start until January 2002, which means that we do not observe pre-Enron behavior at this company. Therefore, our estimates of the media effect may be less reliable for this company.

Figure 15 plots Company F’s daily net transfers into or out of employer stock as a fraction of the prior day’s employer stock balance. Table 7 shows the news impact regression results. In calculating the economic effect, we modify equation (1) because we do not observe total 401(k) balances each day, but only at each year-end. Our alternate formula is

$$\frac{\sum_{t=\tau_0}^{T_0} \beta \cdot \text{News Impact}_t \cdot \text{Employer Stock Balances}_{t-1}}{\text{Total Year - End 2003 401(k) Balances}}, \quad (2)$$

where τ_0 is January 1, 2002 and T_0 is the number of trading days for which we have Company F transactions data.¹⁶ We find that the largest economic effect across all the specifications is a statistically insignificant 3.0 percentage point decrease due to media coverage. One of the reasons for the small calculated magnitude is that because of data limitations, we cannot include the news impact for the first 2½ months of the Enron/Global Crossing/Worldcom bankruptcy period. However, the small regression coefficient on *News Impact* suggests that including that

¹⁵ The economic effect of one of the *control* variables in these regressions is anomalously large. The coefficients on the linear time trend imply a 60 percentage point drop in employer stock holding due to the time trend. Since this would result in a negative average employer stock position in the absence of other forces, we do not interpret this magnitude literally but consider it an artifact of a nonlinearity—see Figure 12—that is not well fit by a cubic polynomial.

¹⁶ We have December 31, 2001 employer stock balances data for Company F from the cross-sectional data.

early period would not increase the magnitude substantially (assuming that the estimated regression coefficient would not change much with to additional data).

Overall, our analysis of employer stock trading at Companies D and F shows no statistically significant effect of Enron/WorldCom/Global Crossing on employees' willingness to hold employer stock, even in accounts that are not subject to diversification restrictions.

C. Impact on Texas Employees Versus Non-Texas Employees

The Enron scandal is more likely to have been salient to workers living in Texas than those living outside Texas. Not only was local news coverage likely to have been more active, but residents of Texas are more likely to have known Enron employees or friends of Enron employees. In this section, we explore whether Texan employees at Companies C and G reduced their employer stock holdings more than non-Texan employees at the same companies.¹⁷

Companies C and G are both large retail firms with a substantial number of employees both in Texas and outside of Texas. Company G imposed no diversification restrictions on its employees, although employer matching contributions had to be initially invested in employer stock. Employees who wished to diversify had to initiate a trade periodically, although they were free to do so at any time. We do not have daily transactions data for Company G, so we rely on a different identification strategy than in Section IV.C. We have cross-sectional snapshots of portfolio allocations at every year-end from 1998 to 2002. We use these snapshots, exploiting the fact that employees rarely change their 401(k) elections after enrolling (Samuelson and Zeckhauser 1989). Therefore, year-end differences in employer stock holding between Texans and non-Texans who enrolled at the same time are likely to be due to asset allocation decisions made at the time of enrollment. We look to see whether Texans who enrolled in the post-Enron period show an increasing tendency to deviate from non-Texans' employer stock allocations.

Figure 16 graphs the fraction of total balances held in employer stock against enrollment date for three groups of employees at Company G: those living in the greater-Houston metropolitan area, those living outside of Houston but in Texas, and those living outside of Texas. The portfolio allocation is taken from the first year-end snapshot after the employee's enrollment date. This Figure shows that the asset allocation patterns of all three groups of

¹⁷ We chose these companies because they both have large numbers of employees in Texas, though both companies have only a small fraction of their total employees in Texas.

employees track each other fairly closely, both before and after Enron. There is certainly no discernable exodus from employer stock for employees in Houston relative to employees living elsewhere, or for employees living in Texas relative to employees living in other states.

Company C imposed age and tenure-based diversification constraints on its employees, as described in Section III.A. Therefore, we examine only employer stock holdings in the accounts over which the employees have full discretion. Figure 17 plots the discretionary holdings in employer stock against initial enrollment date. As in Figure 16, the allocation is measured at the first year-end snapshot after enrollment. Similar to Company G, there is no significant reduction in employer stock holding of Texan employees relative to non-Texans. The average Texan enrollee in July to September 2001 held 4.6 percentage points more in employer stock. This gap narrows to 2.8 percentage points for November 2001 to January 2002 enrollees, and 3.0 percentage points for October to December 2002 enrollees.¹⁸ There are not enough Harris County employees at Company C to conduct a separate analysis.

Overall, it does not seem that proximity to disaster leads to wiser decisions about employer stock.

VI. Conclusions

Although the financial collapse of Enron motivated a flurry of legislative activity aimed at regulating the holding of employer stock in 401(k) plans, none of the regulations are nearly as stringent as those applied to defined benefit plans. This paper has examined the potential impact of some of the additional proposed regulations of employer stock holdings in 401(k) plans currently under consideration in Congress. (e.g., bills S.9, S. 1992, S. 2032, S. 2190).

Overall our analysis suggests that educating employees about the risks of employer stock and empowering them to trade out of employer stock will have little substantive overall impact on employer stock holdings in 401(k) plans. These conclusions are particularly worrisome, since education and empowerment are the key components of almost all of the active legislative proposals to regulate 401(k) investment in employer stock.

The persistent appeal of employer stock is likely to leave economists in a policymaking muddle. On one hand, economists understand the benefits of diversification and broadly agree

¹⁸ Company G's stock also outperformed the S&P 500 in the second half of 2001 while underperforming in the last three months of 2002, thus exaggerating any narrowing in the gap between Texan and non-Texan stockholding in the post-Enron period.

that employer stock should not make up half of a worker's retirement portfolio. On the other hand, economists dislike paternalism and do not want to enact coercive policies like banning employer stock in retirement accounts. More generally, household savings decisions are fraught with numerous economically significant mistakes—see Choi et al (2005a)—that economists and like-minded libertarians would not dream of forbidding.

It would be convenient if education could fix these problems. But educational interventions are expensive and show remarkably little effect (Duflo and Saez 2003, Choi et al. 2002, Choi, Laibson and Madrian 2005a). The current paper adds grist to this mill by showing that a year of headlines about decimated 401(k) accounts did little to drive investors out of employer stock. Our estimates suggest that the media publicity surrounding the Enron/Global Crossing/WorldCom bankruptcies reduced the fraction of 401(k) assets held in employer stock by at most 2 percentage points, from 35% to 33%.

Luckily there are reasonable policy options that *are* likely to mitigate the problem of employer stock without denying investors freedom of choice. In the status quo, firms deposit matching contributions into employer stock. The natural experiments reported in this paper show that such matching contributions stick where they initially land, regardless of *subsequent* diversification opportunities. Hence, the employer stock problem would be significantly reduced if default portfolios were diversified (for example, default portfolios could be required to meet the same fiduciary standards that apply to defined benefit pension plans).

With diversified defaults, investor inertia would be rendered harmless because only activist investors would opt out of the default and pile into employer stock. As noted earlier in Section II, in 401(k) plans with employer stock as an investment option but *without* an employer stock *default* for matching funds, only 22% of employee balances end up in employer stock. By contrast, in 401(k) plans *with* an employer stock default for matching funds, well over 50% of employee balances end up in employer stock.

True libertarians may object to restrictions on default portfolios. If diversified defaults are deemed to be too paternalistic, then employees should be asked to choose their own asset allocation (instead of being defaulted into an undiversified one like employer stock). Switching to such an active decision regime also dramatically lowers the fraction of assets in employer stock (Choi et al 2005, 2005b).

The common theme is that defaults stick and bad defaults are not inevitable. Bad defaults could be replaced with either good (diversified) defaults or with default-free choice. Banning bad defaults does not coerce employees since they are free to opt out of a good default and adopt any asset allocation they so choose. However, banning bad defaults does coerce firms, since they are no longer free to use defaults to induce their employees to become shareholders. We see this as a good thing, though there are some potential countervailing effects, including a potential drop in a firm's willingness to provide a 401(k) match.

Requiring (or at least legalizing) good defaults is a plausible solution to many weaknesses in our retirement savings system. Defaults can be used to encourage participation in retirement plans, raise retirement savings rates among at risk groups, and diversify 401(k) portfolios. In every case, defaults need not be coercive to work. However, defaults are a two-edged sword, since poorly chosen defaults can wreck havoc with financially unsophisticated, inertial consumers.

For better or worse, consumers often follow the path of least resistance. Firms understand defaults and actively exploit them. Policymakers need not passively accept this state of affairs.

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TABLE 1: Congressional Proposals to Regulate Employer Stock in 401(k) Plans

Bill No.	Title, Sponsor, and Date Introduced	Proposed Regulation of Employer Stock in 401(k) Plans	Status as of 8/19/2005
<i>Bills Under Consideration in the 109th Congress (2005-2006)</i>			
H.R.1960	Pension Preservation and Savings Expansion Act of 2005 Sponsor: Rep. Portman (R-OH) Introduced: 4/28/2005	Employees can sell employer stock derived from own contributions immediately. Employees can sell employer stock derived from employer contributions after 3 years of service or 3 years after receiving the employer contribution. Plans that offer employer stock must offer at least three other investment options.	In House subcommittee
H.R.1961	Pension Preservation and Savings Expansion Act of 2005 Sponsor: Rep. Cardin (D-MD) Introduced: 4/28/2005	Employees can sell employer stock derived from own contributions immediately. Employees can sell employer stock derived from employer contributions after 3 years of service or 3 years after receiving the employer contribution. Plans that offer employer stock must offer at least three other investment options.	In House subcommittee
S.219	National Employee Savings and Trust Equity Guarantee Act of 2005 Sponsor: Sen. Grassley (R-IA) Introduced: 1/31/2005	Employees can sell employer stock derived from own contributions immediately. Employees can sell employer stock derived from employer contributions after 3 years of service. Plans that offer employer stock must offer at least three other investment options.	In Senate committee
<i>Bills Under Consideration in the 108th Congress (2003-2004)</i>			
H.R.1000	Pension Security Act Sponsor: Rep. Boehner (R-OH) Introduced: 2/27/2003	Employees can sell employer stock three years after receiving it. Companies cannot require employees to invest their own contributions in employer stock.	Passed in House; no vote taken in Senate
H.R.1776	Pension Preservation and Savings Expansion Act of 2003 Sponsor: Rep. Portman (R-OH) Introduced: 4/11/2003	Employees can sell employer stock derived from own contributions immediately. Employees can sell employer stock derived from matching contributions after 3 years of service, and employer stock derived from all employer contributions after 5 years of service. Plans that offer employer stock must offer at least three other investment options.	No vote taken
H.R.2101	Pension Fairness Act of 2003 Sponsor: Rep. Miller (D-CA) Introduced: 5/14/2003	Employers must notify participants and inform them of the risks of not diversifying assets if employer stock exceeds 10% of balances. Participants must be informed of large employer stock sales by a corporate insider or plan fiduciary. Employees can sell employer stock after 3 years of service.	No vote taken

H.R.5397	Retirement Enhancement Act of 2004 Sponsor: Rep. Andrews (D-NJ) Introduced: 11/19/2004	Companies cannot require participants to invest their own contributions in employer stock. Employees can sell employer stock derived from employer contributions after 3 years of service. Plans that offer employer stock must offer at least three other investment options.	No vote taken
H.R.5398	Retirement Enhancement Revenue Act of 2004 Sponsor: Rep. Andrews (D-NJ) Introduced: 11/19/2004	Employees can sell employer stock derived from employer contributions after 3 years of service. Plans that offer employer stock must offer at least three other investment options.	No vote taken
S.9	Pension Protection and Expansion Act Sponsor: Sen. Daschle (D-SD) Introduced: 1/7/2003	Employers must notify participants if employer stock exceeds 20% of 401(k) balances. Companies must certify that employer stock is a prudent investment. Firms may match in employer stock or offer it for employee contributions, but not both.	No vote taken
S.1892	Sponsor: Sen. Bayh (D-IN) Introduced: 11/19/2003	Plan administrators must notify participants that they may be overinvested in employer securities and real property if such assets' value exceeds 50% of 401(k) balances.	No vote taken
S.2424	National Employee Savings and Trust Equity Guarantee Act Sponsor: Sen. Grassley (R-IA) Introduced: 5/14/2004	Employees can sell employer stock three years after receiving it. Plans that offer employer stock must offer three other investment options.	No vote taken
<i>Bills Under Consideration in the 107th Congress (2001-2002)</i>			
H.R.3640	Pension Protection and Diversification Act of 2002 Sponsor: Rep. Pascrell (D-NJ) Introduced: 1/29/2002	Employer stock capped at 20% of 401(k) assets. Employees can sell employer stock after 90 days. In ESOPs, employees can sell employer stock after 5 years or at age 35.	No vote taken
H.R.3692	Pension Protection and Diversification Act of 2002 Sponsor: Rep. Jackson-Lee (D-TX) Introduced: 2/7/2002	Employer stock capped at 20% of 401(k) assets. Employees can sell employer stock after 90 days. In ESOPs, employees allowed to sell employer stock after 5 years or at age 35.	No vote taken
H.R.3762	Pension Security Act of 2002 Sponsor: Rep. Boehner (R-OH) Introduced: 4/15/2002	Companies cannot require participants to invest their own contributions in employer stock. Employees can sell employer stock after 3 years in the plan. Plans that offer employer stock must offer at least three other investment options.	Passed in House, no vote taken in Senate

H.R.5110	Omnibus Corporate Reform and Restoration Act of 2002 Sponsor: Rep. Jackson-Lee (D-TX) Introduced: 7/12/2002	Employer stock capped at 20% of 401(k) assets. In ESOPs, employees allowed to sell employer stock after 5 years or at age 35.	No vote taken
S.1838	Pension Protection and Diversification Act Sponsor: Sen. Boxer (D-CA) Introduced: 12/18/2001	Employer stock capped at 20% of 401(k) assets. Employees can sell employer matching contributions made in employer stock after 90 days.	No vote taken
S.1919	Retirement Security Protection Act of 2002 Sen. Wellstone (D-MN) Introduced: 2/7/2002	Employer stock capped at 20% of 401(k) assets. Companies cannot require participants to invest their own contributions in employer stock. Employees can sell employer contributions made in employer stock after one year of service.	No vote taken
S.1971	National Employee Savings and Trust Equity Guarantee Act (NESTEG) Sponsor: Sen. Grassley (R-IA) Introduced: 2/27/2002	Employees can sell employer stock three years after receiving it. Plans that offer employer stock must offer at least three other investment options.	No vote taken
S.1992	Protecting America's Pensions Act of 2002 Sponsor: Sen. Kennedy (D-MA) Introduced: 3/6/2002	Employees can sell employer stock three years after receiving it. Companies cannot require participants to invest their own contributions in employer stock. Plans must provide information regarding diversification rights and the importance of diversifying assets. Plans that offer employer stock must offer at least three other investment options.	No vote taken
S.2032	Investor-Employees Need Financial Facts and Options for Responsible Retirement Plan Management Act of 2002 (INFORM) Sponsor: Sen. Durbin (D-IL) Introduced: 3/19/2002	Employers liable for excessive losses on employer securities during lockdowns on plan assets. Employers must notify participants if employer stock exceeds 30% of balances, and further employer contributions to employer stock prohibited until the participant signs a form acknowledging the risks of not diversifying assets.	No vote taken
S.2190	Worker Investment and Retirement Education Act of 2002 (WIRE) Sponsor: Sen. Kerry (D-MA) Introduced: 4/17/2002	Plans must provide investment guidelines to participants. Companies cannot require participants to invest their own contributions in employer stock. Plans that offer employer stock must offer at least three other investment options. Employees can begin selling employer contributions of employer securities after 5 years in the plan, with full divestment permitted after 7 years. Employees can begin selling employer matching contributions of employer securities after 3 years in the plan, with full divestment permitted after 5 years.	No vote taken

TABLE 2: Demographics of Studied Firms (Year-End 2003)

Company	Average age	Percent male	Percent married	Average annual salary	Median annual salary	Total employees
Company A	44.9	76%	N/A	N/A	N/A	~20,000
Company B	39.7	54%	N/A	N/A	N/A	~10,000
Company C	39.0	35%	N/A	N/A	N/A	100,000+
Company D	41.2	40%	62%	\$57,422	\$46,910	~40,000
Company E	34.9	52%	N/A	\$51,991	\$37,040	~10,000
Company F	44.8	28%	N/A	\$66,253	\$61,975	~15,000
Company G*	37.3	64%	N/A	N/A	N/A	100,000+
U.S. workforce (2004 CPS)	39.7	53%	59%	\$36,522	\$27,000	N/A

Source: Authors' calculations and March 2004 Current Population Survey.

* As of year-end 2002.

TABLE 3. 401(k) Plan Features of Studied Firms (Year-end 2003)

	Investment options	Employer Match		
		Match structure	Vesting	Allowable employer stock diversification
Company A	8 options + employer stock	55% to 125% match, depending on profitability, up to 6% of pay contributed; directed into ESOP account	100% immediate	Old: 25% at age 55 and 50% at age 60 with 10 years of tenure New: 25% at age 45, 50% at age 50, 100% at age 55
Company B	8 options + employer stock	50% match up to 6% of pay contributed; directed into ESOP account	5-year graduated	25% at age 50, 50% at age 55, 75% at age 60 with 10 years of tenure
Company C	13 options + employer stock	100% match up to 5% of pay contributed; directed into ESOP account	3-year graduated	50% after 10 years in plan or age 55 with 5 years in plan; 100% at age 70½ or age 60 with 5 years in plan
Company D	6 options + employer stock	50% match up to 5% of pay contributed; additional profit-contingent match possible; directed into ESOP account	100% immediate	Old: 25% at age 55 and 50% at age 60 with 10 years of tenure New: 100% immediately
Company E	7 options + employer stock	100% match up to 4% of pay contributed directed into employer stock	Graduated based on total accumulated hours worked (100% at 5000 hours)	100% immediate
Company F	10 options + employer stock	75% match up to 6% of pay contributed	5-year graduated	100% immediate
Company G*	7 options + employer stock	150% on first 1% of pay contributed; 50% on next 4% of pay contributed; directed into employer stock	3-year cliff	100% immediate

Source: Plan documents. * denotes plan information as of year-end 2002.

Table 4: News Stories on Enron, WorldCom, and Global Crossing, 10/16/2001-12/31/2003

	All stories		401(k) stories only	
	Days with stories	Total story count	Days with stories	Total story count
Newspapers				
<i>New York Times</i>	639	3,134	125	184
<i>Wall Street Journal</i>	534	3,294	115	157
<i>Washington Post</i>	681	2,374	134	176
<i>Los Angeles Times</i>	712	2,567	112	133
<i>Chicago Tribune</i>	327	678	86	111
Television				
ABC Network News	182	700	26	37
NBC Network News	163	459	37	55
CBS Network News	246	768	43	52
All newspapers	810	12,047	332	761
All television	322	1,927	79	144
All newspapers + TV	810	13,974	344	905

Source: Lexis/Nexis and Factiva.

TABLE 5: Effect of the Enron News Impact on Employer Stock Transfers (Hewitt Index, 8/4/1997-11/4/2003)

	All stories				Only 401(k) stories			
	$\delta = 0.25$		$\delta = 0.75$		$\delta = 0.25$		$\delta = 0.75$	
	Newspapers	Papers+TV	Newspapers	Papers+TV	Newspapers	Papers+TV	Newspapers	Papers+TV
News Impact	-0.0008** (0.0003)	-0.0007** (0.0002)	-0.0007* (0.0003)	-0.0008* (0.0004)	-0.0075* (0.0035)	-0.0057* (0.0024)	-0.0086* (0.0040)	-0.0069* (0.0030)
S&P 500 return								
Today	-0.0149** (0.0026)	-0.0150** (0.0026)	-0.0149** (0.0026)	-0.0149** (0.0027)	-0.0148** (0.0027)	-0.0149** (0.0027)	-0.0148** (0.0026)	-0.0149** (0.0027)
Yesterday	-0.0028 (0.0023)	-0.0029 (0.0023)	-0.0028 (0.0023)	-0.0028 (0.0023)	-0.0027 (0.0023)	-0.0027 (0.0023)	-0.0027 (0.0023)	-0.0027 (0.0023)
Prior month	-0.0013 (0.0007)	-0.0012 (0.0007)	-0.0012 (0.0007)	-0.0012 (0.0007)	-0.0012 (0.0007)	-0.0012 (0.0007)	-0.0012 (0.0007)	-0.0012 (0.0007)
Time trend								
Linear	0.0150 (0.0450)	0.0140 (0.0450)	0.0144 (0.0450)	0.0151 (0.0450)	0.0153 (0.0449)	0.0151 (0.0449)	0.0151 (0.0450)	0.0147 (0.0450)
Quadratic	-0.0100 (0.0173)	-0.0096 (0.0173)	-0.0097 (0.0173)	-0.0100 (0.0173)	-0.0097 (0.0173)	-0.0096 (0.0173)	-0.0097 (0.0173)	-0.0095 (0.0173)
Cubic	0.0011 (0.0014)	0.0011 (0.0014)	0.0011 (0.0014)	0.0011 (0.0014)	0.0011 (0.0014)	0.0011 (0.0014)	0.0011 (0.0014)	0.0011 (0.0014)
Intercept	0.0370 (0.0502)	0.0341 (0.0504)	0.0336 (0.0501)	0.0365 (0.0501)	0.0262 (0.0509)	0.0254 (0.0509)	0.0269 (0.0505)	0.0259 (0.0506)
Sample Size	1534	1534	1534	1534	1534	1534	1534	1534
Total news impact effect	-2.35 pp	-2.22 pp	-2.23 pp	-2.08 pp	-1.30 pp	-1.20 pp	-1.47 pp	-1.41 pp

Source: Authors' calculations. The dependent variable is aggregate net normalized employer stock transfers. The unit of observation is a trading day. The dependent variable and stock market returns are measured in percentage point units. Time trend variables are measured in years. All regressions include day-of-the-week dummies, month-of-the-year dummies, and additional stock market return controls extending back four years. Newey-West standard errors with five lags are in parentheses below the point estimates. The total news impact effect is the calibrated percentage point reduction in the fraction of the total portfolio allocated to employer stock due to the aggregate effect of the *News Impact* variable over the sample period. * denotes significance at the 5% level. ** denotes significance at the 1% level.

TABLE 6: Effect of the Enron News Impact on Employer Stock Transfers (Company D, 12/1/1997-12/31/2003)

	All stories				Only 401(k) stories			
	$\delta = 0.25$		$\delta = 0.75$		$\delta = 0.25$		$\delta = 0.75$	
	Newspapers	Papers+TV	Newspapers	Papers+TV	Newspapers	Papers+TV	Newspapers	Papers+TV
News impact	-0.0017 (0.0025)	-0.0012 (0.0017)	-0.0008 (0.0036)	-0.0006 (0.0024)	-0.0037 (0.0241)	-0.0141 (0.0183)	0.0018 (0.0356)	-0.0132 (0.0269)
Company D excess return								
Today	-0.0758** (0.0229)	-0.0758** (0.0229)	-0.0759** (0.0230)	-0.0759** (0.0230)	-0.0759** (0.0230)	-0.0758** (0.0229)	-0.0760** (0.0230)	-0.0758** (0.0230)
Previous day	-0.0193* (0.0086)	-0.0193* (0.0086)	-0.0193* (0.0086)	-0.0193* (0.0086)	-0.0194* (0.0086)	-0.0193* (0.0086)	-0.0194* (0.0086)	-0.0193* (0.0086)
Previous month	-0.0051* (0.0024)	-0.0051* (0.0024)	-0.0051* (0.0024)	-0.0051* (0.0024)	-0.0051* (0.0024)	-0.0051* (0.0024)	-0.0052* (0.0024)	-0.0051* (0.0024)
S&P 500 return								
Today	-0.0970** (0.0190)	-0.0971** (0.0190)	-0.0969** (0.0189)	-0.0970** (0.0190)	-0.0969** (0.0189)	-0.0970** (0.0189)	-0.0969** (0.0189)	-0.0970** (0.0189)
Previous day	-0.0414** (0.0137)	-0.0415** (0.0137)	-0.0413** (0.0137)	-0.0413** (0.0137)	-0.0412** (0.0137)	-0.0412** (0.0137)	-0.0412** (0.0137)	-0.0412** (0.0137)
Previous month	-0.0032 (0.0055)	-0.0032 (0.0055)	-0.0030 (0.0055)	-0.0030 (0.0055)	-0.0029 (0.0054)	-0.0032 (0.0054)	-0.0028 (0.0055)	-0.0031 (0.0055)
Time trend								
Linear	-0.8247** (0.3133)	-0.8258** (0.3134)	-0.8278** (0.3129)	-0.8283** (0.3127)	-0.8281** (0.3136)	-0.8134** (0.3144)	-0.8348** (0.3140)	-0.8145** (0.3148)
Quadratic	0.2511 (0.1661)	0.2514 (0.1661)	0.2528 (0.1660)	0.2529 (0.1659)	0.2530 (0.1661)	0.2457 (0.1665)	0.2563 (0.1664)	0.2465 (0.1667)
Cubic	-0.0195 (0.0185)	-0.0195 (0.0185)	-0.0198 (0.0185)	-0.0197 (0.0185)	-0.0198 (0.0185)	-0.0188 (0.0185)	-0.0202 (0.0186)	-0.0189 (0.0186)
Diversification dummy	0.2484 (0.1338)	0.2370 (0.1288)	0.2366 (0.1428)	0.2315 (0.1327)	0.2272 (0.1302)	0.2251 (0.1240)	0.2233 (0.1355)	0.2294 (0.1268)
Intercept	0.3867 (0.7065)	0.3873 (0.7065)	0.3857 (0.7065)	0.3866 (0.7062)	0.3839 (0.7077)	0.3825 (0.7058)	0.3890 (0.7096)	0.3764 (0.7075)
Sample Size	1520	1520	1520	1520	1520	1520	1520	1520
Total news impact effect	-1.21 pp	-0.99 pp	-0.51 pp	-0.41 pp	-0.15 pp	-0.68 pp	-0.07 pp	-0.62 pp

Source: Authors' calculations. The dependent variable is aggregate net normalized employer stock transfers. The unit of observation is a trading day. The dependent variable and stock market returns are measured in percentage point units. Time trend variables are measured in years. The diversification dummy equals 1 if the date is after the employer allowed for full diversification of matching contributions for all employees. All regressions include day-of-the-week dummies, month-of-the-year dummies, and additional stock market return controls extending back four years. Newey-West standard errors with five lags are in parentheses below the point estimates. The total news impact effect is the calibrated percentage point reduction in the fraction of the total portfolio allocated to employer stock due to the aggregate effect of the *News Impact* variable over the sample period. * denotes significance at the 5% level. ** denotes significance at the 1% level.

TABLE 7: Effect of the Enron News Impact on Employer Stock Transfers (Company F, 1/1/2002-12/31/2003)

	All stories				Only 401(k) stories			
	$\delta = 0.25$		$\delta = 0.75$		$\delta = 0.25$		$\delta = 0.75$	
	Newspapers	Papers+TV	Newspapers	Papers+TV	Newspapers	Papers+TV	Newspapers	Papers+TV
<i>News impact</i>	-0.0003 (0.0041)	-0.0013 (0.0026)	-0.0013 (0.0049)	-0.0011 (0.0032)	-0.0048 (0.0353)	-0.0140 (0.0223)	-0.0039 (0.0427)	-0.0121 (0.0304)
Excess Company F return								
Today	-0.2038** (0.0397)	-0.2041** (0.0397)	-0.2038** (0.0397)	-0.2039** (0.0397)	-0.2036** (0.0396)	-0.2032** (0.0396)	-0.2037** (0.0396)	-0.1631** (0.0497)
Previous day	0.0407* (0.0204)	0.0406* (0.0204)	0.0407* (0.0204)	0.0406* (0.0204)	0.0409* (0.0203)	0.0412* (0.0203)	0.0408* (0.0204)	0.1189* (0.0370)
Previous month	0.0019 (0.0061)	0.0020 (0.0062)	0.0020 (0.0062)	0.0020 (0.0062)	0.0019 (0.0061)	0.0019 (0.0061)	0.0019 (0.0061)	-0.0129 (0.0108)
S&P 500 return								
Today	-0.1632** (0.0496)	-0.1632** (0.0497)	-0.1630** (0.0496)	-0.1631** (0.0497)	-0.1631** (0.0497)	-0.1631** (0.0498)	-0.1632** (0.0497)	-0.2036** (0.0396)
Previous day	0.1188** (0.0369)	0.1189** (0.0370)	0.1190** (0.0371)	0.1190** (0.0370)	0.1189** (0.0370)	0.1191** (0.0370)	0.1189** (0.0370)	0.0409** (0.0204)
Previous month	-0.0127 (0.0108)	-0.0125 (0.0108)	-0.0126 (0.0108)	-0.0126 (0.0108)	-0.0128 (0.0108)	-0.0132 (0.0108)	-0.0127 (0.0108)	0.0019 (0.0062)
Time trend								
Linear	-1.2238* (0.5983)	-1.2660* (0.5740)	-1.2674* (0.6217)	-1.2646* (0.5925)	-1.2258* (0.5635)	-1.2397* (0.5548)	-1.2226* (0.5728)	-1.2355* (0.5610)
Quadratic	0.9555 (0.6023)	0.9848 (0.6029)	0.9749 (0.6010)	0.9786 (0.6027)	0.9656 (0.6054)	1.0081 (0.6036)	0.9607 (0.6045)	0.9911 (0.6039)
Cubic	1.4361* (0.6105)	1.4536* (0.5924)	1.4670* (0.6253)	1.4608* (0.6056)	1.4348* (0.5894)	1.4264* (0.5843)	1.4337* (0.5944)	1.4309* (0.5852)
Intercept	-1.1622 (0.7088)	-1.1222 (0.7101)	-1.1478 (0.7100)	-1.1373 (0.7108)	-1.1631 (0.6996)	-1.1496 (0.7004)	-1.1632 (0.7031)	-1.1479 (0.7047)
Sample Size	504	504	504	504	504	504	504	504
Total news impact effect	-0.48 pp	-2.87 pp	-2.25 pp	-2.25 pp	-0.51 pp	-1.74 pp	-0.41 pp	-1.47 pp

Source: Authors' calculations. The dependent variable is aggregate net normalized employer stock transfers. The unit of observation is a trading day. The dependent variable and stock market returns are measured in percentage point units. Time trend variables are measured in years. All regressions include day-of-the-week dummies, month-of-the-year dummies, and additional stock market return controls extending back four years. Newey-West standard errors with five lags are in parentheses below the point estimates. The total news impact effect is the calibrated percentage point reduction in the fraction of the total portfolio allocated to employer stock due to the aggregate effect of the *News Impact* variable over the sample period. * denotes significance at the 5% level. ** denotes significance at the 1% level.

FIGURE 1. Fraction of Employer Match Balances Held in Employer Stock: Company D (Year-End 2001)

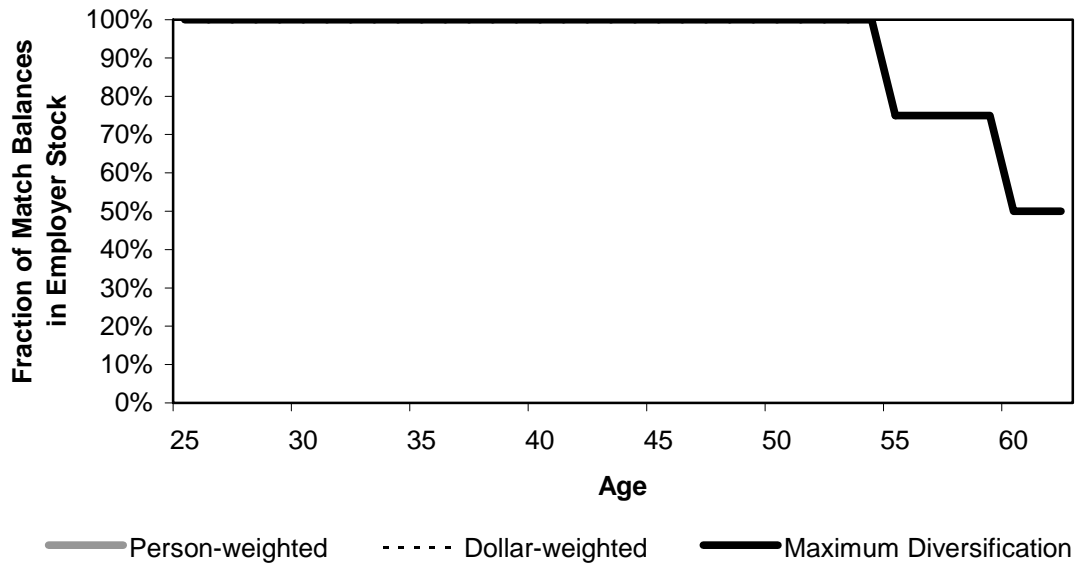


FIGURE 2. Fraction of Employer Match Balances Held in Employer Stock: Company A (Year-End 2003)

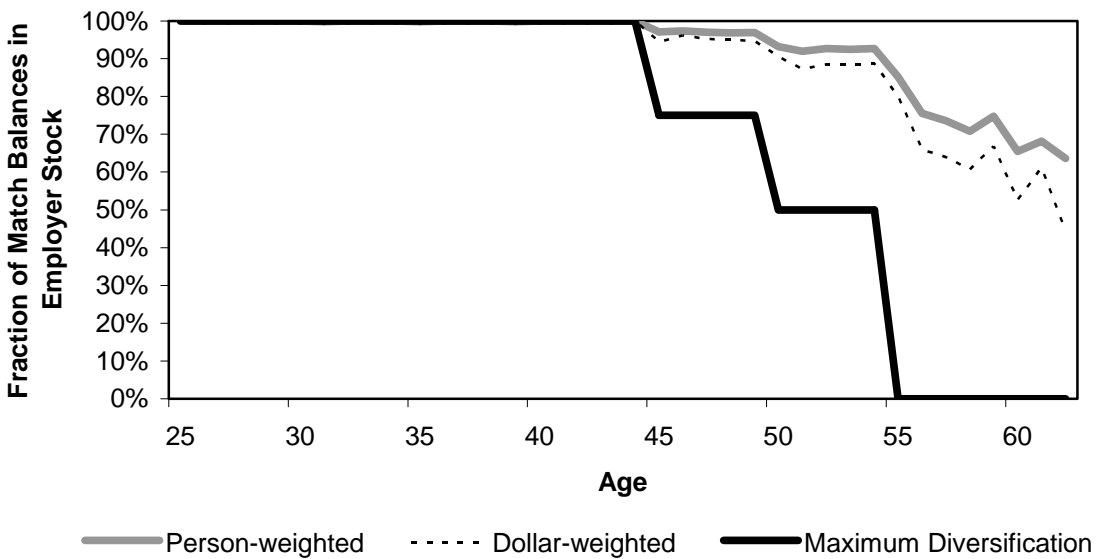


FIGURE 3. Fraction of Employer Match Balances Held in Employer Stock: Company B (Year-End 2003)

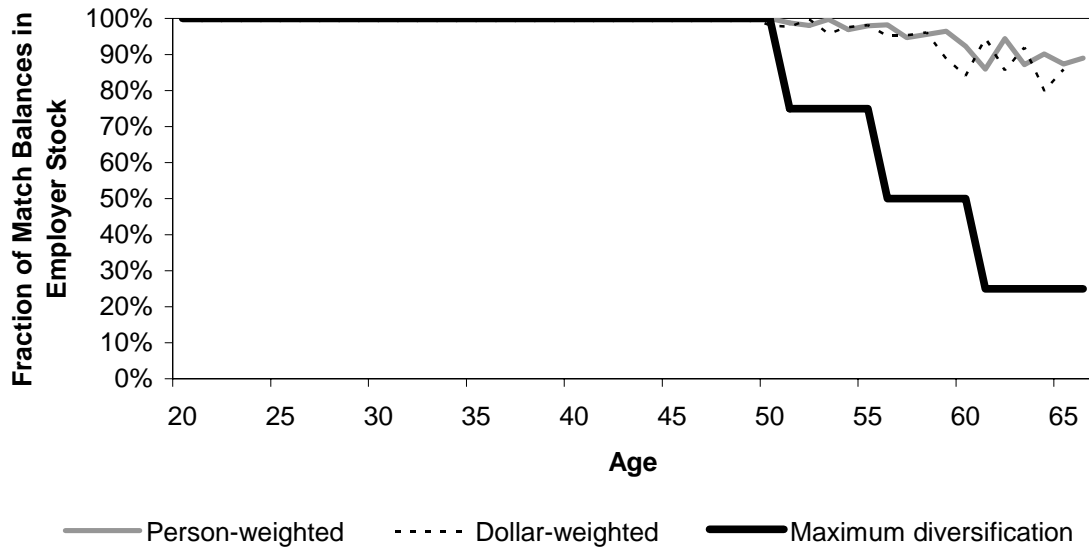


FIGURE 4. Fraction of Employer Match Balances Held in Employer Stock for Employees Under Age 55: Company C (Year-End 2003)



FIGURE 5. Fraction of Employer Match Balances Held in Employer Stock for Employees Aged 55-70 with 5+ Years Tenure: Company C (Year-End 2003)

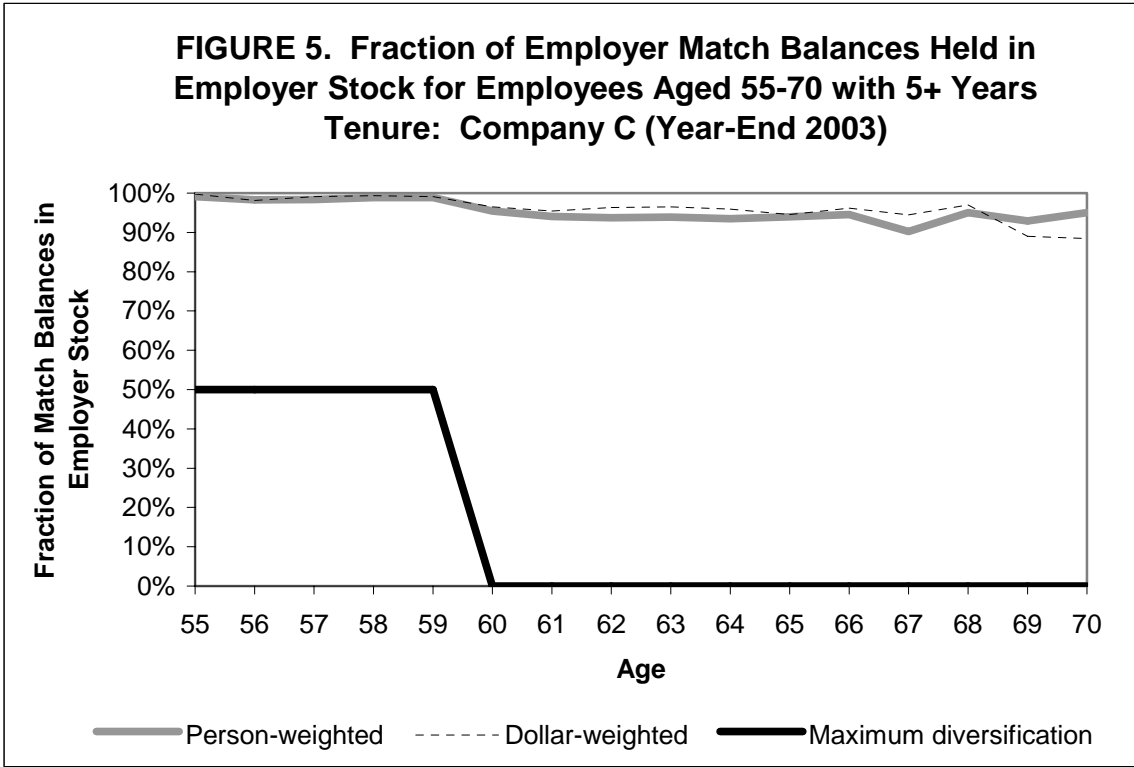


Figure 6: Fraction of Employer Match Balances Held in Employer Stock: Company D

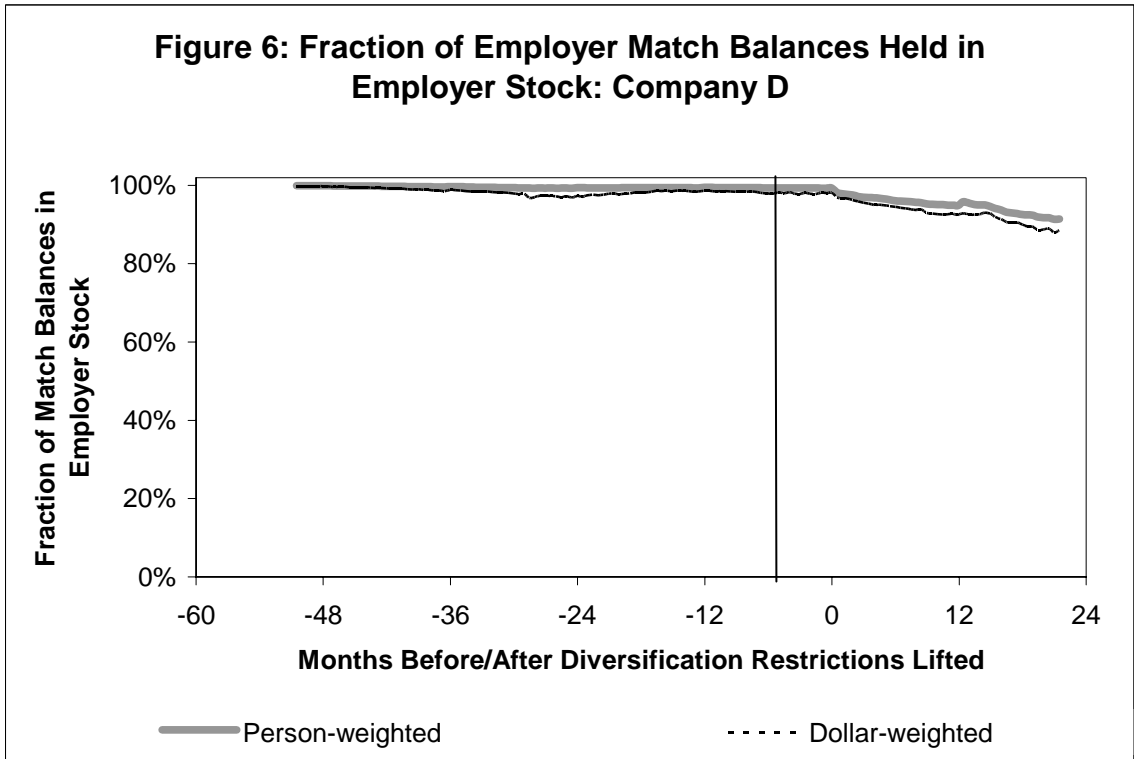


FIGURE 7. Fraction of Employer Match Balances Held in Employer Stock: Company E (Year-End 2003)

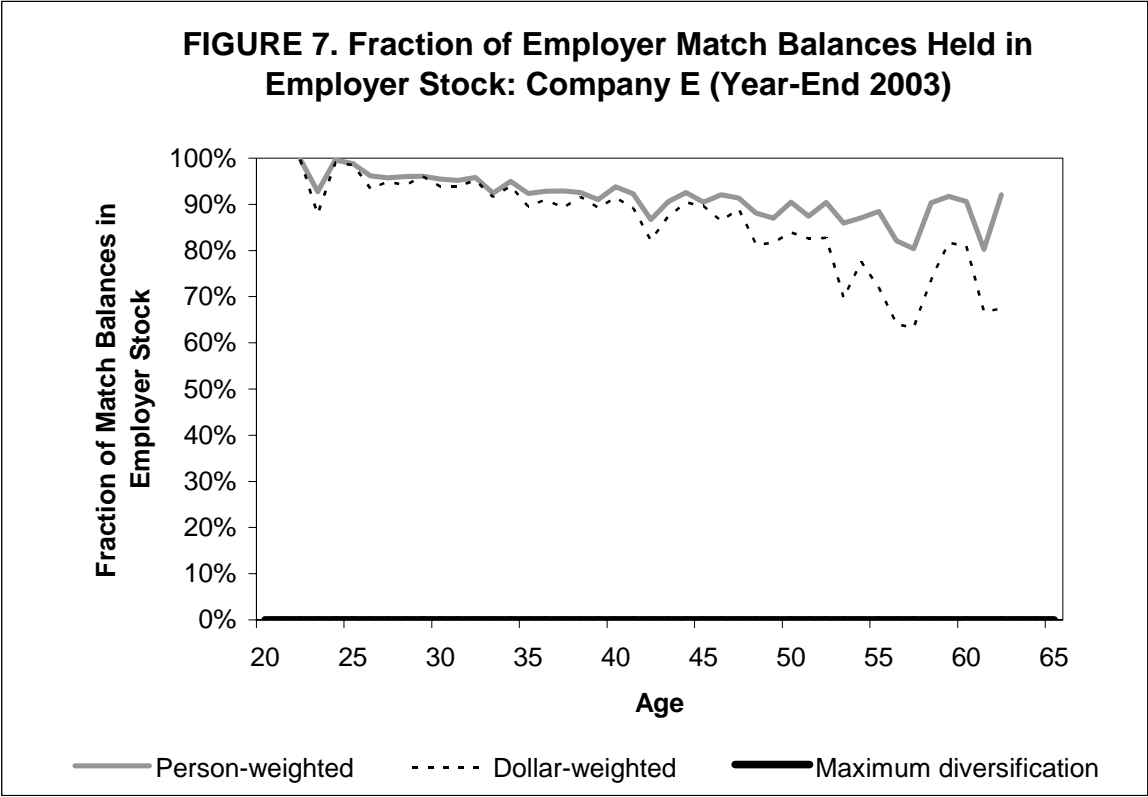
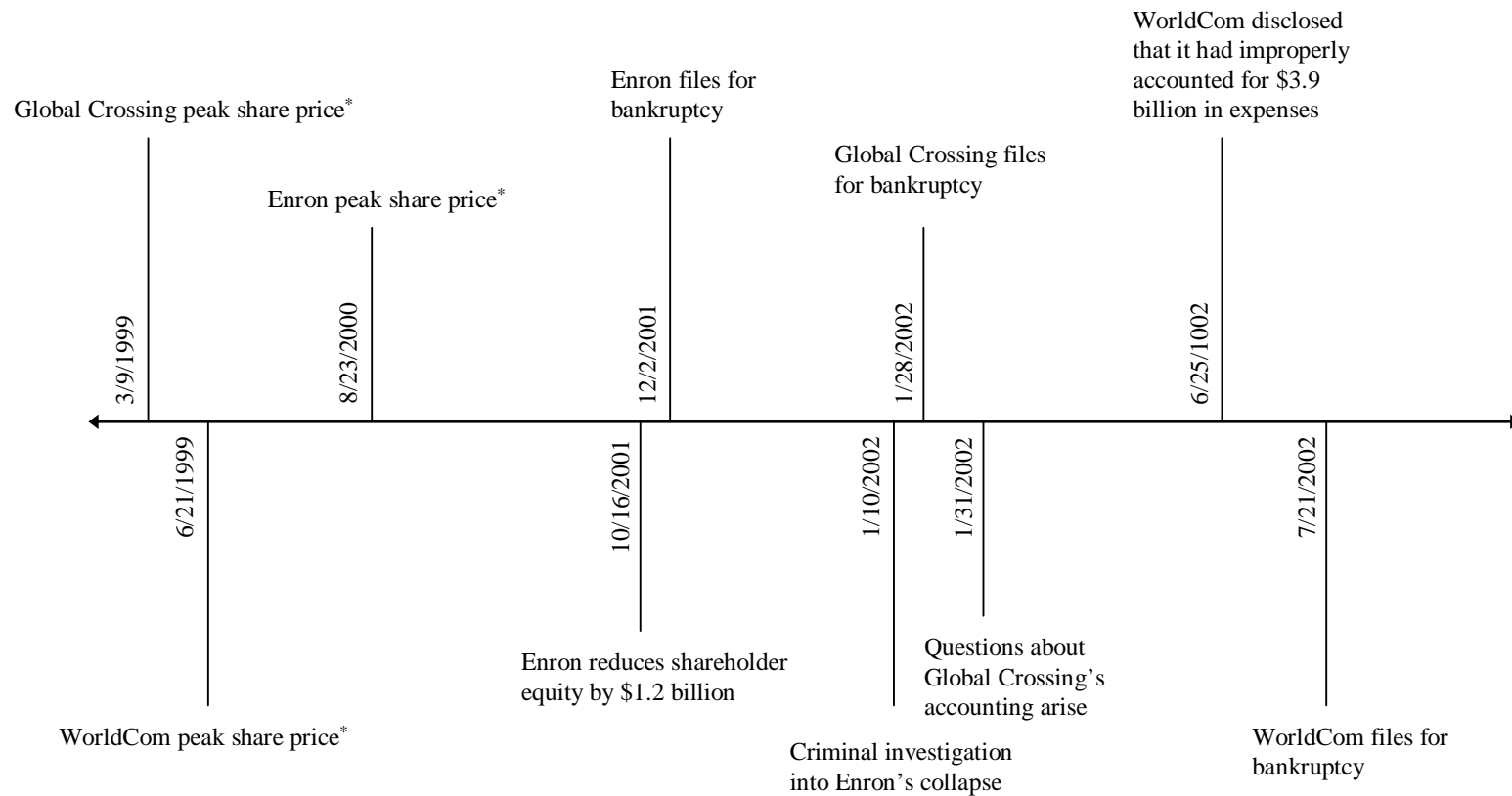


FIGURE 8. The Financial Collapses of Enron, WorldCom, and Global Crossing



Source: Washington Post, New York Times

*Adjusted for stock splits

FIGURE 9. Enron, Global Crossing, and WorldCom Newspaper Stories and News Impact Variable ($\delta = 0.75$)

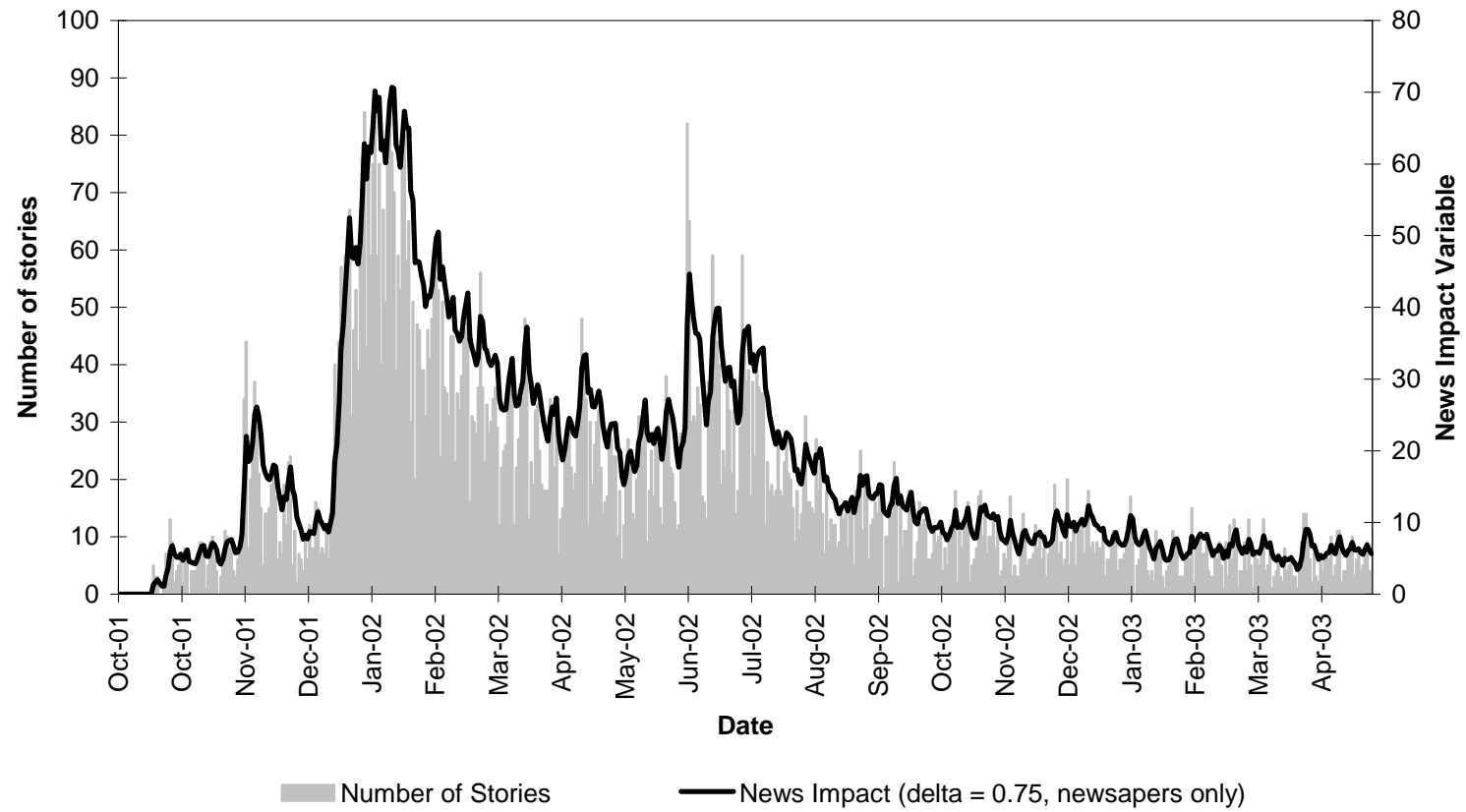


FIGURE 10. Fraction of Total 401(k) Balances Held in Employer Stock: Hewitt Index

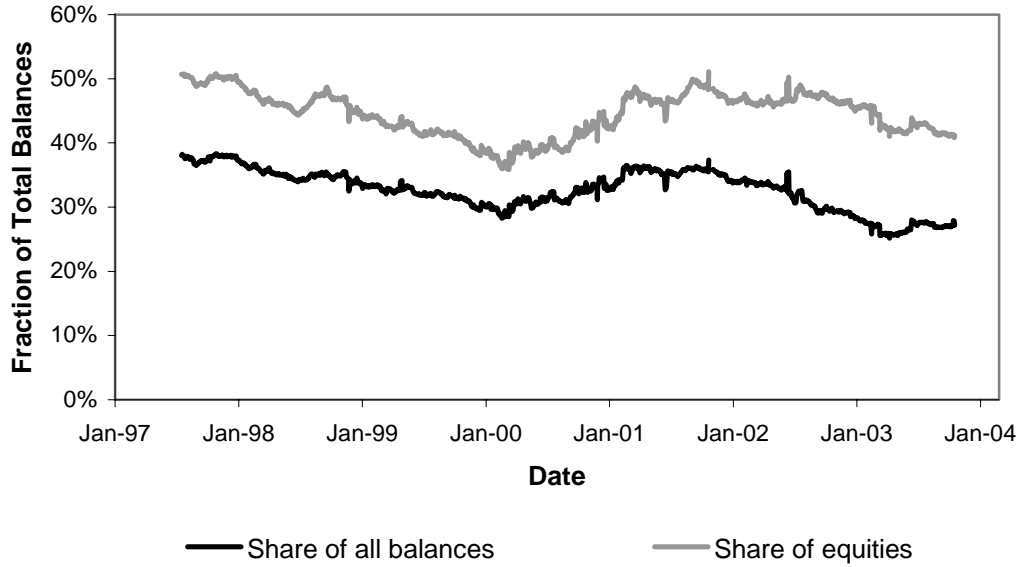


FIGURE 11. Net Employer Stock Transfer Activity as a Fraction of Employer Stock Balances: Hewitt Index

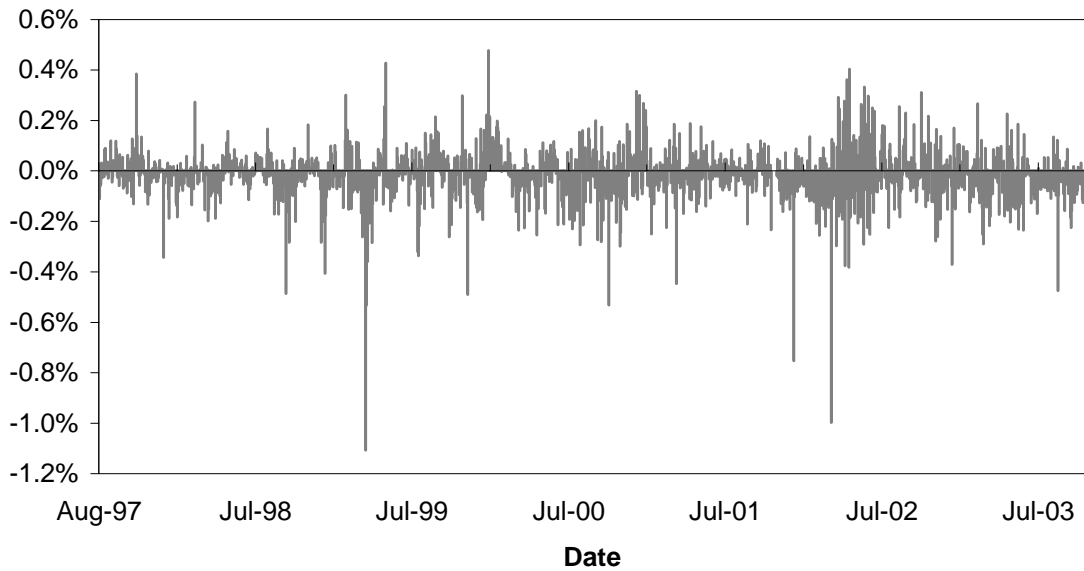


FIGURE 12. Fraction of Employee Contribution Balances Held in Employer Stock: Company D

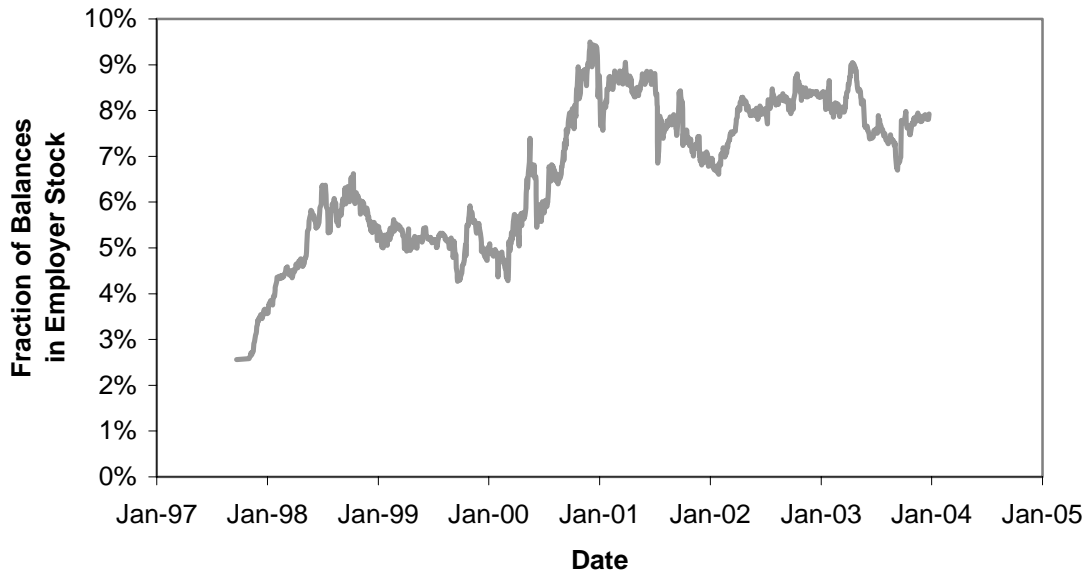


FIGURE 13. Net Employer Stock Transfer Activity as a Fraction of Employer Stock Balances: Company D

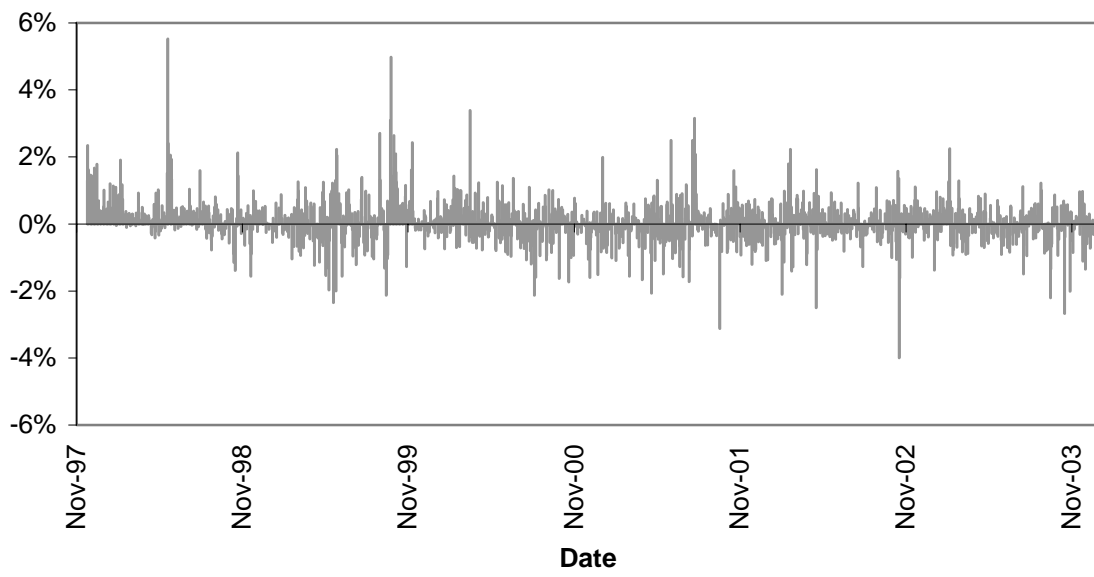


FIGURE 14. Fraction of Total Balances (Excluding Brokerage Window) Held In Employer Stock: Company F

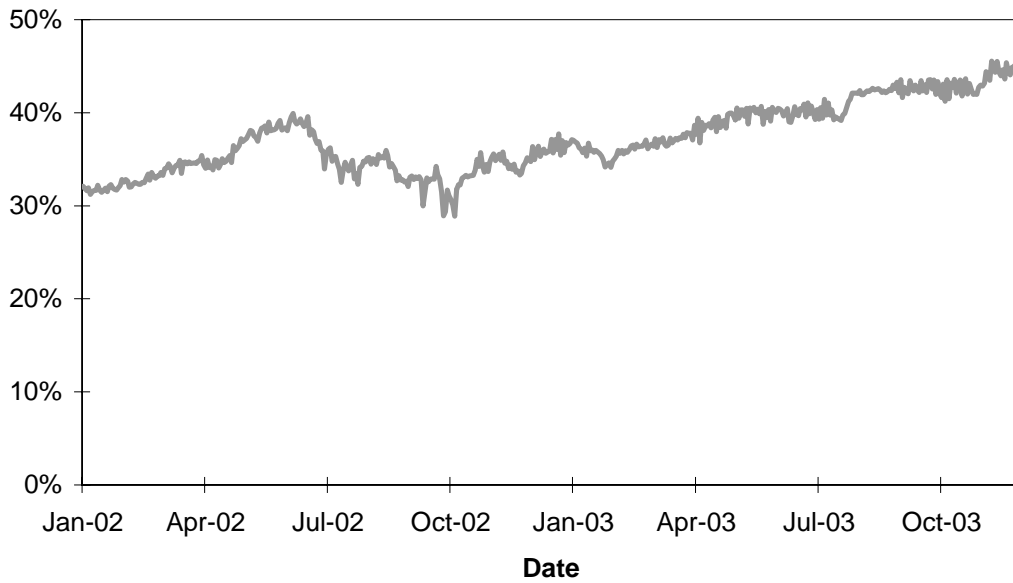


FIGURE 15. Net Employer Stock Transfer Activity as a Fraction of Employer Stock Balances: Company F

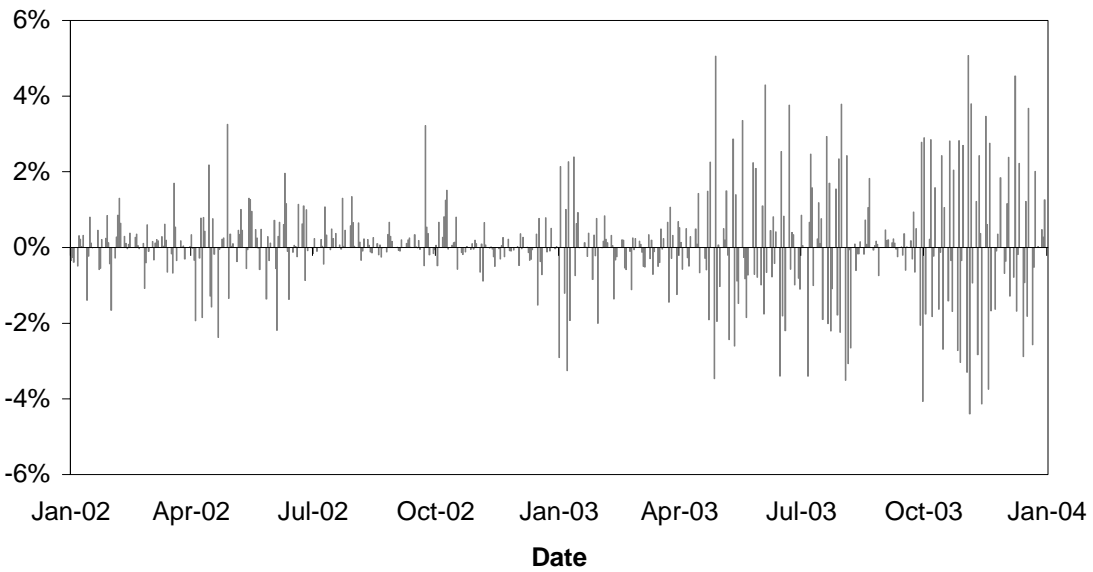


FIGURE 16. Fraction of Total Balances Held in Employer Stock at Year-End for New 401(k) Plan Participants: Company G

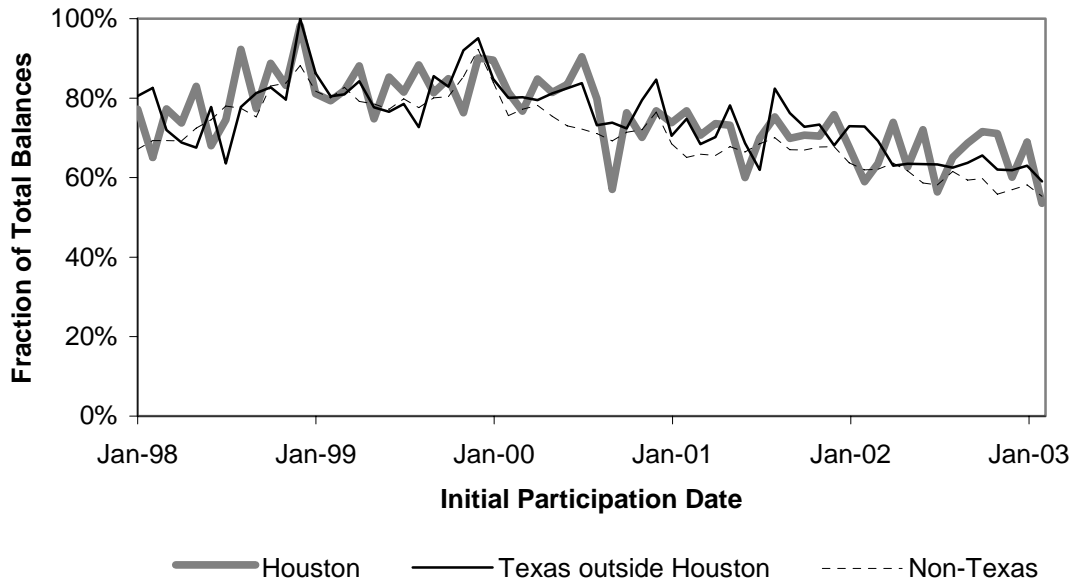


FIGURE 17. Fraction of Employee Contribution Balances Held in Employer Stock at Year-end for New 401(k) Plan Participants: Company C

