

Deferred Compensation Plan Characteristics and Voluntary Employee Turnover

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Abstract

This study examines the effects of deferred compensation plan characteristics on voluntary turnover decisions, using detailed personnel data on store-level employees of a large retail firm. Overall, I find that employees who are eligible to receive deferred profit-sharing payments have significantly lower voluntary turnover. However, the relation between eligibility and turnover varies depending upon the specific plan eligibility requirement (i.e., age, tenure, hours worked per year), with stronger retention effects when plan contributions are larger. Vesting restrictions are associated with lower turnover rates, but only among lower-level store employees. Finally, the retention benefits from unvested plan holdings are driven primarily by deferred compensation that is invested in the company's stock rather than in diversified mutual funds. These findings suggest that employees may respond to the retention incentives provided by a deferred compensation plan, but that specific plan characteristics play a key role in determining the plan's retention benefits.

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1. Introduction

Considerable research has examined the influence of compensation characteristics on employee behavior and firm outcomes. This research has primarily focused on the use of compensation for incentive purposes (e.g., Prendergast, 1999; Merchant et al., 2003). However, firms use compensation plans to achieve a number of other objectives, with employee retention among the most important.¹ Many compensation professionals and academic researchers contend that firms can increase retention (i.e., reduce voluntary employee turnover) through the use of deferred pensions, profit-sharing plans, 401(k) matching, and equity grants (e.g., Lazear, 1990; Oyer and Schaefer, 2005). These compensation mechanisms defer payouts by making them explicitly contingent on the employee staying with the firm for some specified amount of time, typically through the use of tenure-based eligibility and vesting restrictions.²

A key issue in the design of deferred compensation plans is the influence of specific plan characteristics (e.g., eligibility requirements, vesting schedules, size of deferred grants, investment vehicle) on employee turnover decisions. Labor economists such as Lazear (1990, p. 263) argue that “turnover rates are fundamentally influenced by the structure of deferred compensation.” Yet most empirical studies to date have ignored this issue, instead focusing on the cross-sectional association between the presence of deferred compensation plans and employee turnover rates (e.g., Allen et al., 1993; Evan and Macpherson, 1996; Azfar and

¹ For example, surveys by the compensation consulting firm PayScale find that retaining talent is the single most important compensation objective for most firms. For the 2013 survey, 66% of participating firms listed retention as most important, up from 54% in 2012. (<http://resources.payscale.com/hr-2013-compensation-practices-report.html>, accessed February, 2014).

² Throughout this paper, I use the phrase “deferred compensation” to mean compensation that is explicitly contingent on tenure requirements. In other contexts, deferred compensation can refer more narrowly to the practice of executives voluntarily deferring a portion of current pay to achieve tax objectives (e.g., Anantharaman et al., 2013), or the practice of delaying the determination of contingent pay due to uncertainty with respect to performance measurement (e.g., Jackson and Lazear, 1991).

Danninger, 2001), and largely ignoring whether specific plan characteristics have differential effects on employee retention.³

This study addresses this limitation using ten years of detailed data on individual, store-level employees of a large retail firm. The firm's deferred profit-sharing plan covers all store-level employees from entry-level customer service representatives to store managers, with lower turnover one of the plan's primary objectives.⁴ Although any single-firm study faces generalizability concerns, this sample offers a number of significant advantages for investigating the retention benefits from different plan characteristics. First, the plan's eligibility cutoffs and vesting schedules are based on age, tenure, and the number of hours worked during each year, allowing me to identify and test for discontinuities in individual employees' retention incentives that arise from the plan cutoffs and vesting schedules. Second, some of the plan's provisions, including the minimum age for eligibility, the percentage of firm profits contributed to the plan, the length of the vesting schedule, and the investment of plan assets (company stock or diversified mutual fund) changed during the sample period, providing natural experiments to test the effects of these characteristics on employee retention. Finally, the detailed, employee-level data allow an examination of claims regarding the importance of employee characteristics in deferred compensation design (e.g., Salop and Salop, 1976; Rosenbloom, 2005).

Using hazard analysis, I find that employees who are eligible to receive contributions under the deferred compensation plan have significantly lower turnover rates than employees who do not meet the eligibility requirements. Plan eligibility is associated with a 15–35%

³ Exceptions include Kole (1997) and Cadman et al. (2013), which examine vesting terms for executive stock options as a function of proxies for retention importance.

⁴ Similar deferred profit-sharing plans are used by more than twelve thousand U.S. firms to cover more than thirteen million employees, an increase of more than 333% over the last thirty years (NCEO, 2014).

reduction in turnover rates, which corresponds to an expected employment length increase of 17 – 54% for the average employee. The effect of eligibility on turnover is stronger for larger values of deferred compensation grants.

Turnover is not significantly different between employees just below the age or tenure cutoffs and those just above the cutoffs. However, employees who receive deferred compensation by working just over the annual hour cutoff exhibit lower turnover rates than do employees who work just under the required number of hours. The plan eligibility retention effects are stronger for females than for males, and for older workers than for younger workers. To the extent that these characteristics proxy for employees' discount rates, these results are consistent with prior evidence that women have lower discount rates than men (thereby increasing the expected value of deferred compensation), and that discount rates decrease with age (e.g., Warner and Pleeter, 2001).

Because unvested deferred compensation is forfeited if the employee leaves the firm, unvested plan holdings may have a greater influence on voluntary turnover decisions than vested holdings (e.g., Core and Guay, 2001; Kedia and Rajgopal, 2009). Consistent with this argument, I find a negative and significant association between the value of unvested plan holdings and voluntary turnover, but only for employees at the lowest organizational level. For these employees, an additional \$1,000 of unvested holdings is associated with a 26% turnover rate reduction. This reduced turnover rate corresponds to a 35% longer expected employment duration. I also find that the retention effects of unvested holdings are primarily driven by deferred compensation invested in the company's stock, and not by investments in diversified stock holdings. In contrast to non-managerial employees, unvested holdings are not statistically associated with reduced turnover rates for store managers, suggesting that unvested holdings do

not provide strong retention incentives to these employees, who tend to have higher current pay and greater investments in firm-specific human capital.

This paper contributes to the literature on compensation design and employee turnover in three ways. First, I extend prior research by examining whether *specific characteristics* of a deferred compensation plan are associated with employee turnover rates. Beyond the decision of whether to adopt a deferred compensation plan, employers face a number of different choices in designing a plan to meet their retention objectives. The evidence in this study suggests that some plan characteristics are associated with reduced turnover while others appear to have no effect, thus highlighting the importance of examining specific plan characteristics when investigating deferred compensation plan outcomes.

Second, I am better able to overcome the endogeneity problem that has limited prior research on the retention benefits from deferred compensation. Although I do not directly examine whether the existence of a deferred compensation plan affects voluntary turnover, my findings that certain characteristics influence employee turnover are consistent with the plan having retention effects. Prior studies have attempted to investigate the broad question of whether deferred compensation plans reduce employee turnover, with mixed results (e.g., Allen et al., 1993; Gustman and Steinmeir, 1993; Azfar and Danninger, 2001). One empirical difficulty in these cross-sectional studies is overcoming the endogenous decision to adopt such a plan in order to establish a causal relationship. My analysis of employee-level decisions in a single firm reduces this problem because the deferred compensation plan is relatively exogenous from the employees' perspective.

Third, although many studies have examined the determinants and consequences of compensation design for executives, relatively little is known about how design choices impact

employees below the executive level. Research on the use of compensation design to mitigate employee turnover has generally focused on executives (e.g., Chen, 2004; Balsam and Miharjo, 2007; Sundaram and Yermack, 2007). In contrast, the setting for this study includes customer-facing store employees. For non-executive employees, a number of factors may attenuate the retention effects related to plan characteristics. For example, non-executive employees often fail to understand the provisions of deferred compensation plans in which they are eligible to participate (e.g., Mitchell, 1988; Luchak and Gunderson, 2000; Budd, 2008). In addition, deferred compensation for non-executive employees is commonly implemented as part of a qualified retirement plan to take advantage of tax savings. Regulatory requirements for these tax-qualified plans restrict the range of flexibility in designing eligibility criteria and vesting requirements, potentially diminishing the effect of various plan provisions on voluntary turnover. By examining the retention effects of deferred compensation plan characteristics in a setting made up of non-executive workers, this paper responds to calls for research on compensation for employees at lower organizational levels (e.g., Indjejikian, 1999).

The remainder of this paper is organized as follows: In the next section, I provide an overview of theoretical predictions related to the link between deferred compensation and turnover, discuss the research setting, and develop hypotheses related to the retention effects of the research site's specific deferred compensation plan characteristics and institutional setting. Section 3 discusses the sample and measures used for the empirical analysis. In Section 4, I present my results. Conclusions are provided in section 5.

2. Theory, Research Setting, and Hypotheses

2.1 Deferred compensation characteristics and employee turnover

Although prior research posits a number of motivations for the use of deferred compensation, such as taking advantage of tax benefits (Black, 1980; Tepper, 1981), providing effort incentives (Lazear, 1979; Lazear, 1981) and attracting high-quality employees (Salop and Salop, 1976), practitioners and academics alike cite reduced voluntary turnover as one of the most direct benefits of deferred compensation. Recent surveys, for example, show that employers list retention as a primary reason for offering defined benefit and defined contribution pension plans to workers, and employers believe such plans directly impact employee turnover (Diversified Investment Advisors, 2006; Grant Thornton, 2010). Similarly, economic theories argue that deferred compensation in general can be an effective tool for reducing employee turnover (e.g., Lazear, 1990). Other researchers contend that retention is a prime motivation for several specific forms of deferred compensation, including deferred profit-sharing plans and Employee Share Ownership Plans (ESOPs) (Kruse, 1996; Azfar and Danninger, 2001; Rosenbloom, 2005), pensions (Ippolito, 1991), and broad-based equity plans with vesting restrictions (Core and Guay, 2001; Ittner et al., 2003; Oyer and Schaefer, 2005).⁵

The argument for using deferred compensation to reduce voluntary turnover is straightforward. Because new compensation grants and/or vesting of previous grants are explicitly linked to tenure requirements, employees face increased implicit costs of quitting before tenure requirements are reached. However, the retention benefits from deferred

⁵ Several studies use firm-level data to examine whether the use of deferred compensation is related to retention-oriented compensation objectives. Using survey data on stated compensation objectives, Ryterband (1991) finds that reducing employee turnover is a primary objective among ESOP adopters, while Gerakos et al. (2011) find a negative relationship between retention objectives and the use of broad-based stock options. Core and Guay (2001) and Oyer and Schaefer (2005) use proxies for the relative importance of retention and find that these retention proxies are significant determinants of broad-based stock option grants.

compensation are likely to be driven not merely by the existence of such a plan, but also by the specific plan characteristics.

Eligibility rules, for example, can affect retention incentives by stipulating which employees participate in the plan. Holding current pay fixed, eligibility to receive deferred compensation increases future payouts, conditional on remaining with the firm (e.g., Lazear, 1979). The higher the present value of total compensation (i.e., current plus deferred), the less likely an outside offer will exceed the pay at the incumbent job, and therefore the less likely an employee will be to leave the firm.

The amount of money contributed to the plan is also likely to affect voluntary turnover because contribution size determines the difference in retention incentives between employees who are eligible and those who are ineligible for plan grants. Along these lines, Blasi et al. (2008) provide survey evidence that the size of profit-sharing contributions as a percentage of total pay is negatively associated with self-reported intention to seek a new job.

Vesting terms can provide retention incentives by extending the time horizon of payouts (Kole, 1997; Cadman et al., 2011). Prior research specifically cites *unvested* holdings as being especially effective in discouraging employees from quitting, because any outside opportunity must compensate the employee for unvested holdings that would be forfeited on departure (e.g., Core and Guay, 2001; Kedia and Rajgopal, 2009). Consistent with this intuition, Balsam and Miharjo (2007) find that the value of unvested equity holdings is negatively associated with voluntary turnover for their sample of executives.

Finally, the retention effects of unvested holdings depend on the value of the holdings *to the employee*, because the subjective value represents the perceived cost of forfeiture. Employees' valuation of unvested holdings, and thus the associated retention effects, may

depend on whether plan assets are invested in company stock or diversified investment vehicles. Prior research indicates that employees exhibit a preference for investments in employer stock (e.g., Huberman, 2001; Cohen, 2009), notwithstanding portfolio theory's clear prescriptions for diversification. Survey evidence indicates that employees actually consider company stock to be a *less* risky investment than a diversified equity portfolio (John Hancock Financial Services, 2002). Other studies suggest that owning company stock *per se* can increase employees' identification with the firm, and consequently improve loyalty and reduce voluntary turnover (e.g., Pierce et al., 1991; Kruse and Blasi, 1997; Blasi et al., 2008). All of these arguments imply that investing deferred contributions in company stock will yield stronger retention incentives. In contrast, recent studies highlight the cost of under-diversification associated with employees' investments in their companies' stock (e.g., Meulbroek, 2005; Poterba, 2003; Cohen, 2009). If employees recognize the costs of under-diversification, they may steeply discount investments in company stock, reducing the retention effects of company stock relative to diversified investments.

Although a number of studies have examined whether the *existence* of a deferred compensation plan is associated with reduced voluntary turnover,⁶ relatively little evidence exists on the influence of specific plan characteristics on employee retention, despite their theoretical importance to plan outcomes. Given this limitation, I extend prior deferred compensation studies

⁶Most research in this area uses data from broad employment and compensation surveys to compare employee turnover rates at firms using and not using deferred compensation (e.g., Azfar and Danninger, 2001; Ippolito, 1987; 1991; Allen et al., 1993; Evan and Macpherson, 1996). These studies generally find that firms with deferred compensation plans have lower turnover. However, Gustman and Steinmeier (1993) find that, after controlling for appropriate job-and firm-level characteristics, the link between deferred compensation and turnover is not significant. Allen et al. (1993) and Evan and Macpherson (1996) also find limited evidence that deferred compensation reduces voluntary turnover, as opposed to layoffs or other forms of non-voluntary employee departure.

by examining the association between eligibility rules, plan contributions, vesting schedules, and plan investment vehicles on voluntary turnover rates.

2.2 Research setting

I conduct my analyses using records for store-level employees of a large U.S. retail firm. This setting is well-suited for studying retention incentives because the firm experiences high employee turnover and reducing turnover is an important organizational objective. Although the sample firm's voluntary turnover rate is generally lower than those of its industry peers, it is still very high compared to rates for other industries. Over the sample period, voluntary turnover averaged nearly 75 percent annually and reached nearly 100 percent annually among employees at the lowest organizational level.

The firm's strategy involves generating repeat customer business by offering excellent customer service and fostering a sense of community in its stores. A key component of this strategy is a focus on customer-employee interactions, which depend not only on employee "friendliness," but also on familiarity between customers and employees.⁷

The firm operates a deferred profit-sharing plan, with senior managers citing reduced employee turnover as one of the plan's objectives.⁸ However, management acknowledged that they do not have any direct evidence that the profit-sharing plan actually reduces turnover. Under the plan, eligible employees receive an annual contribution from the company to an individual

⁷ Interviews with store managers and other employees provided a number of explanations for a link between employee turnover and store-level operating performance. First, turnover can lead to lower customer satisfaction. Repeat customers become familiar with particular employees and expect to see them when they come in. Employee turnover can also harm a store's ability to maintain high operating standards because employee inexperience leads to slower service and longer lines. Longer-tenured employees are more likely to have mastered the basic routines in the store and thus are able to "focus on the details" to improve store presentation and meet customers' needs. Finally, managers cited the drain on their own time and attention associated with interviewing, hiring, and training new employees. This time-consuming process directs managers' efforts away from higher-value activities.

⁸ In addition to providing retention incentives, management mentioned increasing employee effort as another goal of the plan. The performance consequences of this compensation plan are not the focus of this paper.

retirement account that is managed by a third party. The plan is structured as a qualified retirement plan for Federal income tax purposes, and current employees are restricted from accessing their funds until after retirement.⁹ However, employees can receive distributions from their *vested* plan holdings before retirement age if they separate from the company for any reason.¹⁰ Structuring deferred compensation as a retirement plan impacts the timing of ultimate distributions and the administrative details of the plan, but does not otherwise substantively affect the deferred elements of the plan. The plan is quite general in that it entails making grants to employees in the current period that will not be fully earned until later, similar to other common forms of deferred compensation (e.g., restricted stock, stock options, and pensions). Even so, structuring deferred compensation as a tax-qualified plan requires that plan provisions conform to guidelines for tax-qualified plans outlined by the Employee Retirement Income Security Act (ERISA).

2.3 Hypotheses

In this section, I develop my hypotheses in the context of the specific characteristics of the research site's deferred profit-sharing plan and the firm's institutional setting.

2.3.1 Eligibility

Plan eligibility provisions impact retention incentives by determining which employees receive deferred compensation. Holding current pay fixed, eligible employees effectively earn a

⁹The primary tax benefits for structuring the deferred compensation program as a retirement plan are that contributions invested in the plan are not taxed to the employee until ultimately distributed, and investment returns on plan holdings can grow tax free

¹⁰ For example, after leaving the company, an employee can elect to receive all of his or her vested holdings as a cash distribution, or can roll the vested holdings into another retirement account such as an Individual Retirement Account (IRA). Any cash distribution received before age 59 ½ is subject to an additional 10% penalty tax by the Internal Revenue Service (IRS). If an employee continues to work at the company beyond the normal retirement age (i.e., age 62), he or she can begin receiving distributions from plan holdings after age 70 ½ while still working at the firm.

higher wage than ineligible employees, and therefore are less likely to find an outside offer that exceeds the incumbent total compensation (current and deferred). At the research site, eligibility to receive contributions under the deferred compensation plan is based on tenure, annual hours worked, and age. The firm has flexibility under ERISA to choose cutoffs for each of these criteria within an acceptable range. In particular, ERISA requires tenure cutoffs between zero and twelve months, annual hours worked cutoffs between zero and 1,000 hours, and age cutoffs that do not exceed 21 years. For each of these criteria, the firm has used the flexibility within the ERISA guidelines to adopt the most stringent eligibility requirements allowable for tax-qualified plans. Therefore, to be eligible to receive a contribution, a worker must have been with the firm for at least twelve months, must have worked at least 1,000 hours during the plan year, and must be at least 21 years old.¹¹

Despite the positive expected value of deferred compensation, the store-level employees in the sample may not consider the deferred component of compensation when evaluating potential outside employment opportunities.¹² Because the retail environment is characterized by high turnover rates for entry-level employees, these employees may consider their employment status to be tenuous, leading them to steeply discount future payouts that require them to stay with the firm for an extended period of time.

The uncertain relation between plan eligibility and retention in this setting leads me to test the prediction that employees consider the deferred component of their total pay when making stay or quit decisions. If so, eligible employees have stronger incentives to remain with

¹¹The age-21 requirement was imposed beginning with the 2002 plan year due to a change in ERISA rules. To receive a plan contribution after this date, an employee needs to be age 21 or older, even if they had received a grant in a previous year.

¹²In interviews, managers expressed the belief that store employees disproportionately weight current hourly pay when evaluating outside employment opportunities.

the firm than ineligible employees, and consequently have lower turnover rates. Thus, my first hypothesis:

H1: Eligibility to receive deferred compensation is negatively associated with voluntary turnover rates.

2.3.2 Level of contributions

Plan eligibility increases retention incentives by increasing the present value of future wages, but the size of this effect is likely to vary according to the level of contributions made to the plan. Contribution size at the research site is based on firm performance, but ultimately is at the discretion of the board of directors. Although there is no guarantee that the board will decide to make a grant, the company made a grant every year during the sample period. Annually, the board reviews the performance of the company and decides on the level of contribution to the plan as a percentage of company profits. From 2007 – 2009, annual plan contributions were 15% of profits. Prior to that, grants were 10% of annual profits.

Each employee's grant is determined mechanically based on a multiplier of his or her total eligible earnings for the year.¹³ The multiplier is derived by dividing the total aggregate contribution to the plan by the aggregate eligible earnings. For example, if total plan contribution was \$100 in a given year (15% of firm profits), and total eligible employee earnings was \$1,000, the "contribution factor" for that year would be $100/1,000 = 10\%$, meaning that each employee would receive a contribution equal to 10% of his or her eligible earnings during that year. Although the contribution as a percentage of firm profits was fairly constant over the sample period (with the exception of the increase for years 2007-2009), the contribution to each

¹³ Eligible earnings include all wages earned after initial plan eligibility is achieved.

employee as a percentage of eligible earnings varied from year to year, ranging from roughly 4.9% to 11.4%.

Because employees who are eligible to receive grants under the plan accrue deferred compensation throughout the year, the effective hourly wage for eligible employees increases depending upon the size of the annual contribution factor. This accrued deferred compensation is then contributed to the employees' accounts at the time of the annual grant, and is subject to vesting provisions. If employees are aware of the computation that determines annual deferred compensation grants and are able to form reasonable expectations of the various inputs (e.g., annual profits and wages earned), then higher levels of contributions should increase retention incentives for eligible employees. Therefore, my second hypothesis:

H2: The association between eligibility and voluntary turnover rates is increasing in the level of plan contributions.

2.3.3 Vesting

Tenure-based vesting provisions can provide retention incentives by explicitly linking employees' payouts to the length of time they remain with the firm. As a result, tenure-based vesting schedules are one of the most straightforward means to defer compensation. As with the company's other plan provisions, vesting schedules must conform to ERISA guidelines to maintain the plan's tax-favored status. Although ERISA permits either cliff or gradual vesting, the company has chosen to use a gradual vesting schedule. The maximum length of a permissible vesting schedule changed during the sample period as a result of a change in legislation governing ERISA. Prior to 2007, employees under a gradual vesting schedule had to be fully

vested after a maximum of seven years.¹⁴ For 2007 and later, full vesting must be achieved after a maximum of six years.¹⁵ As with its eligibility requirements, the company used the flexibility allowed within ERISA guidelines to choose the most restrictive vesting requirements available. For grants made prior to 2007, the vested percentage of plan holdings was 0% for fewer than three years of service, and 20% per year for three to seven years of service. Employees were 100% vested in their plan balances after accruing seven years of service. For grants made in 2007 and later, 20% vesting is achieved with each year of service from two to six, and employees are 100% vested in these grants after six years of service.¹⁶ Table 1 presents the vesting schedule. Other than the pre-/post-2007 distinction, these vesting percentages are applied to the account balances themselves, and not to specific grants *per se*. For example, an employee with four years of service who receives a grant in 2005 is immediately 40% vested in that grant, as well as 40% vested in any grant received in previous years.

With respect to the choice to use the longest vesting term allowed under ERISA, company management pointed out that “vesting was structured to promote long-term commitment to the organization,” consistent with the theory that longer vesting schedules increase the retention incentives provided by a deferred compensation plan (e.g., Kole, 1997; Cadman et al., 2011). Prior research argues that it is the value of *unvested* holdings that has the strongest incentive effects (e.g., Core and Guay, 2001; Kedia and Rajgopal, 2009). Unvested holdings represent compensation that is forfeited if an employee leaves, and therefore greater

¹⁴ Vesting is based on the number of years of service an employee has accumulated with the company. Under the research site’s plan, a “year of service” (YOS) is accrued for every year in which an employee works at least 1000 hours.

¹⁵ Under ERISA, full vesting must be achieved after 3 year if cliff vesting is used.

¹⁶ Regardless of years of service, employees achieve 100% vesting when they reach age 62.

values of unvested grants should increase the employee's cost of leaving the firm, leading to my third hypothesis:

H3: The value of unvested holdings is negatively associated with voluntary turnover rates.

2.3.4 Investment of plan assets

The relationship between unvested holdings and voluntary turnover may depend upon whether plan assets are invested in company stock or in diversified investments by altering employees' subjective valuations of their holdings. During the sample period, plan contributions were invested either in company stock as part of an employee share ownership plan (ESOP) or in diversified mutual funds. For the years 1999-2002 and 2004-2006, the investment of plan assets was split equally between company stock and mutual funds. For the years 2003 and 2007-2009, contributions were invested exclusively in company stock. Whether plan contributions were invested in mutual funds or company stock did not have any impact on eligibility, contribution factors, vesting, or distribution of plan holdings, and therefore the ESOP and mutual fund arms of the deferred profit-sharing program were the same in all respects other than how the contributions were invested.

As discussed earlier, psychological factors may cause employees to prefer company stock, despite portfolio theory's clear prescription for diversification. In addition, several studies have shown that employees "excessively extrapolate" company stock returns into the future (e.g., Bernartzi, 2001; Choi et al., 2003; Huberman and Sengmueller, 2004). This may be particularly important in this research setting. Over the sample period, the firm's stock significantly

outperformed the market.¹⁷ If employees extrapolated the superior company returns into the future, their valuation of investments in company stock would be higher than those in diversified funds, increasing the retention effects of ESOP investments vis-à-vis mutual fund holdings. This leads to my fourth hypothesis:

H4: The association between unvested holdings and voluntary turnover rates is stronger for company stock holdings than for mutual fund holdings.

2.3.5 Employee characteristics

Although deferred compensation plan characteristics may affect turnover decisions on average, the extent to which *individual* employees respond to the retention incentives in deferred compensation is likely to differ with a number of employee characteristics (e.g., Salop and Salop, 1976). Rosenbloom (2005) emphasizes the importance of considering employee demographics in designing a deferred compensation plan because employees of different age and gender may find different plan features more or less attractive. For example, risk preferences, discount rates, and labor market participation are all likely to vary with age and gender (Eckel et al., 1998; Holt and Laury, 2002; Warner and Pleeter, 2001; Kirby and Markovic, 1996). These differences could impact an employee's personal valuation of deferred compensation, and therefore moderate the extent to which plan characteristics impact the decision to stay with the firm.

Position in the firm is also likely to matter. For example, promotions within a firm may reflect the extent to which an employee has accumulated firm-specific human capital. The more human capital an employee has within the firm, the more likely the employee's marginal product within the firm exceeds what it would be in a different firm, and therefore the wage offered by the current firm is more likely to exceed what could be obtained through an outside offer (e.g.,

¹⁷ For ESOP purposes, the firm's stock is valued annually by a third party.

Becker, 1962; Parsons, 1972; Nagypal, 2007). For this reason, as employees are promoted current pay may provide sufficiently strong retention incentives so that there is less scope for the deferred compensation plan or its provisions to impact turnover decisions. Alternatively, employees in higher positions may better understand plan provisions (e.g., Mitchell, 1988; Luchak and Gunderson, 2000; Budd, 2008), making it more likely that they will take plan characteristics into account when deciding whether to leave.

Based on the results in related studies, I predict the retention effects of deferred compensation characteristics to vary according to employee gender, age, and position in the firm. Therefore, my fifth hypothesis is as follows:

H5: Employee gender, age, and position moderate the relationship between deferred compensation characteristics and voluntary turnover rates.

3. Sample and Measures

3.1 Data collection

I test these hypotheses using records for all store-level employees hired between 1998 and 2008. The data include employee hire date, termination date and type (voluntary or involuntary), age, gender, wage, and position, as well as the size of grants to the employee under the company's deferred profit-sharing plan for plan years 1999-2008. The sample includes 145,961 unique employees hired between 1998 and 2008, working a total of 1,773,263 months. I observe 175,558 instances of employee turnover, of which 127,012 (72.35%) are classified as voluntary.¹⁸ To better understand the deferred compensation plan and institutional setting, I

¹⁸ Note that some employees that separate from the firm are re-hired, and may separate again.

examined official plan documentation, interviewed corporate employees responsible for administering the plan, and met with store employees across different organizational levels.

3.1.1 Dependent variable

The outcome of interest in this study is monthly voluntary turnover for each employee. The dependent variable *vol_turnover* equals one in the month a given employee voluntarily leaves the firm, and zero otherwise. Although there were no layoffs during the sample period, involuntary turnover occurred due to employees being terminated.^{19 20 21}

3.1.2 Independent variables

As discussed above, eligibility to participate in the deferred profit-sharing plan is based on cutoffs with respect to age, tenure, and annual hours worked. After satisfying the age and tenure requirements, employees are technically eligible to receive a grant after passing a 1,000-hours-worked threshold. However, I consider employees eligible if they are *on pace* to achieve 1,000 hours in a given year, which corresponds to working an average of 20 hours per week. I do this to avoid coding all employees as non-eligible at the start of every year, even though they can fully expect to receive a grant at year-end if they remain with the firm. Specifically, *eligible* is an indicator variable equal to one if an employee is at least 21 years old (for years 2002 and later), has been with the firm for at least 12 months, and worked an average of at least 20 hours per

¹⁹ Following prior research on voluntary turnover (e.g., Trevor, 2001), I include in the analyses employees who are involuntarily separated, and the survival analysis treats these observations as being right censored (i.e., although these employees exit the sample, they do so before voluntary turnover, the event of interest, is observed). The model accounts for the fact that there was no voluntary turnover during these censored employees' tenure.

²⁰ As noted above, some employees leave the firm, are rehired, and then may leave again. In unreported analyses, I repeat the analyses without allowing these "repeated failures," removing employees from the sample after their first separation. Inferences remain unchanged.

²¹ While there were no layoffs, there were instances of store closings during the sample period, which may lead to employees with strong geographic preferences to quit (i.e., some employees may be unwilling to transfer to another store). In unreported tests, I exclude all stores that closed during the sample period, and results are similar.

week during the given year. In addition, I employ indicator variables for the individual eligibility criteria in additional tests.

Unvested holdings measures the dollar value (in year-2000 terms) of previously granted holdings that are yet to vest. Employees achieve vesting based on accumulated “years of service,” defined as the number of years in which an employee worked at least 1,000 hours. I therefore determine when an employee reaches a vesting cutoff by estimating the month an employee reaches the 1,000-work-hour mark in each year.²²

To examine whether the effect of plan characteristics varies with employee characteristics, I use measures of age, gender, and position in the firm. *Age* is the employee’s age in years. *Female* is an indicator equal to one if the employee is female and zero otherwise. Positions in the firm include Customer Service Representatives (CSRs), hourly managers, assistant store managers, and store managers.²³

I include a number of control variables drawn from prior literature on employee turnover (e.g., Griffeth et al., 2000; Trevor, 2001; Benson et al., 2004). *Tenure* is the total number of months an employee has worked at the firm. I measure *Hourly wage* in real year-2000 dollars to account for the effect of inflation across my sample period. *Hours per week* is the total hours worked in a given year divided by the total number of weeks an individual was employed during the year. In addition to these employee-level variables, I obtain monthly unemployment rates at

²² The data for hours worked were provided on an annual basis, so I use the following procedure to estimate the month of vesting. First, I count the total number of weeks worked during the year, and divide the total hours worked by the number of weeks to obtain the hours worked per week. Next, I divide 1,000 by hours per week multiplied by 4.3 (i.e., monthly hours worked). For example, an employee who worked 1,500 hours and was employed for the entire year (52 weeks) would be estimated to vest during September, as follows: $1,500/52 = 28.85$ hours per week. $1,000/(4.3*28.85) = 8.06$.

²³ Organizational hierarchy at the store level consists of a store manager and an assistant store manager, both of whom are full-time, salaried employees. Below them are a number of lower-level managers with responsibility over specific store functions. These positions are paid hourly, but are also full-time. Below these hourly managers are the Customer Service Representatives, who are paid hourly and may be either part time or full time.

the county level from the U.S. Bureau of Labor Statistics to control for outside employment opportunities in the local labor market.²⁴ I include year fixed effects to control for changes in macroeconomic factors (other than unemployment) and company policies across years that affected all employees equally, and monthly fixed effects to control for seasonal differences in employee turnover.²⁵

3.2 Descriptive statistics

Table 2 highlights the differences in employee characteristics across organizational levels. CSRs are considerably younger, and have shorter tenure than employees in managerial positions, and earn lower wages working fewer hours per week. These differences may result in differential deferred compensation effects across employee categories. For example, the average CSR tenure (ranging from approximately 15 to 32 months across the sample period) implies that full (100%) vesting is still several years away for most CSRs. In contrast, managers are much more likely to be in the latter stages of the vesting schedule. Wages rise sharply with promotions (e.g., store managers' salaries in 2008 were almost three times higher than those for CSRs). This wage structure may reflect firm-specific human capital investments and hence wages at these levels more likely exceed what could be obtained from outside employment opportunities (e.g., Ippolito, 1991). Therefore, current pay following promotions may provide sufficiently powerful retention incentives so that the incremental retention effects from deferred compensation are small for managers. CSRs tend to work less than a standard "full-time" work week (mean hours

²⁴ In (unreported) alternative specifications, to control for outside labor opportunities I include the number of retail stores within the same zip code, scaled by the population within the zip code. Inferences remain unchanged.

²⁵ To account for the possibility that unobserved, time-invariant store-level are associated with both deferred compensation and employee turnover decisions, in unreported analyses I include store fixed effects, and find similar results.

per week ranges from approximately 24 to 29), while all other employee categories average more than 40 hours per week.

The average values for *age*, *tenure*, and *weekly hours* (Panels B through D) suggest that nearly all employees above the CSR level are eligible to receive contributions under the deferred profit-sharing plan. In contrast, there is substantial variation in CSR eligibility. The total proportion of eligible CSRs has generally increased over the sample period, with almost 40 percent of CSRs eligible to receive contributions by 2008. In terms of eligibility requirements, the proportions of employees meeting the age, tenure, and hours-worked cutoffs all increased over time.²⁶

Table 3 indicates that the correlations among the *age*, *tenure*, and *weekly hours* cutoffs are all significantly positive. However, the three eligibility cutoffs do not necessarily collapse into a single eligibility dimension. In unreported analysis, I find that among CSRs who are *not* eligible, the most common reason for ineligibility is failure to meet the tenure requirement. In particular, approximately 20 percent of ineligible CSRs meet the other two requirements while falling short on tenure, compared to roughly 10 to 15 percent who would be eligible if not for either the age or hours requirement.

²⁶ Note that prior to 2002 there was no age eligibility requirement. As a result, the mean and median values of *age requirement* for 2000 are both 1.

4. Results

4.1 The effect of plan characteristics on voluntary turnover

The primary question for this study is the influence of different deferred compensation plan characteristics on employees' voluntary turnover decisions.²⁷ Participation in the plan depends on age, tenure, and hours worked, all of which are observed covariates. In addition, employee wages determine individual grant size, and hence plan holdings. Prior literature on employee turnover (e.g., Trevor, 2001; Hom and Kinicki, 2001) suggests that these covariates can have a direct impact on employee separation decisions, even in the absence of a deferred compensation plan. Thus, the empirical challenge is to identify the effect of the deferred compensation separately from the effect of the covariates that determine plan eligibility and grant size. The empirical strategy I rely on to overcome this challenge is a regression discontinuity (RD) research design, which has been widely used for program evaluation in the economics literature (e.g., Thistlewaite and Campbell, 1960; Trochim, 1984; Van Der Klaauw, 2002; DiNardo and Lee, 2004; Card et al., 2004). Regression discontinuity is appropriate when the “treatment” of interest (deferred compensation in this case) is determined by whether an observable covariate (known as a “forcing variable”) is on either side of a threshold. Even if the covariate determining the treatment is itself associated with the outcome of interest, the effect of the treatment is still identified under the assumption that the relation between the forcing variable and the outcome of interest is not discontinuous exactly around the administrative cutoff.

²⁷ One of the primary assumptions underlying the research site's deferred compensation plan is the previously (untested) belief that lower voluntary turnover leads to higher store financial performance. If this assumption is not true, then any relation between plan characteristics and lower turnover will have no impact on economic performance. I conducted a number of tests to assess the validity of managements' assumption that lower voluntary turnover is associated with higher store-level operating performance. Overall I find that lower turnover is associated with improved operating performance, consistent with other recent research in the retail industry (e.g., Ton and Huckman, 2008; Glebeek and Bax, 2006). However, due to confidentiality concerns of the participating company, I am unable to report the results from these performance analyses.

Following prior literature on organizational turnover (e.g., Trevor, 2001; Hom and Kinicki, 2001; Benson et al., 2004), I primarily rely on Cox proportional hazard models to estimate the relationship between deferred compensation and voluntary turnover. Hazard analysis permits estimating the rate of voluntary turnover over time (i.e., the “hazard rate”), as opposed to estimating the odds of turnover occurring during some window of time, as is the case with logistic regression analysis. Rather than treating employee turnover as a dichotomous decision, hazard analysis implicitly accounts for the timing of the quit decision, so that an employee who leaves after one month conveys different information than an employee who separates after one year. Cox hazard models estimate the hazard rate as a “baseline hazard” (i.e., the hazard rate faced by everyone) shifted multiplicatively by observed covariates. The general Cox hazard model specification I use is

$$h(t|x) = h_0(t)\exp(\beta_1 x_{plan\ variable} + \beta_2 x_{controls}) \quad (1)$$

where $h(t|x)$ is the hazard rate conditional on having lasted until time t , $h_0(t)$ is the baseline hazard, *plan variable* represents either plan eligibility or plan holdings, and *controls* is a vector of the control variables discussed above. Within the hazard analysis framework, Cox models are commonly used in part because they are non-parametric, in the sense that no parametrization is assumed for the baseline hazard function and it is left unestimated.^{28 29}

²⁸When a specific parametrization of the baseline hazard can be reasonably assumed, a parametric hazard model can produce more efficient estimates than the semiparametric Cox model. However, if the assumed parametrization is not correct, the parametric model can produce biased coefficient estimates.

²⁹An assumption required to use the Cox model is proportionality, i.e., the hazard rate for an individual with one set of values for the covariates is a fixed proportion of the hazard rate for an individual with a different set of values. This assumption implies that for covariates that are fixed (e.g., gender), the coefficient does not vary across time. However, this assumption is not required for covariates that change with time (Van den Poel and Lariviere, 2003; Allison, 1995), as the majority of covariates in my specifications do. For the remaining covariates, I test the proportionality assumption using STATA’s STPHTEST command.

4.2 The effect of eligibility on voluntary turnover

My first hypothesis predicts that plan eligibility is negatively associated with voluntary turnover. To test this, I restrict the sample to include only CSRs, since this is the only group with meaningful variation in eligibility. Table 4 presents the Cox hazard model results. These and subsequent hazard analysis results are presented with exponentiated coefficients, which can be interpreted as hazard ratios (i.e., the ratio of hazard rates) so that values above one indicate an increased rate of voluntary turnover, and values below one represent a reduced rate of turnover. For example, the coefficient of .63 for *eligible* in column 1 indicates that the turnover rate for eligible employees is 37% ($= 1 - .63$) lower than the rate for non-eligible employees. An exponentiated coefficient equal to one represents no turnover effect, and is analogous to a coefficient of zero in an OLS regression.

Column 1 includes an indicator for whether an employee is eligible, along with a number of control variables. Since this model does not include hours worked or tenure, *eligible* likely captures not only the effect of the deferred compensation plan, but also the underlying covariates that determine eligibility. The identification strategy for RD designs is to exploit the discontinuity in eligibility that is distinct from the effect of the continuous forcing variables. To this end, columns 2 and 3 include linear and higher order functions of the forcing variables *tenure* and *hours per week*. By controlling for the continuous variation in the forcing variables, the *eligible* indicator can be interpreted as the effect of plan eligibility *per se*.³⁰ Columns 2 and 3 indicate that the effect of eligibility is to reduce the hazard rate by 18.5% and 15%, respectively.

³⁰The necessary assumption for this interpretation is that hours worked and tenure do not have a discontinuous effect on turnover precisely at the levels required for eligibility (1,000 hours and 12 months, respectively). This assumption seems reasonable given that the firm chose the most restrictive eligibility requirements allowable under ERISA. Given that these values represent the boundary of permissible requirements, they can be thought of as relatively exogenously determined rather than being based on economically meaningful values with respect to employee behavior.

While these effects are smaller than those reported in column 1, they are still statistically significant, suggesting that at the margins of eligibility requirements, eligibility has a turnover effect beyond the direct effects of tenure and hours per week. Based on untabulated analyses, the estimated hazard rate (i.e., voluntary turnover rate) for a non-eligible employee with 12 months tenure and average values for the other covariates is approximately 7% per month. Given this turnover rate, the estimated effect of eligibility for an average CSR is to increase the expected employment duration by roughly 2.5 months.³¹ For comparison, the estimated hazard ratio for *hourly_wage* in column 3 is .893, suggesting that an additional dollar of hourly wage is associated with a reduction in the voluntary turnover rate of almost 11%.

The results reported in columns 1 - 3 represent the average effect of eligibility across gender and age categories. However, it is likely that employees of different age and gender face different employment horizons and discount rates, and thus are likely to respond to the retention incentives implicit in a deferred compensation plan differently. To investigate whether the effect of eligibility varies with gender, I include an interaction term between *female* and *eligible* in Column 4. The coefficient for the interaction term is significantly less than one, indicating that the retention effect of eligibility is greater for females than for males, consistent with women applying a lower discount rate when valuing deferred compensation than men. The hazard ratio for men is .926, whereas for women it is .806.³²

³¹Based on a 7% turnover rate, the expected number of months until turnover would be 14.28 ($= 1/.07$). A hazard ratio of .85 suggests a turnover rate of 5.95%, which corresponds to an expectation of 16.8 months until turnover ($= 1/.0595$). Note that this comparison involves an abstraction, because in actuality the hazard rate is expected to change over time. Therefore, while the hazard rate of eligible employees is expected to stay proportional to ineligible employees, the comparison rate may not stay at 7%.

³² The interpretation of the coefficient on an interaction term (using hazard ratios) in Cox models is as the ratio of hazard ratios. For example, dividing .806 by .926 yields .871, which is the coefficient on the interaction term. In column 4, the hazard ratio for the interaction is based on the sum of the main effect and the interaction.

In Column 5, I interact eligibility with an indicator for employees older than 30 (i.e., roughly the sample mean). The hazard ratio for the eligibility main effect is not significantly different from one, suggesting that, at the eligibility margins, eligibility is not associated with reduced turnover for younger employees. However, the eligibility effect for older employees is significant with a hazard ratio of .805 (i.e., the effect of eligibility is to reduce the turnover rate for older employees by nearly 20%). This is consistent with older employees using a lower discount rate to value deferred compensation than younger employees. Overall, the results presented in Table 4 support Hypothesis 1's prediction that plan eligibility is associated with lower voluntary turnover rates. However, the effect of eligibility depends upon employee characteristics.

4.2.1 Age eligibility requirement

I next test the turnover effects of the three individual eligibility criteria (age, tenure, and hours worked). First, I examine whether voluntary turnover rates changed for 18- to 20-year old employees before and after the age-21 restriction was put in place in 2002. I restrict the sample to include only employees in this age group, and I only include the years 1999-2004. In addition, I include only employees who had been with the firm for more than 12 months and had worked over 20 hours per week. In effect, all employees in this sample were eligible to receive deferred compensation before 2002, and none were eligible from 2002 onwards. The primary variable of interest for this test is *pre_02*, an indicator variable equal to one for the years 1999-2001, and zero otherwise. If restricting eligibility among this age group weakened retention incentives, the hazard ratio for *pre_02* should be significantly less than one. Because turnover rates among 18- to 20-year olds may have changed across these years for reasons other than the change in eligibility rules, I control for the average monthly turnover rate for all 21-year-old employees at

the firm. 21-year-olds represent an appropriate control group because they are very close in age to the employees in the sample, but they were not impacted by the change in eligibility requirements.

The results are presented in Table 5. As shown in Column 1, the hazard ratio for *pre_02* is not significantly different from 1, indicating that plan eligibility does not affect turnover behavior of employees under age 21. The contribution factor (i.e., the percentage by which an individual's earnings are multiplied to determine the annual contribution) during this period ranged from approximately five percent to almost six- and-a-half percent (see Table 2), which represents an implicit "raise" in the form of deferred compensation for eligible employees. Yet, it appears employees in this age category either do not consider the deferred component of pay when making stay or quit decisions, or else apply a sufficiently large discount to deferred compensation so as to mute the retention effects of this additional pay. As reported in Column 2, neither males nor females in the under-21 age group are affected by eligibility, as indicated by the insignificant hazard ratio on the interaction between *pre_02* and *female*. These results are consistent with those in Table 4 showing that eligibility has no association with turnover of young employees.

4.2.2 Tenure eligibility requirement

I examine whether the tenure cutoff for eligibility influences turnover by testing whether there is a discontinuity in turnover rates after reaching the 12-month employment requirement.³³ As before, the empirical difficulty is estimating the effect of the eligibility rule apart from the effect of tenure, which itself is expected to be associated with reduced turnover. To address this issue, I

³³ Once an employee becomes eligible he or she receives written communication from the firm about the deferred compensation plan, and therefore additional retention effects may arise due to increased visibility and awareness of the plan.

use a difference-in-difference design to compare the difference in turnover rates before and after 12 months of tenure for employees who are otherwise eligible (i.e., are over 21 and work at least 20 hours per week) and employees who are not. That is, the control group for this test is employees who are not otherwise eligible, and thus are not affected by the tenure eligibility requirement. The interaction term *over_12xeligible* is the difference-in-difference estimator, and a retention effect associated with this eligibility rule would be reflected by a hazard ratio significantly less than 1.

As reported in Column 1 of Table 6, the estimated hazard ratio is less than one but is not significant, suggesting that eligibility among employees around the tenure cutoff does not influence turnover decisions. Turnover rates are particularly high among employees with low tenure, and these employees may not expect to be with the firm long enough to become vested in any contributions they received, thus muting any potential retention effect. Alternatively, notwithstanding efforts to provide materials about the plan, these employees simply may not be aware of their eligibility status either before or after reaching the 12 month requirement. To further examine whether the retention effect varies with employee characteristics, Columns 2 and 3 report hazard ratios for 3-way interactions of *over_12xeligible* and indicators for older than 30 and female, respectively. Although the effect of the 12 month eligibility requirement does not differ across young and old workers, Column 3 provides weak evidence that turnover rates among female employees after the 12 month cutoff are lower for eligible employees than for non-eligible employees.

4.2.3 Annual hours worked eligibility requirement

The third eligibility criterion is working 1,000 hours within each plan year. I test the effect of this requirement by examining voluntary turnover rates for employees who either

received a grant in the prior year or did not, based on being just above or below the 1,000-hour cutoff.³⁴ In using this design, I assume that receiving a grant increases an employee’s awareness of the plan, and increases the employee’s expectation of receiving a grant in the future. For this test, I focus on the subsample of employees who met the age and tenure requirements as of the end of the previous year, so that whether an employee received a grant is only a function of hours worked relative to the cutoff. In addition, to focus on the discontinuity, the analyses use only employees whose prior-year hours worked is within a window around the 1,000-hour cutoff (Imbens and Lemieux, 2008). The assumption motivating these tests is that, after controlling for the number of hours worked within a given window, employees above the cutoff are substantively similar to those below the cutoff.³⁵ While this assumption is more likely to hold the smaller the window size, there is a tradeoff of comparability between “treatment” and “control” subjects and sample size as the window gets larger. Following Imbens and Lemieux’s (2008) suggestion for RD analyses, I report results for different window sizes.

The estimated results from this RD analysis are reported in Table 7. The variable of interest is *above_1000_{t-1}*, an indicator equal to one if the employee was above the hours cutoff in the prior year (and therefore received a grant), and zero otherwise. In addition to including control variables for other determinants of voluntary turnover, I include squared and cubed prior-year hours worked to control for the continuous variation in this forcing variable as flexibly as

³⁴ Note that this is a somewhat different test than for Tables 5–7. Tables 5–7 estimate the effect of eligibility in the current year on turnover rates, whereas the tests for Table 8 estimate the effect of eligibility in the prior year (i.e., whether or not an employee received a grant). While both age and tenure (which primarily determine eligibility in the previous two tables) can easily be measured at the monthly level, hours worked is only measured annually. Therefore, to cleanly define eligible vs. ineligible employees with respect to the hours worked cutoff, I require hours worked data for the *completed year*, which is why for this test I examine the effect of prior-year eligibility on voluntary turnover.

³⁵ In interviews, managers indicated that whether an employee worked 1,200 hours or 800 hours (i.e., my largest window size) did not represent a meaningful distinction, as both levels were well below the full-time threshold.

possible. Although the estimated effect for the lagged 1,000-hour indicator is negative across window sizes, the relationship is significant only for window size of +/- 150 hours ($p < .1$) and +/- 200 hours ($p < .05$).^{36 37} The estimated hazard ratios using the +/- 200 hours window suggest that eligibility to receive a grant in the prior year reduces the rate of turnover by nearly 35% for employees near the eligibility cutoff. For a benchmark hazard rate of 7% monthly, these hazard ratios suggest an increase in expected employment duration of nearly eight months, representing a roughly 54% increase in expected employment duration. As in Table 4, this estimated effect is large compared to the effect of an additional dollar of hourly wage. In sum, the results in Tables 4–7 provide support for Hypothesis 1’s prediction that eligibility is associated with reduced voluntary turnover. This effect is stronger for women and for older workers. Moreover, plan eligibility appears to be most important for employees at the margin of the 1,000-hour cutoff.

4.3 Effect of contribution amounts on voluntary employee turnover

I next examine the moderating effect of contribution amounts on the relationship between eligibility and turnover. The amount of money contributed to the profit-sharing plan varied from year to year, and the contribution size rose dramatically starting in 2007 due to an increase in the percentage of profits used to compute contributions. Total contributions were 10% of profits prior to 2007, and 15% from 2007 onwards. This change resulted in a substantial increase in total contributions, and therefore in the contribution factor determining individual grants as well.

³⁶ Restricting these tests to only include employees within a relatively small window of hours worked significantly reduces the sample size for these tests. That the hazard ratio for *above_1000_{t-1}* is similar across windows and is increasing in significance as the sample increases suggests that the tests relying on the smaller windows may suffer from a lack of statistical power.

³⁷ To address concerns that these results are driven by the size of the window (i.e., comparing employees who are not comparable due to the difference in hours worked) and not the eligibility distinction, in unreported analyses I perform “placebo” tests using a window size of +/- 200 around cutoffs of 800 and 1200 hours, respectively. In both these cases the window does not include the true eligibility cutoff. I do not find that being above these artificial cutoffs has a statistically significant effect on turnover after controlling for hours worked, with a p-value of .71 and .35 for the 800- and 1200-hour cutoffs, respectively. Therefore, I conclude that the results reported in Table 7 are driven by the eligibility cutoff at 1000 hours, and not unobservable differences due to the size of the window.

Since the total amount contributed to the plan is a function of firm profits, the effect of eligibility on turnover is likely to vary with employees' expectations of the portion of profits that will be allocated to the plan. Employees are given detailed quarterly reports of firm performance, including profits, so it is likely employees can form reasonable expectations of annual profits throughout the year. I proxy for employees' expectations of annual contributions using actual dollar contributions to the plan, scaled by contributions in 1999.³⁸ The scaling produces an index that captures plan contributions relative to 1999 contributions (the first year with available data). In addition to the change in percentage of profits contributed to the plan, in 2007 the firm shortened the vesting schedule by one year due to a change in ERISA requirements for tax-qualified retirement plans, and also began investing new contributions exclusively in the ESOP plan.

To control for changes in turnover rates over time that are due to factors other than changes in the deferred compensation plan, I use a difference-in-difference research design to compare the change in turnover rates before and after 2007 for both eligible and non-eligible employees. If changes in plan characteristics influence turnover rates, I expect the effects to exist only for eligible employees. Table 8 reports results from hazard analyses designed to test the effect of contribution size, as well as the effect of other changes in plan characteristics on employee turnover. I first examine the average effect of the combined 2007 changes (i.e., the increase in contribution size, the shorter vesting schedule, and the exclusive focus on the ESOP) by estimating voluntary turnover rates as a function of an indicator variable equal to one for the years 2007 and later, and zero otherwise. As reported in Column 1, the coefficient on the interaction term *eligiblex2007* is significantly less than 1, indicating that the combined changes

³⁸I also use actual current and prior year plan contribution percentages and find similar results.

in plan characteristics increased the association between eligibility and reduced voluntary turnover. Whereas eligibility in the pre-2007 period is associated with a turnover rate reduction of almost 12%, for 2007 and later eligibility is associated with a turnover reduction of approximately 24%. To disentangle the effects of contribution size from the other changes, I include an additional interaction variable *contributionxeligible* in Column 2 to investigate whether the eligibility effects vary with contribution size. When I include both interactions, it is apparent that the entire turnover reduction associated with plan changes is due to increased contribution levels, with no significant effect from the other changes. The estimates in Column 2 imply that doubling contribution size compared to the baseline level in 1999 increases the effect of eligibility on turnover rates by an additional 4.6%.

Because a change in the vesting period in particular may have different effects depending on where the employee stands in relation to the vesting schedule, I estimate the model separately for employees with tenure between 12–36 months and employees with tenure between 36–84 months. The results in Columns 3 and 4 suggest that a shorter vesting schedule does not impact the relationship between eligibility and turnover decisions regardless of tenure. Taken together, the evidence in Table 8 supports Hypothesis 2’s prediction that contribution levels moderate the effect of eligibility on voluntary turnover.

4.4 The association between unvested holdings and voluntary turnover

I test Hypothesis 3 by estimating Cox hazard models of voluntary turnover rates as a function of the value of unvested holdings.³⁹ I again control for underlying variables that

³⁹ Alternatively, it may be the case that the impact of unvested holdings on turnover behavior depends on the size of the holdings relative to the employee’s non-deferred wages (i.e., \$1 of unvested holdings may mean more to an employee earning \$10/hour as opposed to \$15. To address this possibility, in unreported tests I scale the value of unvested holdings by *weekly_wage*, and inferences remain unchanged.

determine grant size and are likely to be correlated with turnover rates. Grant size in a given year is a function of whether the employee is eligible for a grant and the wages earned during the year. Although I can rely on the discontinuities associated with eligibility to provide variation in the value of unvested holdings, variation also results from differences in contribution rates and differences in the return on plan assets across time. In addition, the value of unvested holdings varies across time for a given employee as the portion of holdings that are vested changes and as the vesting requirements are achieved.

I estimate separate hazard models for each position to investigate whether the effects of unvested holdings varies across organizational levels. In addition, I eliminate employees who are already fully vested (i.e., employees over age 62 and employees with tenure over 7 years). Columns 1 through 4 of Table 9 report hazard ratios for CSRs, hourly managers, assistant store managers, and store managers, respectively. Column 1 shows that an additional \$1,000 of unvested holdings reduces the rate of voluntary turnover by almost 26% for CSRs. Control variable results are also generally consistent with expectations and previous tests. However, as seen in Columns 2 through 4, there is no significant relationship between the value of unvested holdings and voluntary turnover for managerial employees. As discussed earlier, employees in hourly manager and higher positions differ substantially from their CSR counterparts in terms of age, tenure, wage, and hours worked. These differences may create other, more powerful retention incentives that crowd out the effect of unvested holdings. For example, the higher wages associated with promotions may exceed what employees with these skills can obtain elsewhere. If current pay provides sufficiently powerful incentives for managerial employees to

stay, unvested holdings may provide little incremental retention incentive.⁴⁰ Alternatively, the quality of outside opportunities available to employees above the CSR level may be substantially greater, increasing the likelihood that a job change more than compensates managerial employees for forfeited holdings. Another possibility is that after accumulating sufficient tenure to be promoted, employees in higher positions recognize a superior fit with the firm, and therefore are reluctant to leave (e.g., Jovanovic, 1979; Mitchell et al., 2001). Consistent with the latter explanation, voluntary turnover rates are dramatically lower for employees above the CSR level. Thus, for employees above the CSR level, there may simply be less scope for deferred compensation to influence turnover decisions to begin with.

Because vested holdings are highly correlated with unvested holdings and potentially provide countervailing incentives to separate from the firm (i.e., an employee cannot cash out of his or her vested holdings until after leaving the firm), I include vested holdings as an additional control in models 5 through 8. As before, unvested holdings are associated with lower CSR turnover rates, but have no significant association with reduced turnover of managerial employees.⁴¹ In addition, I find no significant relationship between vested holdings and voluntary turnover, suggesting that employees do not tend to leave the firm in order to access vested plan holdings. These results provide mixed support for Hypothesis 3. While unvested

⁴⁰ Another potential explanation is that while the overall effect of unvested holdings is not significant, there is a significant effect for employees whose holdings are above some threshold. For example, while low levels of unvested holdings may not provide enough incentive to influence turnover decisions, at higher levels the effect begins to manifest. I explore this possibility in two unreported analyses. First, I replace *unvested_1000* with indicator variables for terciles within each position group, to test whether a “high” level of holdings has a retention effect. Second, I include separate variables for *unvested_1000* for each tercile of holdings within each position group to explore whether the effect depends on the level of unvested holdings. In both sets of analyses, I fail to find significant effects of unvested holdings.

⁴¹ Contrary to expectations, Column 8 of Table 10 reports that unvested holdings are associated with *increases* in turnover rates among store managers. Due to the relatively small sample size for this test and the high correlation between vested and unvested holdings, it is possible that this represents a spurious result due to multicollinearity. When either unvested or vested holdings are included in the model separately, there is no significant association with turnover for store managers.

holdings are significantly associated with reduced voluntary turnover among CSRs, there is no association for managerial employees.

4.4.1 Investment of plan holdings

Table 10 investigates whether retention effects differ depending upon whether plan contributions are invested in company stock or diversified mutual funds. I conduct tests similar to those in Table 9, but replace total unvested holdings with separate variables for holdings invested in the firm's ESOP and holdings invested in diversified funds. For CSRs, \$1,000 of unvested ESOP holdings is significantly associated with a turnover rate reduction of nearly 32%. In contrast, the hazard ratio for unvested mutual fund holdings is closer to one (indicating a 12% reduction in turnover rate) and is not significant at conventional levels ($p = .10$). This evidence suggests that among CSRs, the retention effects of unvested holdings are driven primarily by the holdings invested in employer stock. However, consistent with the total holdings results in Table 9, I do not find a significant relationship for either unvested ESOP or mutual fund holdings when examining employees above the CSR level. In Columns 5 through 8, I control for the value of total vested holdings and find similar results.⁴² In particular, although the hazard ratio for unvested diversified holdings is less than one ($p < .10$), the effect of unvested ESOP is larger and the difference in these hazard ratios is highly significant ($p < .01$ level). The results in Table 10 suggest that deferred compensation that is invested in company stock is particularly effective for reducing employee turnover. This finding is consistent with Hypothesis 4 and supports claims

⁴² In Table 10 Columns 5-8 I control for total vested holdings rather than controlling separately for vested ESOP and mutual funds due to concerns with multicollinearity. The correlation between vested ESOP and mutual funds is particularly high, and VIFs for the separate vested components are both over five. When vested ESOP and mutual fund holdings enter the model individually, both components of unvested holdings are significantly negatively associated with voluntary turnover. In addition, vested ESOP holdings are not significantly associated with turnover, while vested mutual fund holdings are significantly positively associated with voluntary turnover. Because the focus of Table 11 is on the effect of investment allocation for *unvested* holdings, I do not conduct further analysis of the components of vested holdings.

that broad-based equity plans are especially beneficial for achieving retention objectives (e.g., Oyer and Schaefer, 2005).

5. Conclusion

This paper utilizes detailed records from a large retail firm to examine the retention effects of deferred compensation plan characteristics. I rely on eligibility cutoffs for plan participation to identify discontinuities in employees' retention incentives related to the plan. I find that plan eligibility is associated with a statistically significant decrease in the rate of voluntary turnover of non-managerial employees. Among these employees, plan eligibility is associated with a decrease in voluntary turnover of between 15–35%. However, the eligibility effect depends upon the specific eligibility requirement, the size of contributions, and employee characteristics. In additional tests, I find that the value of unvested plan holdings is associated with reduced turnover rates among low-level employees, and this effect is stronger when unvested plan assets are invested in company stock. In contrast, I do not find a significant, negative relationship between unvested holdings and voluntary turnover for employees in management positions. Collectively, my results suggest that employees may respond to the retention incentives implicit in deferred compensation plan characteristics, but that the strength of these incentives is determined both by specific plan characteristics (e.g., eligibility criteria, level of contributions, and investment allocation of plan assets) and employee characteristics (i.e., discount rates and position in the organizational hierarchy).

An important limitation of my study is the use of data from a single large firm, and therefore generalizing these results to other firms in different settings should be done with caution. Nevertheless, focusing on a single firm allows me to capture employee data and plan characteristics at a level of detail unavailable in any broad-sample dataset. Using detailed,

employee-level data, as well as having access to plan documentation to identify discontinuities in retention incentives, allows me to construct powerful tests of the effects of plan characteristics on voluntary turnover.

This research has implications for academics studying the retention effects of deferred compensation. Prior research has generally examined whether the *existence* of a deferred compensation plan is associated with reduced turnover, but my results suggest that the *characteristics* of a plan determine retention incentives at the employee level. In addition, the findings of this study should interest practitioners designing deferred compensation plans, as I document that employee characteristics moderate the relationship between deferred compensation and voluntary turnover. This suggests that a “one size fits all” approach to designing deferred compensation plans may not result in the desired retention effects among all employee groups.

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Table 1:
Vesting schedule

This table presents the vesting schedule applicable to plan holdings. Vesting percentages are applied to an employee's entire account, rather than to a specific grant. Starting in 2007, the permissible vesting schedule was shifted up one year due to a change in the Pension Protection Act; this change applies to plan holdings received in 2007 and later. Vesting percentages are based on the accumulation of "years of Service" which is defined as the number of calendar years in which an employee works at least 1,000 hours.

Years of service	Vesting % for grants prior to 2007	Vesting % for grants 2007 and later
Less than 2 years	0%	0%
2 years	0%	20%
3 years	20%	40%
4 years	40%	60%
5 years	60%	80%
6 years	80%	100%
7 years or more	100%	100%

Table 2:
Descriptive statistics

This table presents mean (Median) values of select variables for even sample years. *Tenure* is number of months since employee was hired. *Wage* is measured in year 2000 dollars, and is scaled by the median value for Customer Service Representatives (CSR) in 2000. *Eligible* is an indicator for whether the employee meets requirements to receive a contribution under the deferred profit-sharing plan. *Age requirement*, *Tenure requirement*, and *hours requirement* represent indicator variables for whether age, tenure, and hours-worked eligibility requirements are met, respectively. *Contribution %* is the factor by which eligible earnings are multiplied to determine annual contributions under the deferred profit-sharing plan.

Panel A: CSRs					
<i>Year</i>	2000	2002	2004	2006	2008
<i>#Employees</i>	9,545	11,049	12,284	13,099	13,674
<i>Female</i>	0.65 (1)	0.62 (1)	0.6 (1)	0.61 (1)	0.6 (1)
<i>Age</i>	30.25 (23)	30.04 (23)	29.76 (22)	30.43 (23)	32.13 (25)
<i>Tenure</i>	14.93 (10)	17.48 (9)	19.34 (9)	21.9 (10)	32.05 (19)
<i>Wage</i>	1 (1)	.97 (.96)	.93 (.91)	.96 (.94)	1.01 (.99)
<i>Eligible</i>	.31 (0)	.22 (0)	.24 (0)	.26 (0)	.39 (0)
<i>Age requirement</i>	1 (1)	.59 (1)	.58 (1)	.60 (1)	.68 (1)
<i>Tenure Requirement</i>	.47 (0)	.45 (0)	.45 (0)	.48 (0)	.66 (1)
<i>Hours Requirement</i>	.61 (1)	.60 (1)	.68 (1)	.68 (1)	.73 (1)
<i>Contribution %</i>	5.82	4.88	6.49	6.79	10.7
Panel B: Hourly Managers					
<i>Year</i>	2000	2002	2004	2006	2008
<i>#Employees</i>	2,104	2,791	3,056	3,193	1,569
<i>Female</i>	0.71 (1)	0.68 (1)	0.65 (1)	0.63 (1)	0.62 (1)
<i>Age</i>	35.93 (35)	36.59 (36)	36.84 (36)	37.37 (37)	36.9 (36)
<i>Tenure</i>	26.31 (34)	36.76 (38)	46.72 (43)	54.86 (50)	57.34 (48)
<i>Wage</i>	1.27 (1.27)	1.31 (1.31)	1.31 (1.28)	1.35 (1.31)	1.46 (1.47)
<i>Contribution %</i>	5.82	4.88	6.49	6.79	10.7
Panel C: Assistant Store Managers					
<i>Year</i>	2000	2002	2004	2006	2008
<i>#Employees</i>	188	162	132	161	587
<i>Female</i>	0.4 (0)	0.39 (0)	0.39 (0)	0.37 (0)	0.44 (0)
<i>Age</i>	36.12 (36)	37.19 (37)	37.49 (38)	37.42 (37)	37.63 (36)
<i>Tenure</i>	22.53 (24)	34.10 (32)	35.03 (28)	39.14 (29)	57.20 (45)
<i>Wage</i>	1.99 (2.01)	2.06 (2.08)	2.05 (2.12)	2.12 (2.15)	2.09 (2.08)
<i>Contribution %</i>	5.82	4.88	6.49	6.79	10.7
Panel D: Store Managers					
<i>Year</i>	2000	2002	2004	2006	2008
<i>#Employees</i>	515	558	553	583	576
<i>Female</i>	0.52 (1)	0.5 (1)	0.47 (0)	0.45 (0)	0.41 (0)
<i>Age</i>	39.31 (38)	40.09 (39)	40.47 (40)	40.71 (41)	41.06 (42)
<i>Tenure</i>	34.85 (36)	53.82 (60)	70.91 (84)	84.12 (100)	93.55 (102)
<i>Wage</i>	2.34 (2.5)	2.39 (2.39)	2.42 (2.35)	2.84 (2.87)	2.83 (2.87)
<i>Contribution %</i>	5.82	4.88	6.49	6.79	10.7

Table 3:

Correlation tables

This table presents correlations among variables used in the empirical analyses. Variables are defined in Table 2. Pearson correlations are presented above, and Spearman correlations below the diagonal. All correlations are significant at the .01 level or below.

	<i>Female</i>	<i>Age</i>	<i>Hourly wage</i>	<i>Weekly hours</i>	<i>Tenure</i>	<i>Vested holdings</i>	<i>Unvested holdings</i>
<i>Female</i>		0.13	-0.02	0.03	0.11	0.03	0.01
<i>Age</i>	0.16		0.15	0.21	0.38	0.23	0.15
<i>Hourly wage</i>	0.05	0.46		0.30	0.29	0.35	0.18
<i>Weekly hours</i>	0.04	0.31	0.54		0.31	0.29	0.30
<i>Tenure</i>	0.10	0.34	0.63	0.37		0.57	0.17
<i>Vested holdings</i>	0.09	0.38	0.56	0.42	0.58		0.09
<i>Unvested holdings</i>	0.06	0.23	0.35	0.32	0.40	0.58	

Table 4:**Effect of plan eligibility on voluntary turnover**

This table presents results of estimating Cox proportional hazard models of the rate of voluntary monthly turnover. All coefficients are exponentiated to represent hazard ratios. Values below one represent a reduced rate of turnover, and values above one indicate an increased rate of turnover. A value of one indicates no effect on turnover. *Eligible* is an indicator equal to 1 if an employee is over 21 years old (for years after 2002), has tenure ≥ 12 months, and works at least 20 hours/week, and equal to 0 otherwise. *Unemployment* is the county-level unemployment rate, measured monthly. *Over_30* is an indicator variable equal to one if an employee is over 30 years old. Standard errors are calculated by clustering at the employee level. Robust z-statistics are in parentheses.

VARIABLES	(1)	(2)	(3)	(4)	(5)
<i>Eligible</i>	0.630*** (-43.154)	0.815*** (-18.679)	0.846*** (-15.215)	0.926*** (-4.831)	0.987 (-1.040)
<i>Female</i>	0.970*** (-4.308)	0.983** (-2.518)	1.003 (0.502)	1.026*** (3.690)	1.006 (0.970)
<i>hourly_wage</i>	0.709*** (-35.917)	0.870*** (-15.780)	0.893*** (-13.032)	0.892*** (-13.172)	0.888*** (-13.710)
<i>Age</i>	0.998*** (-6.151)	0.998*** (-5.859)	0.997*** (-9.955)	0.997*** (-10.004)	1.002*** (4.398)
<i>Tenure</i>		0.965*** (-58.225)			
<i>unemployment</i>	0.963*** (-12.533)	0.968*** (-11.366)	0.972*** (-9.853)	0.972*** (-9.901)	0.972*** (-9.992)
<i>eligiblexfemale</i>				0.871*** (-7.748)	
<i>Over_30</i>					0.917*** (-5.371)
<i>Eligiblexover_30</i>					0.648*** (-23.515)
Higher order tenure and hours controls	No	No	Yes	Yes	Yes
Year and month fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	139,639	137,850	137,850	137,850	137,850

*** p<0.01, ** p<0.05, * p<0.1

Table 5:
Effect of age-21 requirement on voluntary turnover

This table presents results of estimating Cox proportional hazard models of the rate of voluntary monthly turnover. The sample for this test includes only employees ages 18-20 for the years 1999-2004. All coefficients are exponentiated to represent hazard ratios. Values below one represent a reduced rate of turnover, and values above one indicate an increased rate of turnover. A value of one indicates no effect on turnover. *Pre_02* is an indicator variable equal to one if the year is less than 2002. *Turnover_21* is the average turnover rate for 21-year-old employees and is measured monthly. Standard errors are calculated by clustering at the employee level. Robust z-statistics are in parentheses.

VARIABLES	(1)	(2)
<i>pre_02</i>	1.017 (0.314)	1.073 (1.004)
<i>Female</i>	0.939 (-1.621)	0.960 (-0.926)
<i>pre_02xfemale</i>		0.910 (-1.147)
<i>turnover_21</i>	1.030*** (2.587)	1.030*** (2.579)
<i>hours_per_week</i>	0.984*** (-5.177)	0.984*** (-5.165)
<i>hourly_wage</i>	0.668*** (-6.636)	0.666*** (-6.739)
<i>Age</i>	0.907** (-2.492)	0.907** (-2.485)
<i>unemployment</i>	0.911*** (-5.422)	0.911*** (-5.419)
Month fixed effects	Yes	Yes
Observations	52,469	52,469

*** p<0.01, ** p<0.05, * p<0.1

Table 6:**Effect of tenure-based eligibility requirement on voluntary turnover**

This table presents results of estimating Cox proportional hazard models of the rate of voluntary monthly turnover. The sample for this test includes only observations in the 12-month period around the 12-month tenure cutoff for eligibility (i.e., +/- six months). All coefficients are exponentiated to represent hazard ratios. Values below one represent a reduced rate of turnover, and values above one indicate an increased rate of turnover. A value of one indicates no effect on turnover. *Over_12* is an indicator for whether tenure is greater than 12 months. *Eligible_12* is an indicator for whether, in the absence of a tenure requirement, an employee would be eligible to receive deferred compensation. Standard errors are calculated by clustering at the employee level. Robust z-statistics are in parentheses.

VARIABLES	(1)	(2)	(3)
<i>over_12</i>	0.774*** (-4.020)	0.792*** (-2.995)	0.657*** (-4.392)
<i>eligible_12</i>	0.899*** (-3.101)	0.892** (-2.484)	0.891** (-1.972)
<i>over_12xeligible</i>	0.973 (-0.400)	1.018 (0.176)	1.151 (1.167)
<i>over_12xover_30</i>		0.940 (-0.679)	
<i>eligiblexover_30</i>		1.015 (0.272)	
<i>over_12xeligiblexover_30</i>		0.918 (-0.656)	
<i>over_12xfemale</i>			1.280** (2.411)
<i>eligiblexfemale</i>			1.015 (0.201)
<i>over_12xeligiblexfemale</i>			0.778* (-1.721)
<i>Female</i>	0.946* (-1.684)	0.947* (-1.668)	0.912* (-1.792)
<i>hourly_wage</i>	0.754*** (-5.941)	0.754*** (-5.935)	0.754*** (-5.931)
<i>Age</i>	0.978*** (-18.298)	0.979*** (-14.118)	0.978*** (-18.302)
<i>unemployment</i>	0.988 (-0.917)	0.988 (-0.922)	0.988 (-0.913)
Year and month fixed effects	Yes	Yes	Yes
Observations	48,530	48,530	48,530

*** p<0.01, ** p<0.05, * p<0.1

Table 7:**Effect of hours worked eligibility requirement on voluntary turnover**

This table presents results of estimating Cox proportional hazard models of the rate of voluntary monthly turnover. The sample includes only employees on either side of the 1000 hour cutoff in the prior year. Window sizes range from +/- 50 to +/- 200 hours. All coefficients are exponentiated to represent hazard ratios. Values below one represent a reduced rate of turnover, and values above one indicate an increased rate of turnover. A value of one indicates no effect on turnover. *Above 1000_{t-1}* is an indicator for whether the employee worked more than 1,000 hours in the prior year and thus received a deferred compensation grant. Standard errors are calculated by clustering at the employee level. Robust z-statistics are in parentheses.

VARIABLES	(1) +/-50 hours	(2) +/-100 hours	(3) +/-150 hours	(4) +/-200 hours
<i>Above 1000_{t-1}</i>	0.847 (-0.525)	0.694 (-1.377)	0.673* (-1.863)	0.656** (-2.285)
<i>Male</i>	0.950 (-0.292)	1.022 (0.175)	1.015 (0.143)	0.968 (-0.363)
<i>Hourly wage</i>	0.796 (-1.621)	0.782*** (-3.426)	0.745*** (-4.622)	0.771*** (-5.569)
<i>Hours per week</i>	0.947*** (-4.037)	0.951*** (-5.417)	0.950*** (-6.611)	0.948*** (-8.105)
<i>Age</i>	0.987*** (-2.576)	0.988*** (-3.363)	0.989*** (-3.852)	0.988*** (-4.566)
<i>Tenure</i>	0.995 (-0.820)	0.997 (-0.824)	0.997 (-1.020)	0.996 (-1.624)
<i>Unemployment</i>	1.067 (0.985)	0.982 (-0.392)	0.992 (-0.212)	0.979 (-0.680)
Higher order lagged hours controls	Yes	Yes	Yes	Yes
Year and month fixed effects	Yes	Yes	Yes	Yes
Observations	686	1,243	1,698	2,161

*** p<0.01, ** p<0.05, * p<0.1

Table 8:**Effect of plan changes on voluntary turnover**

This table presents results of estimating Cox proportional hazard models of the rate of voluntary monthly turnover. All coefficients are exponentiated to represent hazard ratios. Values below one represent a reduced rate of turnover, and values above one indicate an increased rate of turnover. A value of one indicates no effect on turnover. *Year_2007* is an indicator for observations in year 2007 (the year of the plan changes) and later. *Contribution* is the size of annual contributions in dollars, scaled by the value at the beginning of the sample period. Standard errors are calculated by clustering at the employee level. Robust z-statistics are in parentheses.

VARIABLES	(1)	(2)	(3)	(4)
			Tenure between 24 and 36	Tenure between 36 and 84
<i>Eligible</i>	0.884*** (-9.527)	0.960 (-1.240)	1.091 (1.576)	1.329*** (2.792)
<i>year_2007</i>	0.691*** (-37.215)	0.949** (-2.562)	0.892** (-2.369)	0.735*** (-2.962)
<i>contribution</i>		0.876*** (-17.889)	0.906*** (-5.463)	1.017 (0.453)
<i>eligiblex2007</i>	0.861*** (-7.491)	1.003 (0.060)	1.090 (1.101)	1.103 (0.707)
<i>contributionxeligible</i>		0.950*** (-3.187)	0.932*** (-2.680)	0.879*** (-2.814)
<i>Male</i>	1.015* (1.870)	1.018** (2.223)	1.051*** (3.099)	0.976 (-0.706)
<i>hourly_wage</i>	0.764*** (-30.039)	0.742*** (-30.483)	0.719*** (-16.134)	0.763*** (-11.303)
<i>hours_per_week</i>	0.979*** (-49.638)	0.979*** (-47.348)	0.973*** (-28.171)	0.965*** (-16.790)
<i>Age</i>	0.995*** (-14.637)	0.997*** (-7.252)	0.984*** (-24.567)	0.981*** (-18.665)
<i>unemployment</i>	0.940*** (-21.494)	0.944*** (-19.319)	0.932*** (-11.779)	0.941*** (-5.271)
<i>industry_turnover</i>	1.034*** (5.516)	1.001 (0.194)	1.028** (2.053)	1.059** (2.209)
Higher order tenure and hours controls	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes
Observations	122,784	120,700	32,702	10,904

*** p<0.01, ** p<0.05, * p<0.1

Table 9:**Effect of unvested holdings on voluntary turnover**

This table presents results of estimating Cox proportional hazard models of the rate of voluntary monthly turnover. The sample includes only employees who are not yet fully vested (i.e., employees under age 62 with less than 7 years of service). All coefficients are exponentiated to represent hazard ratios. Values below one represent a reduced rate of turnover, and values above one indicate an increased rate of turnover. A value of one indicates no effect on turnover. *Unvested* and *vested holdings* represent the dollar value of total vested and unvested plan holdings (in thousands), respectively. Standard errors are calculated by clustering at the employee level. Robust z-statistics are in parentheses.

VARIABLES	(1) CSR	(2) hourly manager	(3) assistant manager	(4) Store manager	(5) CSR	(6) store manager	(7) assistant manager	(8) store manager
<i>Unvested holdings</i>	0.739*** (-12.565)	0.999 (-0.029)	0.983 (-0.201)	1.188 (1.611)	0.731*** (-11.632)	1.007 (0.228)	0.980 (-0.227)	1.193* (1.682)
<i>Vested holdings</i>					1.023 (0.992)	0.983 (-0.768)	1.011 (0.185)	1.049 (1.085)
<i>Female</i>	1.002 (0.328)	0.932** (-2.466)	0.758** (-2.274)	0.701 (-1.279)	1.002 (0.328)	0.931** (-2.468)	0.758** (-2.274)	0.730 (-1.127)
<i>hourly_wage</i>	0.895*** (-12.559)	0.934*** (-5.587)	0.904*** (-3.493)	0.906*** (-2.600)	0.895*** (-12.601)	0.935*** (-5.556)	0.904*** (-3.500)	0.900*** (-2.827)
<i>Age</i>	0.998*** (-5.606)	0.994*** (-4.527)	1.014** (2.439)	0.979 (-1.530)	0.998*** (-5.584)	0.994*** (-4.472)	1.014** (2.383)	0.975* (-1.668)
<i>Unemployment</i>	0.970*** (-10.370)	0.955*** (-3.630)	0.928* (-1.829)	1.100 (0.860)	0.970*** (-10.382)	0.955*** (-3.640)	0.928* (-1.824)	1.114 (0.997)
Higher order tenure and hours controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year and month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	135,651	10,979	1,738	624	135,651	10,979	1,738	624

*** p<0.01, ** p<0.05, * p<0.1

Table 10:**Effect of investment allocation on voluntary turnover**

This table presents results of estimating Cox proportional hazard models of the rate of voluntary monthly turnover. The sample includes only employees who are not yet fully vested (i.e., employees under age 62 with less than 7 years of service). All coefficients are exponentiated to represent hazard ratios. Values below one represent a reduced rate of turnover, and values above one indicate an increased rate of turnover. A value of one indicates no effect on turnover. *Unvested esop* and *unvested_diversified* represent the dollar value of total unvested holdings (in thousands) invested in company stock and diversified mutual funds, respectively. *Vested_holdings* represent the dollar value (in thousands) of total vested holdings (the sum of company stock and diversified mutual funds). Standard errors are calculated by clustering at the employee level. Robust z-statistics are in parentheses.

VARIABLES	(1) CSR	(2) hourly manager	(3) assistant manager	(4) store manager	(5) CSR	(6) hourly manager	(7) assistant manager	(8) store manager
<i>unvested_esop</i>	0.679*** (-9.891)	0.975 (-0.453)	1.005 (0.050)	1.216 (1.441)	0.667*** (-9.551)	0.985 (-0.268)	1.002 (0.021)	1.217 (1.466)
<i>unvested_deversified</i>	0.884 (-1.643)	1.045 (0.475)	0.914 (-0.417)	1.128 (0.568)	0.880* (-1.700)	1.047 (0.501)	0.916 (-0.409)	1.141 (0.631)
<i>vested_holdings</i>					1.028 (1.218)	0.984 (-0.735)	1.008 (0.123)	1.049 (1.085)
<i>Female</i>	1.002 (0.321)	0.932** (-2.458)	0.759** (-2.256)	0.702 (-1.275)	1.002 (0.321)	0.932** (-2.461)	0.759** (-2.256)	0.731 (-1.124)
<i>hourly_wage</i>	0.895*** (-12.488)	0.934*** (-5.580)	0.904*** (-3.497)	0.905*** (-2.600)	0.895*** (-12.538)	0.935*** (-5.552)	0.904*** (-3.502)	0.900*** (-2.824)
<i>Age</i>	0.998*** (-5.589)	0.994*** (-4.520)	1.014** (2.436)	0.978 (-1.538)	0.998*** (-5.562)	0.994*** (-4.467)	1.014** (2.384)	0.975* (-1.659)
<i>Unemployment</i>	0.970*** (-10.372)	0.955*** (-3.635)	0.928* (-1.811)	1.103 (0.887)	0.970*** (-10.386)	0.955*** (-3.644)	0.928* (-1.808)	1.117 (1.016)
Higher order tenure and hours controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year and month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	135,651	10,979	1,738	624	135,651	10,979	1,738	624

*** p<0.01, ** p<0.05, * p<0.1