Financial Management

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ORIGINAL ARTICLE OPEN ACCESS

Implicit Promises and the Timing of Defined-Benefit Pension Plan Freezes

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Received: 13 March 2025 | **Revised:** 13 March 2025 | **Accepted:** 2 April 2025

Keywords: CEO turnover | implicit contracts | defined-benefit pension plans | pension freezes

ABSTRACT

Firms time defined-benefit (DB) plan freezes after CEO turnovers to protect CEO retirement benefits from cost cuts affecting the wider workforce. We document a significant increase in voluntary CEO turnovers just before the freeze, without notable post-freeze changes. Our results suggest that firms prioritize retaining their CEOs and avoiding reputational costs over cost-cutting measures that could negatively impact their top talent. Overall, the study uncovers the timing of the freeze as a strategy that firms use to honor pension promises to their CEOs and informs the academic debate on the relation between DB plans and employee mobility.

JEL Classification: G30, J32, J33, M12, M52

1 | Introduction

Defined-benefit (DB) pension plans have traditionally served as a human resource tool for firms to encourage long tenures and attract highly skilled employees (e.g., Lazear 1979; Ippolito 1987; Allen et al. 1993; Gustman and Steinmeier 1995). However, in recent years, many firms in the United States have opted to "hard freeze" their DB plans and replace them with defined contribution (DC) plans. Despite the large research examining the effect of the freeze decision from the sponsoring firms' economic perspective (e.g., Rubin 2007; McFarland et al. 2009; Milevsky and Song 2010; Phan and Hegde 2013; Choy et al. 2014), academic research on whether and how pension freezes impact employee turnover is scarce. This gap in the literature is surprising given the current labor market dynamics characterized by declining employee tenure and retention rates and record-breaking CEO turnovers, alongside recent calls for a resurgence of DB plans in the "war for talent."[1] In this study, we fill this void in the literature by examining CEO turnovers around pension plan freezes.

We focus on CEOs because pension contracts are particularly important in top management positions. The high hiring and separation costs and the intense competition for managerial talent have led many firms to adopt executive DB plans as a crucial tool to attract and retain top talent (e.g., Lazear 1979; Hutchens 1986, 1987).[2] These plans have been prevalent among S&P 1500 firms, accounting for a substantial portion of overall CEO compensation (Bebchuk and Jackson 2005; Sundaram and Yermack 2007; Cadman and Vincent 2015). Furthermore, the fact that CEO turnovers are highly publicized and easily observable events provides an opportunity for an in-depth empirical examination of the role of pensions in retaining top talent.

Importantly, this shift from DB to DC plans offers a novel setting to contribute to the ongoing academic debate on whether and how pensions affect employee retention. One possibility is that, under the "implicit contracts" framework (Ippolito 1985), CEO mobility will significantly increase in the years following the freeze ("pension incentives" hypothesis). This is because a DB

plan freeze nullifies the current CEO's incentives to stay with the firm and continue to earn benefits, while DC plans—that are not backloaded as traditional DB plans and are generally more portable—are not as effective at retaining top talent (e.g., Haverstick et al. 2010).

However, the theory of implicit contracts also predicts an increase in CEO turnovers near or just before pension freezes ("timing" hypothesis). When firms freeze their pensions, they save costs by effectively reneging on promised future pension benefits to employees (Rauh et al. 2020). However, this breach of the implicit contract can significantly affect the current CEO's work ethic and willingness to stay with the firm, posing a risk of costly top-level turnover. Further, the high visibility of pension freezes may harm the firm's reputation in the highly competitive managerial labor market, challenging its ability to attract and retain top talent.[3] Disruption theory emphasizes the substantial costs of abrupt CEO changes, especially when the CEO is highly talented or when labor market conditions make it harder to find a replacement quickly (e.g., Grusky 1963; Boeker 1992; Coyne and Coyne 2007; Ballinger and Marcel 2010). Consequently, firms mindful of the potential adverse effects on CEO retention and replacement might choose to honor existing pension contracts and time pension freezes near planned turnovers. Thus, under the implicit contracts framework, pension freezes could also be associated with observable patterns in CEO turnovers near the freeze.

On the other hand, two alternative explanations for the link between pension plan coverage and lower employee mobility suggest that pension freezes might not affect CEO turnovers. The first explanation posits that pensions serve as a screening tool that attracts employees who are less likely to quit or be fired (Lazear 1979, 1981; Lazear and Moore 1984; Ippolito 1987). The second explanation argues that employees are reluctant to leave because pension contracts serve as a mechanism to offer excessive compensation (e.g., Gustman and Steinmeier 1993; Bebchuk and Fried 2004). Together, these two explanations imply that pension incentives through backloading may play a less critical role in employee retention. Therefore, because DC plans and other components of the CEO compensation structure can effectively substitute for pension incentives, pension freezes are unlikely to affect CEO retention. Against this backdrop of competing hypotheses, how CEO turnovers vary around pension freezes is ultimately an empirical question that is addressed in this paper.

To this end, we examine CEO turnovers for up to 11 years around the DB freeze date of 264 unique firms that hard froze their DB plans between 2000 and 2015. We find a statistically and economically significant increase in CEO turnovers in the year before the pension plan is frozen, with no substantial change in CEO turnovers in the post-freeze period. To alleviate concerns that poor financial performance may be associated with both CEO turnovers and DB plan freezing, we distinguish between forced and voluntary turnovers throughout our analysis. Notably, we find that the increase is observed in voluntary but not in forced turnovers. These results are consistent with the timing hypothesis, which suggests that firms may time the freeze after CEO turnovers to mitigate the negative effect of the freeze on the CEO's retirement benefits.

Next, to more confidently attribute these findings to the timing hypothesis, we investigate characteristics that may increase the need to time the pension freeze. We find that the likelihood of CEO turnovers before the freeze is more pronounced in planned departures, and when the freeze is expected to substantially reduce CEO benefits. These findings reinforce our interpretation that the increase in CEO turnovers before the freeze is driven by the board of directors' effort to protect the CEO's retirement benefits and mitigate concerns that some triggering event or other endogenous factors are driving the results.

Building upon these insights, we then delve into the motivations behind the strategic timing of freezes. First, we hypothesize that firms are more inclined to honor pension contracts in environments where CEO retention is a primary concern. Consistent with our hypothesis, we observe that the timing of pension freezes is more pronounced when executives have better employment mobility and when CEO replacement costs are higher. Second, we examine the potential influence of CEO negotiating power on the timing of pension freezes. We find evidence consistent with the hypothesis that CEOs with greater negotiating power can impact the timing of pension freezes. Our latter result aligns with both the efficient contracting view—where firms strategically time pension freezes to retain talented CEOs (e.g., Rosen 1981; Hermalin and Weisbach 1998; Edmans and Gabaix 2009; Baranchuk et al. 2011; Song and Wan 2019)—and the managerial rent-seeking view on executive compensation (e.g., Shivdasani and Yermack 1999). While distinguishing between these two explanations is empirically challenging, further analyses suggest that the timing of pension freezes aims, at least in part, to retain key executive talent. Specifically, we observe that the timing of freezes occurs even in firms with less dominant CEOs, and that performance metrics in the years prior to the freeze do not indicate worse performance in firms timing their freezes, contrary to entrenchment expectations. Finally, qualitative analysis of online news and sources regarding departing CEOs predominantly indicates instances of highly skilled individuals rather than cases of CEO entrenchment. Overall, while we cannot definitively rule out the possibility of managerial rent-seeking, the evidence leans towards the strategic timing of pension freezes being motivated, at least partially, by the goal of retaining key executive talent.

We then explore alternative strategies that boards may choose to honor pension promises made to their CEOs, given that timing the pension freeze may, in some cases, be too costly or impractical. We show that timing the freeze is less likely in firms with an increase in CEO pension benefits prior to the freeze (see, Stefanescu et al. 2018), and in firms that elect not to freeze the executive's pension while freezing the pension of rank-and-file employees. These findings underscore a consistent and proactive effort by firms to uphold pension promises made to CEOs.

Finally, we expand our analysis to include other top executives and rank-and-file employees. The rationale is that while firms may prioritize retaining their CEOs over cost-cutting measures, they are less likely to do so with other employees who usually have a lower impact on a firm's productivity and profitability at the margin and weaker negotiating power. We observe a significant increase in employee turnover following the pension freeze, particularly among rank-and-file employees and, to a lesser extent, among top executives other than the CEO. This result

indicates that in the absence of measures to safeguard promised benefits, employee turnovers increase in the post-freeze period. These findings align with the implicit contract theory of pension plans, emphasizing that retention concerns, particularly within top management positions, play a critical role in determining the timing of pension freezes.

Our empirical analysis incorporates a comprehensive set of controls commonly associated with CEO turnovers. Our findings remain robust when including year, year and industry, or year and firm fixed effects. Additionally, our results hold under alternative controls, estimation methods, and classifications of turnovers as voluntary or forced. Finally, the tenor of the results remains unchanged when employing matching techniques such as propensity score matching or entropy balancing.

This study contributes to the literature in several ways. To the best of our knowledge, this is the first study to provide evidence on CEO and employee turnovers around pension freezes. Importantly, by examining the relationship between pension freezes and turnovers, this study sheds light on the traditional rationale for offering DB plans in the first place and informs the long-standing academic debate as to why employer-provided pensions are associated with longer employee job tenures (e.g., Schiller and Weiss 1979; Mitchell 1982; Ippolito 1987; Cornwell et al. 1991; Allen et al. 1993; Gustman et al. 1994; Dorsey 1995; Haverstick et al. 2010). Our results indicate that firms take steps to honor their implicit promises at least to their CEOs. These results favor the implicit contracts theory. Firms' efforts to protect their CEOs' retirement benefits suggest that they perceive DB plan incentives as vital for retaining top talent. In contrast, such efforts are inconsistent with the excess compensation view or the screening view of pension contracts.

Our findings also align with the disruption theory (e.g., Grusky 1963; Ballinger and Marcel 2010), which underscores the need to carefully manage CEO transitions to avoid organizational disruptions and short-term performance costs (e.g., Beatty and Zajac 1987; Zeitoun and Pamini 2017; Cvijanović et al. 2023). Our research adds to this line of work by providing evidence on proactive measures that firms employ to minimize the risks and costs associated with abrupt CEO turnovers, and corroborate anecdotal evidence that firms often safeguard their executives' pensions despite broader cost cuts, providing a fresh perspective on these practices.

Finally, our study reveals the role of CEO negotiating power in pension freeze decisions, complementing the recent evidence by Stefanescu et al. (2018)—that firms manipulate their top executives' pensionable earnings and pension assumptions just before pension freezes. Our study extends the literature on opportunistic behavior in executive pension-related decisions in two key aspects (Bebchuk and Jackson 2005; Kalyta and Magnan 2008; Kalyta 2009; Gerakos 2010; Stefanescu et al. 2018). First, we uncover the timing of the pension freeze as an alternative and subtler strategy through which boards can protect their CEOs' retirement benefits while cutting the benefits of rank-and-file employees. Second, whereas prior research attributes these decisions to managerial rent-seeking, our evidence suggests that efficiency considerations also play a crucial role.

2 | Background and Motivation

2.1 | Pensions and Employee Mobility

An extensive body of empirical research has shown that employee mobility is significantly lower in jobs covered by DB pension plans, making it one of the most firmly established "stylized facts" in pension literature (e.g., Mitchell 1982; Ippolito 1987; Cornwell et al. 1991; Allen et al. 1993; Gustman et al. 1994; Gustman and Steinmeier 1995). Pensions are particularly important in top management positions that are characterized by high hiring and separation costs (Lazear 1979), which explains their prominent role in CEO compensation contracts (see, e.g., Bebchuk and Jackson 2005; Sundaram and Yermack 2007; Cadman and Vincent 2015). Top executives participate in broad-based qualified DB plans but gain most of their retirement through supplemental executive retirement plans (SERPs).

The impact of pensions on mobility can be explained in three ways. The first explanation falls under the traditional "implicit contracts" framework, which states that the lower mobility occurs primarily because of financial disincentives created by DB plans. DB plans are designed to backload pension accruals by giving disproportionate weight in the final years before retirement in the calculation of benefits. Under the implicit contracts framework, employees essentially post a bond with the firm by accepting lower pay than their marginal contribution early in their career with the promise to earn more later in their career. If employees leave the firm before qualifying for retirement, they suffer capital losses by giving up the opportunity for substantial increases in pension benefits (e.g., Ippolito 1986; Allen et al. 1993).

Although sponsoring firms can renege on their future pension accruals promises at any time, they would incur reputation costs in doing so, which would likely lower current employees' efforts and willingness to stay with the firm and inhibit the firm's ability to enter into similar contracts in the future. Thus, while the bonding component of pensions discourages quits, reputation costs in the labor market prevent sponsors from reneging on these future promises and serve as an enforcement mechanism for the implicit part of the pension contract.

A second potential explanation is that the lower job mobility is caused by pensions acting as a self-selection device by screening out employees who are likely to quit or be fired (Lazear 1979, 1981; Lazear and Moore 1984; Ippolito 1987). Thus, the prospect of suffering a sizable capital loss in the future operates as a self-selection device, matching long-staying workers with jobs covered by pensions. However, if employees with specific characteristics prefer pension-covered jobs or are systematically selected by employers, then any deferred compensation scheme, rather than the pension backloading per se, will be associated with lower quit rates. A final explanation is that firms providing pensions pay "excessive" wages, which are wages set above competitive levels, to incentivize employees to stay with the firm to collect the stream of wage premiums. This explanation is consistent with the finding of Gustman and Steinmeier (1993) that members of both DB and DC plans have lower quit rates than employees not covered by retirement plans, even though DC plans do not contain the backloading feature of a typical DB plan. In the

United States, for example, "excessive" executive pension benefits have been headlined numerous times in the financial press.[4,5] In fact, the potential use of pensions as a vehicle to offer top executives excessive compensation was the primary driver of the Securities and Exchange Commission's (SEC's) decision to revise the disclosure rules on executive pensions on December 15, 2006 (e.g., Colvin 2001; Bebchuk and Fried 2004; Hodgson 2004).

2.2 | Pension Freezes and Hypotheses

Under the implicit contracts framework, we expect DB plan freezes to affect managerial turnover in one of two ways. First, if the disincentive created by backloading is a significant deterrent to quits, we expect an increase in CEO turnovers following the freeze. This is because current CEOs stop accumulating benefits through a DB plan and have no incentive to stay with the firm until retirement to collect the anticipated retirement benefits. Further, under the implicit contracts framework, DC plans are not an effective mechanism for retention because benefits accrue smoothly over the CEO's tenure, and they are not backloaded as in traditional DB plans (Stock and Wise 1990; Haverstick et al. 2010). We refer to this as the "pension incentives" hypothesis.

Second, if firms anticipate the negative effect of the DB freeze on CEO retention, and the potential reputation costs in the managerial labor market from reneging on their future promises, they are likely to take steps to mitigate these adverse outcomes. A subtle way to alleviate these costs is strategically timing the pension freeze near or just after planned CEO departures. By timing the freeze, firms ensure that the current CEO will stay with the firm to collect the anticipated pension benefits, and at the same time, they protect their reputation by honoring their pension promises. Thus, under the implicit contracts framework, pension freezes could also be associated with observable patterns in CEO turnovers near the freeze. We refer to this as the "timing" hypothesis.

In contrast, if screening or efficiency wages, rather than pension incentives, through backloading primarily drive the pension–mobility relation, then pension freezes are not expected to substantially affect CEO turnovers. These alternative explanations suggest that DC plans and other components of the CEO's compensation structure can effectively substitute for pension incentives, implying that the freeze is unlikely to affect CEO retention.

3 | Sample Selection and Descriptive Statistics

Our sample includes all firms with defined benefit pension obligations and pension assets between 2000 and 2015 in Compustat and available CRSP stock returns. The sample period begins in 2000 because, before 2000, pension plan freezes were rare and primarily associated with financial distress (Munnell and Soto 2007). It ends in 2015 to allow adequate data for the five-year post-freeze analysis. We merged firm-years with a DB pension plan with boards of directors information from the MSCI GMI Ratings database. We then manually reviewed the proxy statements and footnote disclosures in 10-k reports to identify hard freezes of the broad-base qualified DB plan affecting all or most employees. We focus on hard freezes affecting most or all employees because they generally have an immediate impact on the firm in terms of funding requirements and financial reporting, as well as on current employees and executives. Thus, our sample excludes freezes of acquired DB plans following a takeover and in connection with spinoffs, subsidiary or foreign employee-specific plans, union plans, multiemployer pension plans, and freezes due to bankruptcy or reorganization.

To ensure a comprehensive sample of hard freezes, we conducted two additional searches. First, for firm-years not in the MSCI GMI Ratings database, we manually examine the proxy statements and 10-K reports of firms suspected of freezing their pensions flagged by a sudden reduction in service costs.[6] Finally, we supplement these firm-years with a list of firms hard-freezing their pension plans from the Department of Labor's Form 5500.[7] By thoroughly reviewing all available Form 5500, 10-K reports, and proxy statements, we verified that the CEOs were indeed covered under the frozen qualified DB plans.[8]

Overall, we identified 264 unique firms that hard froze their qualified DB plans from 2000 to 2015. Figure 1 shows the temporal distribution of freezes from 2000 to 2015. DB freezes increased sharply between 2004 and 2009, peaking in 2006 and 2009 with 44 and 41 events, respectively. Figure 2 shows the industry distribution. Pension freezes are distributed over almost all major industry groups, with a higher concentration in the manufacturing sector (47.4% of qualified DB freezes) and the financial sector (25.8% of qualified DB freezes).

To identify CEO changes, we follow the sample firms for up to 11 years surrounding the DB freeze and hand-collect information from proxy statements and 10-K reports. A CEO turnover is identified when a CEO leaves by the end of that fiscal year. We then separate the cases of CEO turnover into forced and voluntary, based on information in the departure announcements and press reports as well as proxy statements, using the Parrino (1997) algorithm (see Appendix I for more details).

We identified 287 CEO turnovers in the sample of firm-years examined. We then excluded 15 turnovers related to the CEO's poor health or death and nine cases in which the CEO cedes the CEO title but remains full-time executive chairman of the board with compensation exceeding the CEO. From the remaining 263 turnovers, we classify 191 as voluntary and 72 as forced. The forced turnovers thus account for 27% of total turnovers, which is very similar to the 25% involuntary turnovers reported in Sundaram and Yermack (2007).

Table 1 presents summary statistics from 1996 to 2018, covering 11 years around pension freezes.[9] The control sample includes 2,450 firm-years without turnovers. *T*-tests (Wilcoxon rank-sum tests) compare means (medians) between the turnover and control samples. Notably, excess returns for the voluntary turnover sample do not significantly differ from the control sample, while current and prior-year excess returns are significantly lower for the forced turnover sample ($p < 0.05$ and $p < 0.01$, respectively). This finding provides some comfort that our classification process successfully classifies turnovers into voluntary and involuntary.

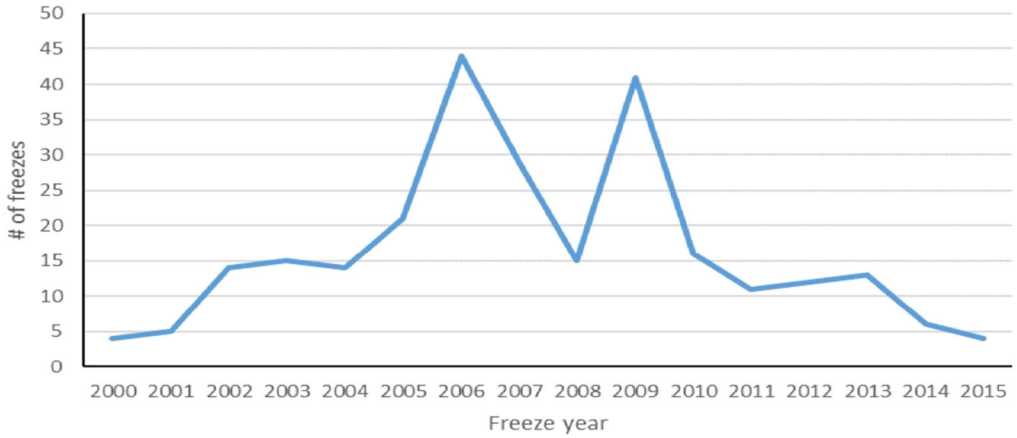

FIGURE 1 | Distribution of 264 DB pension plan freezes by year for the period 2000 to 2015. [Color figure can be viewed at wileyonlinelibrary.com]

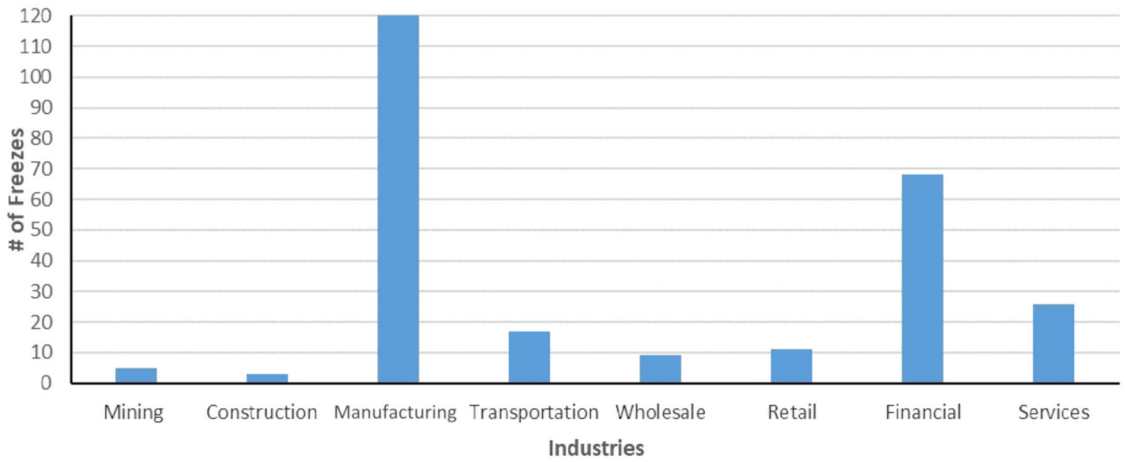

FIGURE 2 | Distribution of 264 DB pension plan freezes across industries (one-digit SIC code). [Color figure can be viewed at wileyonlinelibrary.com]

4 | Empirical Analysis

4.1 | Univariate Analysis

We begin our empirical analysis by tabulating the frequency of CEO turnovers in the years surrounding the freeze year, i.e., year 0. The results in Figure 3 show an increase in turnovers in the years leading up to the freeze, peaking at 45 or 17% of total turnovers in the year before the freeze (year −1). Notably, this frequency spike is mainly driven by voluntary turnovers, with 34 or 17.8% of total voluntary turnovers in the year prior to the freeze. In contrast, forced turnovers are more evenly distributed around pension freezes.

The univariate analysis presented in Figure 3 shows a concentration of total CEO turnovers in the year immediately prior to the freeze, driven mainly by voluntary turnovers, with no notable changes in the post-freeze period. Although suggestive, the univariate results are more consistent with the timing hypothesis.

4.2 | Multivariate Analysis

To investigate whether CEO turnovers are abnormally high in the year before the freeze, we estimate a linear probability model using CEO turnovers as the dependent variable and the fiscal year before the pension freeze as our main independent variable. We use a linear probability model to ease the interpretation of the coefficients and accommodate the number of fixed effects.[10] Specifically, our baseline specification is

$$CEO\,Turnover_{it} = \beta_0 + \beta_1 Pre\,freeze - 1_{it} + \sum_{q=1}^{m} \lambda_q\, Control_{qit-1} + \varepsilon_{it}, \quad (1)$$

where *CEO turnover* takes the value of one if the CEO departs in that fiscal year and zero otherwise. *Pre freeze -1* is an indicator variable that takes the value of one if the observation is from the fiscal year immediately prior to the freeze fiscal year and zero otherwise. If a CEO turnover is more likely in the year before the freeze relative to a turnover in any other year around the freeze, then we expect $\beta_1 > 0$.

TABLE 1 | Summary statistics.

	Control (n = 2,450)			Voluntary turnovers (n = 191)			Forced turnovers (n = 72)		
	Mean	**Std**	**Median**	**Mean**	**Std**	**Median**	**Mean**	**Std**	**Median**
Excess returns	0.046	0.378	−0.008	0.037	0.363	0.012	−0.070**’	0.406	−0.100**
Excess returns lag	0.055	0.386	0.000	0.022	0.348	−0.032	−0.185***’	0.332	−0.231***
Std (returns)	0.026	0.014	0.022	0.024**	0.012	0.021*	0.030***	0.019	0.024*
Sales growth	0.052	0.179	0.040	0.046	0.159	0.042	−0.004***	0.172	−0.001***
R&D	0.011	0.022	0.000	0.013	0.021	0.000*	0.019***	0.033	0.001**
Market to book	1.460	0.704	1.217	1.506	0.737	1.254	1.343	0.458	1.239
Leverage	0.223	0.177	0.192	0.225	0.181	0.197	0.279***	0.197	0.269***
Assets ($millions)	17,694.580	62,411.210	2,032.792	20,050.380**	65,979.800	2,872.400**	37,084.910**	110,562.200	2,326.593
CEO Chair	0.545	0.498	1.000	0.634**	0.483	1.000**	0.458	0.502	0.000
Board size	10.098	2.634	10.000	10.408*	2.594	10.000*	10.417	2.460	10.000
%NE directors	0.802	0.121	0.833	0.799	0.122	0.833	0.807	0.131	0.852
%insiders ownership	0.106	0.158	0.040	0.092	0.132	0.046	0.087	0.160	0.030**
%institutional ownership	0.508	0.351	0.588	0.536	0.349	0.618	0.425*	0.368	0.494**
CEO age	56.442	6.958	56.000	62.131***	5.776	63.000***	56.167	5.582	56.500
CEO tenure	6.816	6.949	5.000	9.194***	6.357	8.000***	5.792	3.049	5.000

The table presents descriptive statistics for turnover and non-turnover observations of pension freeze firms from 1996 to 2018. The control sample is all firm-years without a turnover. The voluntary turnover sample includes firm-years when a company experienced a voluntary turnover. The forced turnover sample includes firm-years when a company experienced a forced turnover. *Excess returns* (*lag*) is the difference between daily firm raw stock returns and the CRSP value-weighted index cumulated over the current (previous) fiscal year; *Std (returns)* is the standard deviation of daily raw returns over the fiscal year; *Sales growth* is current year sales less prior-year sales scaled by sales in the prior-year. *R&D* is the ratio of research and development expenditures scaled by total assets. *Market to book* is the book value of assets plus the market value of equity less the sum of the book value of equity and deferred assets scaled by the book value of total assets. *Leverage* is short- and long-term debt scaled by total assets. *Assets* are the firm's total assets. *CEO Chair* equals one if the firm's CEO is also the Chair of the board and zero otherwise. *Board size* is the total number of directors on the board. *%NE directors* is the fraction of nonexecutive directors on the board. *%Insider ownership* is the fraction of common stock owned by insiders. *% Institutional ownership* is the fraction of common stock owned by institutional investors; *CEO age* is the CEO's age. *CEO tenure* is the number of years that the current CEO served as a CEO. All variables are defined in more detail in Appendix I. All continuous variables are winsorized at the 1st and 99th percentiles. *t*-tests (Wilcoxon rank-sum tests) are used to test the equality of means (medians) between the turnover and control samples. ***, **, and * indicate levels of significance of 1%, 5%, and 10%, respectively.

Our specification includes control variables commonly associated with CEO turnovers (e.g., Sundaram and Yermack 2007; Jenter and Lewellen 2020). We include current (prior) year excess returns, *Excess returns (lag)*; the standard deviation of daily raw returns, *Std(returns)*; *Sales growth*; *R&D* expenditures; *Market to Book* value of assets; the firm's leverage, *Leverage*; and firm size, *Ln (assets)*. We also control for board structure, ownership, and CEO characteristics. We include a *CEO Chair* indicator variable; the log of board size, *Board size*; the fraction of nonexecutive directors on the board, *%NE Directors*; the fraction of common stock owned by insiders, *% insiders' ownership*; the fraction of common stock held by institutional investors, *%institutional ownership*; the CEO's age, *CEO age*; and the CEO's tenure, *CEO tenure*. Refer to Appendix I for more detailed definitions of variable measurements.

Finally, we include year fixed effects to absorb common shocks to the macroeconomic environment and industry or firm fixed effects to control for time-invariant unobserved differences among industries or firms. All control variables except excess returns are measured at the beginning of the year. All regression estimates include robust standard errors clustered at the firm level.

Table 2 presents the results. Model 1 shows the analysis of total turnovers, and models 2 and 3 present the analysis of voluntary and forced turnovers, respectively. Each column presents estimations of each model using three different fixed-effects specifications. The probability of a CEO turnover is significantly higher in the year immediately before the freeze, after holding constant other confounding factors. Notably, the *Pre freeze -1* indicator has a positive and significant estimate ($p < 0.01$) in the models for total and voluntary turnovers but not for forced turnovers. The coefficient estimates range from 6.8% to 7.5% in the total turnover analysis and from 5.9% to 6.3% in the voluntary turnover analysis.[11] Given the unconditional total CEO turnover rate of 9.6% (263 turnovers divided by 2,713 firm-years) and an unconditional voluntary turnover rate of 7.2% (191 turnovers divided by 2,641 firm-years) in our sample, this implies that the turnover rate in the year prior to the freeze rises to 16.4% to 17.1% (13.1% to 13.5%) for total (voluntary) turnovers. This percentage point increase represents a 70.8% to 78.1% (81.9% to 87.5%) increase in total (voluntary) turnovers relative to the baseline rate. This magnitude suggests that the effect is economically meaningful as it reflects a substantial increase in CEO departures in the period immediately before the freeze. These results are also consistent with the pictorial evidence presented in Figure 3.

TABLE 2 | CEO turnovers before pension plan freezes.

	1			2			3		
	Total turnovers			**Voluntary turnovers**			**Forced turnovers**		
Pre freeze -1	0.075***	0.074***	0.068***	0.063***	0.062***	0.059***	0.019	0.019	0.020
	(0.024)	(0.024)	(0.023)	(0.022)	(0.022)	(0.021)	(0.015)	(0.015)	(0.015)
Excess returns	−0.019	−0.024	−0.013	0.003	0.000	0.007	−0.026***	−0.027***	−0.021**
	(0.015)	(0.016)	(0.017)	(0.014)	(0.014)	(0.015)	(0.009)	(0.010)	(0.010)
Excess returns lag	−0.050***	−0.052***	−0.045***	−0.013	−0.014	−0.015	−0.042***	−0.044***	−0.036***
	(0.015)	(0.015)	(0.016)	(0.013)	(0.013)	(0.014)	(0.009)	(0.010)	(0.010)
Std (returns)	0.459	0.515	0.722	−0.610	−0.445	−0.281	1.179***	1.055**	1.077*
	(0.516)	(0.573)	(0.788)	(0.432)	(0.481)	(0.660)	(0.443)	(0.479)	(0.584)
Sales growth	−0.058**	−0.063**	−0.060**	−0.024	−0.024	−0.025	−0.038**	−0.042**	−0.038**
	(0.029)	(0.029)	(0.028)	(0.025)	(0.026)	(0.026)	(0.017)	(0.017)	(0.017)
R&D	0.610**	0.279	−0.240	0.267	−0.010	−0.412	0.430**	0.351*	0.265
	(0.278)	(0.306)	(1.307)	(0.225)	(0.240)	(0.921)	(0.190)	(0.207)	(1.201)
Market to book	0.008	0.006	−0.000	0.008	0.007	0.014	−0.000	−0.002	−0.012
	(0.007)	(0.009)	(0.017)	(0.007)	(0.009)	(0.015)	(0.004)	(0.004)	(0.010)
Leverage	0.059**	0.043	−0.030	0.028	0.007	−0.076	0.038*	0.041	0.045
	(0.029)	(0.037)	(0.080)	(0.024)	(0.033)	(0.070)	(0.022)	(0.028)	(0.050)
Ln (assets)	0.010***	0.015***	−0.013	0.007**	0.012***	−0.020	0.004	0.004	0.004
	(0.004)	(0.004)	(0.022)	(0.003)	(0.004)	(0.018)	(0.003)	(0.003)	(0.016)
CEO Chair	−0.027**	−0.035**	−0.036*	−0.020*	−0.026**	−0.034*	−0.011	−0.012	−0.008
	(0.013)	(0.014)	(0.021)	(0.011)	(0.013)	(0.018)	(0.008)	(0.009)	(0.015)
Ln (board size)	0.011	0.023	0.039	0.002	0.012	0.035	0.011	0.014	0.010
	(0.025)	(0.027)	(0.044)	(0.022)	(0.025)	(0.039)	(0.014)	(0.015)	(0.025)
%NE directors	0.006	0.021	0.037	0.023	0.030	0.068	−0.015	−0.005	−0.036
	(0.056)	(0.055)	(0.106)	(0.047)	(0.049)	(0.091)	(0.033)	(0.033)	(0.067)
%insiders ownership	−0.076*	−0.097**	−0.136	−0.061*	−0.073*	−0.021	−0.025	−0.036	−0.140**
	(0.041)	(0.044)	(0.085)	(0.035)	(0.039)	(0.079)	(0.026)	(0.027)	(0.055)
%institutional ownership	0.005	−0.020	−0.030	0.018	0.001	−0.000	−0.014	−0.026*	−0.038
	(0.016)	(0.020)	(0.051)	(0.014)	(0.016)	(0.041)	(0.012)	(0.015)	(0.031)
CEO age	0.008***	0.009***	0.011***	0.008***	0.009***	0.013***	0.000	0.000	−0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
CEO tenure	0.001	0.002	0.016***	0.001	0.002	0.012***	0.000	0.000	0.006***
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.000)	(0.000)	(0.002)
Intercept	−0.498***	−0.592***	−0.618***	−0.483***	−0.569***	−0.687***	−0.049	−0.067	0.034
	(0.082)	(0.089)	(0.227)	(0.077)	(0.084)	(0.196)	(0.048)	(0.052)	(0.165)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	No	Yes	No	No	Yes	No
Firm FE	No	No	Yes	No	No	Yes	No	No	Yes
F-statistic	10.23	11.30	13.71	8.45	9.55	13.99	3.59	3.48	2.38
Adjusted *R*-squared	4.49%	4.43%	8.04%	5.13%	5.06%	8.62%	2.58%	1.99%	3.18%
N	2,713	2,713	2,713	2,641	2,641	2,641	2,522	2,522	2,522

The table shows the linear probability estimation of a CEO turnover. The dependent variable takes the value of one in the fiscal year that the CEO departs the firm and zero otherwise. *Pre freeze -1* is an indicator variable that takes the value of one if the observation is from the fiscal year immediately prior to the pension freeze fiscal year and zero otherwise; *Excess returns* (*lag*) is the difference between daily firm raw stock returns and the CRSP value-weighted index cumulated over the current (previous) fiscal year; *Std (returns)* is the standard deviation of daily raw returns over the fiscal year; *Sales growth* is current year sales less prior-year sales

(Continues)

TABLE 2 | (Continued)

scaled by sales in the prior-year. *R&D* is the ratio of research and development expenditures scaled by total assets. *Market to book* is the book value of assets plus the market value of equity less the sum of the book value of equity and deferred assets scaled by the book value of total assets. *Leverage* is short- and long-term debt scaled by total assets. *Ln(Assets)* is the natural log of the firm's total assets. *CEO Chair* equals one if the firm's CEO is also the Chair of the board and zero otherwise. *Ln(board size)* is the natural log of the number of directors on the board. *%NE directors* is the fraction of nonexecutive directors on the board. *%Insider ownership* is the fraction of common stock owned by insiders. *% Institutional ownership* is the fraction of common stock owned by institutional investors; *CEO age* is the CEO's age. *CEO tenure* is the number of years that the current CEO served as a CEO. All variables are defined in more detail in Appendix I. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors (in parentheses) are robust and clustered at the firm level. ***, **, and * indicate levels of significance of 1%, 5%, and 10%, respectively.

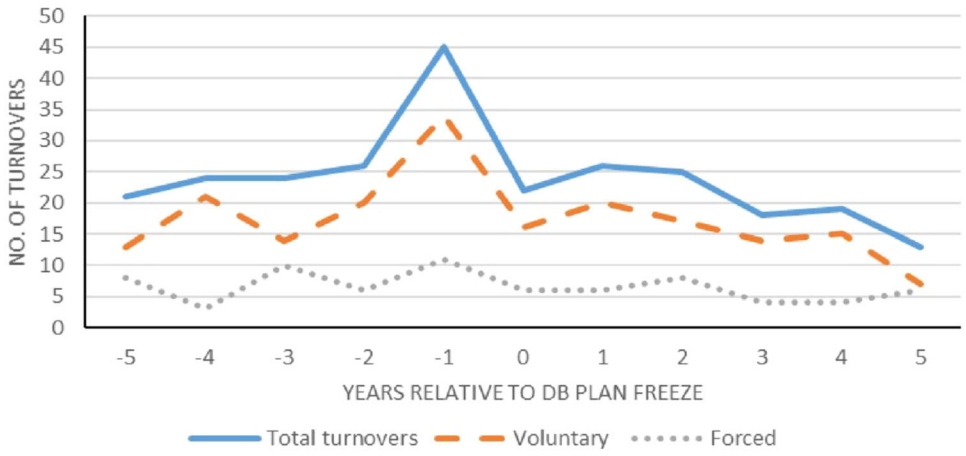

FIGURE 3 | Frequency of total (263), voluntary (191), and forced (72) CEO turnovers around pension freezes. The pension freeze year is year zero. [Color figure can be viewed at wileyonlinelibrary.com]

The coefficients on the control variables are consistent with prior literature. *Excess returns* and *Sales growth* are significantly negatively associated with forced turnovers, suggesting that poor performance is a significant predictor of involuntary departures, while the standard deviation of returns, *Std(returns)*, and *R&D* intensity are positively related to forced turnovers (e.g., Bushman et al. 2010). As expected, *CEO age* is the most significant predictor of voluntary turnovers. Further, similar to Sundaram and Yermack (2007), indicators of CEO power, such as *CEO chair* duality and insider ownership, are negatively related to voluntary turnovers (in the year and industry/year fixed-effects models), suggesting that powerful CEOs tend to have longer tenures.

To further investigate CEO turnover trends around pension freezes, we expanded our baseline analysis to include indicator variables for each year relative to the freeze, using the fifth year before the freeze (year −5), as the baseline.[12] We report graphically the estimated coefficients for the years around the freeze along with their confidence intervals in Figure 4. As depicted, the abnormal increase in total and voluntary CEO turnovers is observed only in the year immediately before the freeze, while turnovers in any other year around the freeze are not significantly different from the baseline group.

Overall, our multivariate analysis reinforces the univariate results. Across all models, we observe a statistically and economically significant increase in CEO turnovers just before the freeze, without notable changes in the post-freeze period. This increase is significant in voluntary but not in forced turnovers, aligning more with the timing hypothesis. In subsequent cross-sectional tests, we attempt to verify the timing explanation more explicitly.

5 | Moderators of the Timing of CEO Turnovers

5.1 | Planned Turnovers

The evidence so far suggests a higher incidence of CEO turnovers just before pension freezes, hinting at strategic board decisions to time freezes after a CEO's voluntary departure. Another potential explanation is that CEOs may anticipate or learn about the impending freeze and opt to leave their firms to avoid association with difficult and unpopular decisions, such as pension freezes, that negatively affect the broader workforce and often attract unwanted media attention, potentially harming their reputation in the managerial labor market.

If the observed results are caused by the board of directors planning the timing of the freeze, we expect a higher incidence of CEO turnovers when the CEO's departure is planned. In contrast, if the departing CEO's reputational concerns drive the results, the effect would be more pronounced for unplanned voluntary turnovers. To determine whether the higher CEO turnover rate before the freeze is due to board planning or CEOs' reputational concerns, we use two indicators that are highly likely to identify *planned* voluntary turnovers.

First, we assume that a turnover is planned when the CEO meets the pension plan's retirement conditions and has the right to draw down the total amount of their pension benefits without a penalty. Thus, we use an indicator variable that equals one if the departing CEO's age equals the pension plan's minimum retirement age and zero otherwise (*Pension start age*). Second, we assume that turnovers are planned retirements if the departing CEO's age

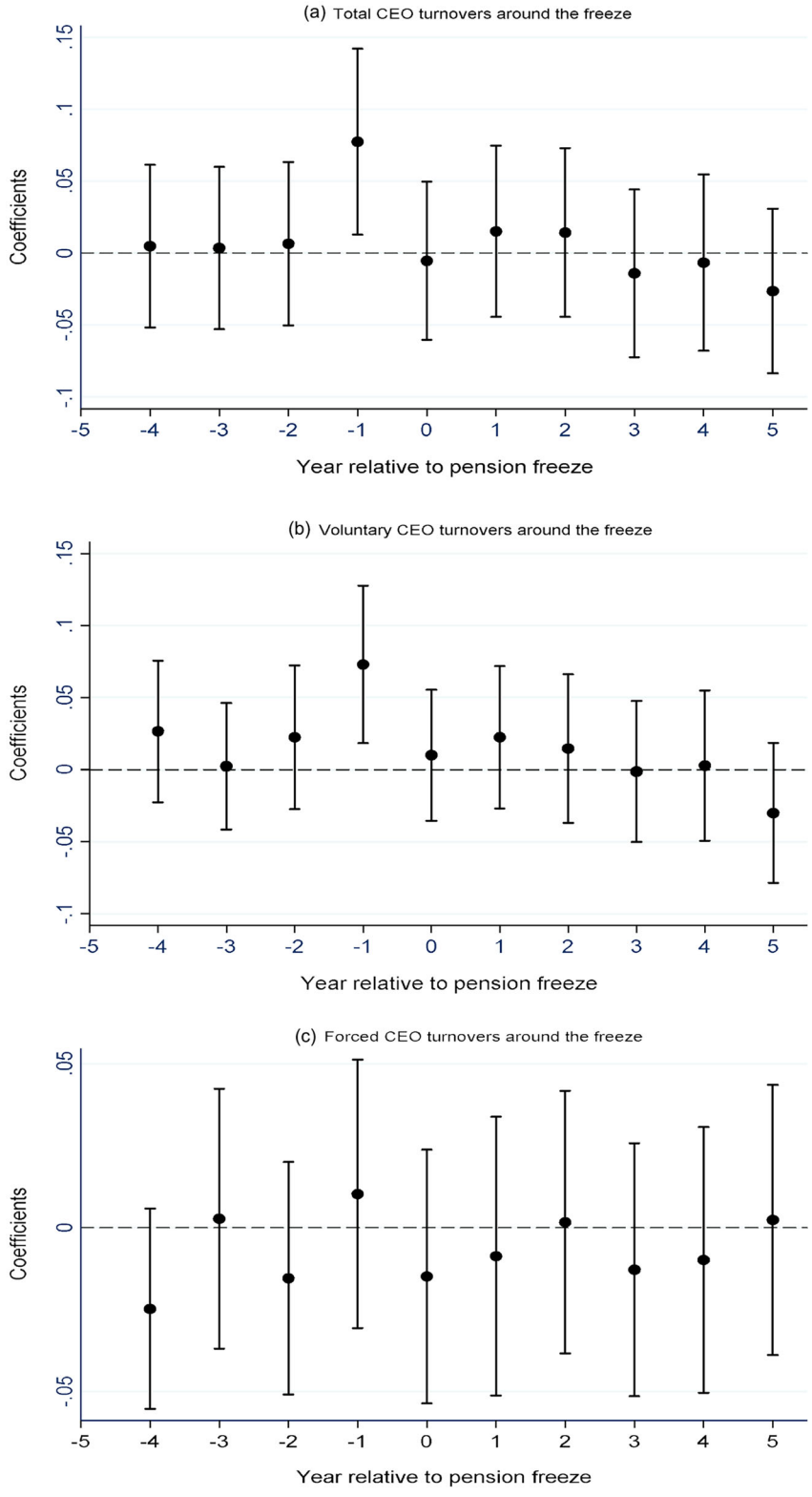

FIGURE 4 | (a) Total CEO turnovers around the freeze. (b) Voluntary CEO turnovers around the freeze. (c) Forced CEO turnovers around the freeze. The figure presents CEO turnovers around pension freezes. The dependent variable takes the value of one in the fiscal year that the CEO departs the firm and zero otherwise. The dependent variable in Figure 4a represents total turnovers, in Figure 4b voluntary turnovers, and in Figure 4c forced turnovers. The explanatory variables of interest are indicator variables that take the value of one when the observation is from the respective year before or after the pension freeze and zero otherwise. The coefficients are estimated using linear probability models with year fixed effects and all control variables used in Table 2. Standard errors are clustered at the firm level. The coefficients are depicted with 95% confidence intervals.
[Color figure can be viewed at wileyonlinelibrary.com]

equals or exceeds 65 (*Age65+*). We use age 65 to identify planned retirements because a majority of firms mandate the retirement age of their CEO at 65 (e.g., Jenter and Lewellen 2015), and it is also the most frequent retirement age specified in pension plans (Sundaram and Yermack 2007; Stefanescu et al. 2018).[13]

In panel A of Table 3, we examine whether the likelihood of voluntary CEO turnovers is higher or lower immediately before the freeze when turnovers are planned by adding interactive terms between the *Pre-freeze -1* indicator and the two indicators for planned turnovers separately and together. The dependent variable takes the value of one in the fiscal year of a voluntary CEO turnover and zero otherwise. The estimations include year fixed effects and clustered standard errors at the firm level.[14]

In all specifications, the coefficient estimates on *Pre-freeze -1* × *Pension start age* are positive and statistically significant at the 5% level or better. The probability of a CEO turnover in the year prior to the freeze is 35% higher (39% higher in column 1), on average, when the CEO has just met the pension plan's retirement condition and is entitled to the total amount of their pension benefits. Similarly, the estimated coefficient of *Pre freeze -1* × *Age 65+* is positive and statistically significant at the 5% level when included separately, see column (2), suggesting a turnover rate of 18.5% higher, on average, when the CEO's age is equal to or greater than 65. When both interactive terms are included in the model, i.e., column (3), only the *Pre freeze -1* × *Pension start age* is statistically significant, indicating that the pension start age rather than the CEO age is the primary input into the timing decision.

Overall, the results presented in panel A of Table 3 support the timing hypothesis, indicating a statistically significant increase in planned CEO turnovers just before pension freezes. This strongly suggests that the boards likely consider a CEO's scheduled departure date when determining the freeze's effective date, rendering the CEO's reputation concerns explanation highly unlikely. Notably, the minimum retirement age is a preestablished criterion, and the age of the CEO is a deterministic variable, which further reduces the likelihood of other confounding factors driving the relationship between CEO departures and the timing of pension freezes.

5.2 | Severity of Pension Freezes on CEO Retirement Benefits

Another possibility is that CEOs may depart due to strategic disagreements over pension risk management or the broader corporate direction rather than personal financial incentives. If this were the case, we would expect no systematic relationship between turnover patterns and the severity of the freeze's financial impact on the CEO. Instead, CEO departures would occur regardless of whether the freeze meaningfully affects their own retirement benefits.

However, if firms strategically time freezes to minimize their impact on the CEO's retirement benefits, we should observe fewer voluntary CEO departures before freezes with a lower financial impact and a higher incidence of turnover before freezes that could substantially reduce CEO retirement benefits. This pattern would suggest that financial incentives, rather than strategic disagreements, primarily drive turnover decisions.

Given that all CEOs in our sample participate in the frozen qualified DB plans, we assess the freeze's impact on CEO retirement benefits using three proxies. First, since CEOs at public companies receive the largest proportion of their retirement benefits in the form of SERPs (see, e.g., Sundaram and Yermack 2007), we expect the negative effect of the freeze to be more substantial when the SERP is also frozen (*SERP freeze*).[15] Second, the impact of the pension freeze is likely to be less severe when the pension plan is a cash balance plan, as these plans accumulate benefits in a very similar fashion to DC plans (*Cash balance plan*).[16] Finally, the adverse effect of the freeze is likely to be negatively related to the remaining years to retirement because shorter-tenured CEOs have more time until the retirement age to accumulate benefits in a DC plan and offset the accrual loss from a DB freeze (*Years to retirement*). The transition from a DB to a DC plan replaces a backloaded accrual structure—which disproportionately benefits older, more senior employees—with a uniform accrual rate that remains constant regardless of age or tenure. Research by VanDerhei (2006) and Rauh et al. (2020) supports this, indicating that employees in the mid-to-late stages of their careers suffer the most from freezes. These employees are often unable to recover the lost benefits, despite any increases to their 401(k) contributions.

The results are shown in panel B of Table 3. The probability of a voluntary CEO turnover prior to the freeze is 12.3% higher, on average, when the SERP is also frozen, as indicated by the positive coefficients on *Pre freeze -1* × *SERP freeze* in columns (1) and (4); is 11.5% lower, on average, when the pension plan is a cash balance plan, as shown by the negative coefficients on *Pre freeze -1* × *Cash balance plan* in columns (2) and (4); and it decreases by 0.7%, on average, for every additional year that the CEO is further from retirement as implied by the negative coefficients on *Pre freeze -1* × *Years to retirement* in columns (3) and (4).[17,18]

In summary, the results presented in Table 3 offer compelling evidence in favor of the timing hypothesis. Specifically, we observe a significant increase in CEO turnovers in the year prior to the freeze, particularly when the departure is planned and when the freeze could substantially impact the CEO's retirement benefits. These results suggest that boards strategically time freezes to minimize their impact on CEOs' retirement benefits.

6 | Additional Analyses

6.1 | Firms' Retention and Reputation Concerns, and CEOs' Negotiating Power

This section explores whether the timing of pension freezes is influenced by the board of directors' retention and reputation concerns and the power dynamics between CEOs and the board. If retention and reputation concerns are driving the results, we expect CEO turnovers before the freeze to be more pronounced when executives have better employment mobility and CEO replacement costs are higher. Furthermore, since pension freezes usually involve lengthy negotiations with affected parties, CEOs

TABLE 3 | Planned CEO turnovers and severity of pension freezes on CEO retirement benefits.

Panel A: Planned turnovers			
	1	**2**	**3**
Pre freeze -1	0.030	0.036*	0.022
	(0.019)	(0.020)	(0.019)
Pension start age	0.201***		0.186***
	(0.044)		(0.045)
Pre freeze -1 × Pension start age	0.393***		0.353***
	(0.118)		(0.130)
Age65+		0.095***	0.052*
		(0.031)	(0.030)
Pre freeze -1 × Age65+		0.185**	0.075
		(0.082)	(0.083)
Controls and Year FE	Yes	Yes	Yes
F-statistic	13.29	6.94	11.67
Adjusted *R*-squared	10.40%	6.68%	10.70%
N	2,641	2,641	2,641

Panel B: Severity of pension freezes				
	1	**2**	**3**	**4**
Pre freeze -1	−0.013	0.079***	0.109***	0.043
	(0.024)	(0.025)	(0.039)	(0.036)
SERP freeze	0.007			0.006
	(0.010)			(0.010)
Pre freeze -1 × SERP freeze	0.123***			0.129***
	(0.040)			(0.040)
Cash balance plan		−0.015		−0.008
		(0.015)		(0.014)
Pre freeze -1 × Cash balance plan		−0.115***		−0.127***
		(0.038)		(0.039)
Years to retirement			−0.006***	−0.007***
			(0.002)	(0.001)
Pre freeze -1 × Years to retirement			−0.007**	−0.006**
			(0.003)	(0.003)
Controls and year FE	Yes	Yes	Yes	Yes
F-statistic	8.10	8.04	9.21	8.68
Adjusted *R*-squared	5.52%	5.25%	5.50%	6.23%
N	2,641	2,641	2,641	2,641

The dependent variable takes the value of one in the fiscal year that the CEO voluntarily departs the firm and zero otherwise. *Pre freeze -1* is an indicator variable that takes the value of one if the observation is from the fiscal year immediately prior to the pension freeze fiscal year and zero otherwise. In panel A, *Pension start age* is an indicator variable that takes the value of one if the departing CEO's age is equal to the pension plan's minimum retirement age and zero otherwise. *Age65+* is an indicator variable that takes the value of one if the CEO's age is equal to or greater than 65 and zero otherwise. In panel B, *SERP freeze* is an indicator variable that takes the value of one if the SERP is also frozen and zero otherwise. *Cash balance plan* is an indicator variable that takes the value of one if the pension plan is a cash balance plan and zero otherwise. *Years to retirement* is the difference between the pension plan's minimum retirement age and the CEO's age. The model includes all control variables reported in Table 2 and are defined in Appendix I, for which results are not tabulated for brevity. All models include year fixed effects. Standard errors (in parentheses) are robust and clustered at the firm level. ***, **, and * indicate levels of significance of 1%, 5%, and 10%, respectively.

with greater negotiating power may leverage their influence to pressure the board to honor their pension contracts. Thus, we anticipate CEO turnovers before the freeze will be more pronounced when CEOs are more powerful.

We draw from prior research and use three different proxies to measure retention and reputation concerns. First, we posit that executives have better employment mobility in industries with more external CEO hiring (*Many outside CEO hiring*) (e.g., Cremers and Grinstein 2014). Second, drawing from Berry et al. (2006), we contend that CEO replacement costs are higher in diversified firms because managing a diversified firm is more challenging compared with a focused firm, leading to a smaller pool of capable individuals from which to choose a suitable CEO replacement (*Diversified*). Finally, we expect CEO replacement costs to be higher when the labor market is tight, i.e., in industries with a lower unemployment rate (*Unemployment rate*).[19]

To examine the managerial power hypothesis, we compare turnovers across CEOs with greater and less negotiating power. Following Stefanescu et al. (2018), we construct an equal-weighted power index, *CEO Power*, using four CEO power indicators defined relative to the same two-digit SIC industry and year mean (CEO–Chair duality, the size of the board of directors, the fraction of executive directors on the board, and the fraction of insider ownership). A CEO is defined as having greater negotiating power if the index is greater than or equal to two (the top quantile of our sample). For more details on the measurement of these variables, refer to Online Appendix Section 1.

In Table 4, the coefficients on the *Pre freeze -1* × *Many outside CEO hiring* interactions are positive and statistically significant at the 10% level or better (columns 1 and 5), suggesting that voluntary CEO turnover in the year preceding the freeze is approximately 8%–10% more likely when the firm operates in industries characterized by higher CEO mobility. Moreover, the *Pre freeze -1* × *Diversified* coefficients are also positive and statistically significant at the 10% level or better (columns 2 and 5), indicating a 14%–16% higher likelihood of voluntary CEO turnover in more complex and diversified firms. Finally, the *Pre freeze -1* × *Unemployment rate* interaction coefficients are negative and statistically significant at the 1% level (columns 3 and 5). The probability of a voluntary CEO turnover before the freeze is 2% lower on average for a percentage increase in the unemployment rate. These findings suggest that boards are more inclined to time the freeze when retention and reputation concerns are expected to be more pronounced and support the retention and reputation concerns argument.

The results in columns (4) and (5) of Table 4 show that the coefficients on the interactive term *Pre freeze -1* × *CEO power* are positive and statistically significant at the 5% level. This finding suggests that the likelihood of a voluntary CEO turnover before the freeze increases by 16% when CEOs possess greater negotiating power, supporting the managerial power hypothesis. Because CEO negotiating power often stems from both managerial talent and past performance, as well as managerial entrenchment, our latter result is open to two plausible interpretations. First, firms may strategically time pension freezes to retain a highly skilled and talented CEO until retirement. Second, a powerful and potentially entrenched CEO may hesitate to initiate changes before their retirement benefits become effective, prompting the board to implement the freeze shortly after their departure.

Empirically distinguishing between these explanations is challenging partly due to the latent nature of both managerial talent and rent-seeking ability, and partly because these factors are not necessarily mutually exclusive and tend to overlap. Nevertheless, the significant coefficients on the *Pre freeze -1* variable in columns (4) and (5) suggest the timing of the freeze extends to firms with less powerful CEOs and is not solely driven by dominant CEOs. To further explore the interplay between a firm's efficiency considerations and the managerial rent-seeking perspective, we performed additional tests and a qualitative analysis of online news and sources on departing CEOs (for more information, please refer to Appendix II). While we cannot conclusively rule out managerial entrenchment, the evidence suggests that strategic timing of pension freezes is likely also driven by a desire to retain key executive talent. In summary, the results of this section suggest that both retention/reputation concerns and managerial power are factors that the board considers in planning the timing of the freeze.[20]

6.2 | Alternative Strategies

Our empirical analysis suggests that firms time pension freezes to honor pension promises made to their CEOs. However, in cases where timing the freeze is deemed too costly, boards may opt for alternative strategies to compensate their CEOs for the reduction in anticipated future benefits (see, e.g., Stefanescu et al. 2018). One such strategy is for the board to elect not to freeze the executive's SERP while freezing the pension of rank-and-file employees. This would allow the CEO to continue receiving their promised retirement benefits while still reducing costs for the company.[21] Our results, as reported in section 5.2 (panel B of Table 3), indicate that the timing strategy is more likely in firms that freeze their SERPs, suggesting that these two strategies are substitutes.

A second strategy is for the board to adjust pensionable earnings or pension assumptions in the year before or in the year of the freeze to boost their CEO's pension benefits and offset the cost of the pension freeze (see, Stefanescu et al. 2018). If the board chooses to substitute the timing strategy with compensation adjustments, then we expect the incidence of CEO turnovers to be less likely in firms with an increase in pension benefits prior to the freeze. We empirically test this hypothesis and report the results in Online Appendix Section 2. Consistent with our expectations, the findings indicate that firms safeguard their CEOs' pensions by either timing the freeze or increasing their pension benefits before the freeze. Our results provide additional insights into the results obtained by Stefanescu et al. (2018) and enhance our understanding of the various strategies companies employ to safeguard their CEOs' pensions.

6.3 | Further Evidence From Other Executives and Rank-and-File Employees

This section expands our analysis to other top executives and rank-and-file employees. While firms may take steps to safe-

TABLE 4 | Firms' retention and reputation concerns and CEOs' negotiating power.

	1	2	3	4	5
Pre freeze -1	0.027	0.027	0.180***	0.041*	0.118**
	(0.026)	(0.027)	(0.050)	(0.022)	(0.050)
Many outside CEO hiring	0.021*				0.015
	(0.011)				(0.012)
Pre freeze -1 × Many outside CEO hiring	0.086*				0.099**
	(0.047)				(0.046)
Diversified		−0.015			−0.028
		(0.017)			(0.019)
Pre freeze -1 × Diversified		0.139*			0.163**
		(0.081)			(0.081)
Unemployment rate			0.006*		0.007*
			(0.003)		(0.004)
Pre freeze -1 × Unemployment rate			−0.021***		−0.029***
			(0.006)		(0.007)
CEO power				−0.032**	−0.033*
				(0.016)	(0.018)
Pre freeze -1 × CEO power				0.159**	0.167**
				(0.079)	(0.079)
Controls and year FE	Yes	Yes	Yes	Yes	Yes
F-statistic	10.90	10.00	10.33	10.05	8.77
Adjusted *R*-squared	5.67%	5.03%	5.16%	5.29%	6.65%
N	2,461	2,639	2,562	2,641	2,385

The dependent variable takes the value of one in the fiscal year that the CEO voluntarily departs the firm and zero otherwise. *Pre freeze -1* is an indicator variable that takes the value of one if the observation is from the fiscal year immediately prior to the pension freeze fiscal year and zero otherwise. *Many outside CEO hiring* is an indicator variable that equals to one if the percentage of outside-hired CEOs in the firm's industry during the past three years is above the sample median, and 0 otherwise. An outside-hired CEO is an individual who assumes the CEO position within one year of joining the firm. *Diversified* equals one minus the firm's segment Herfindahl index, which is calculated by dividing the sum of the square of segment sales by the square of firm sales. *Unemployment rate* is the industry unemployment rate (2-digit NAICS by year) obtained from the U.S. Census Bureau. *CEO power* equals one if the CEO power index is in the top quantile of our sample, zero otherwise. The model includes all control variables reported in Table 2 and defined in Appendix I, for which results are not tabulated for brevity. All models include year fixed effects. Standard errors (in parentheses) are robust and clustered at the firm level. ***, **, * indicate levels of significance of 1%, 5%, and 10%, respectively.

guard their CEOs' retirement benefits, they are less likely to do so for other employees, who usually have a lower impact on a firm's productivity and profitability at the margin and weaker negotiating power. For example, Rauh et al. (2020) found that DB pension plan freezes result in significant long-term payroll savings for firms, which may suggest that firms are reneging on their implicit pension promises to other employees. If firms do indeed renege on their pension promises to other employees, then, under the implicit contract theory, we expect a significant increase in employee mobility in the post-freeze period.

To examine top executives and rank-and-file employee mobility around the freeze, we use a similar empirical strategy as in section 4. We collect information on top executive turnovers on our sample firms covered by the Standard & Poor's Execucomp database from 1996 to 2018 (194 firms). Our dependent variable takes the value of one if a top executive other than the CEO departs the firm during the fiscal year and zero otherwise. For rank-and-file employees, we replace the dependent variable with the total number of separated and retired employees scaled by the total number of employees covered by the pension plan during the fiscal year. We extract this information for our sample firms between 1999 and 2018 from Form 5500 (226 firms).

Our primary explanatory variables are indicator variables for each year relative to the freeze year, leaving out year −5, as the baseline group. We use the same set of control variables as before. In addition, in the top executive model, we include the top executive's age and an indicator variable of whether the top executive is a director. In the rank-and-file model, we include the natural logarithm of the total number of employees participating in the pension plan.

In Figure 5, we report graphically the estimated coefficients corresponding to the years relative to the freeze and their confidence intervals. We observe a significant increase in top executive turnovers in the year immediately before the freeze,

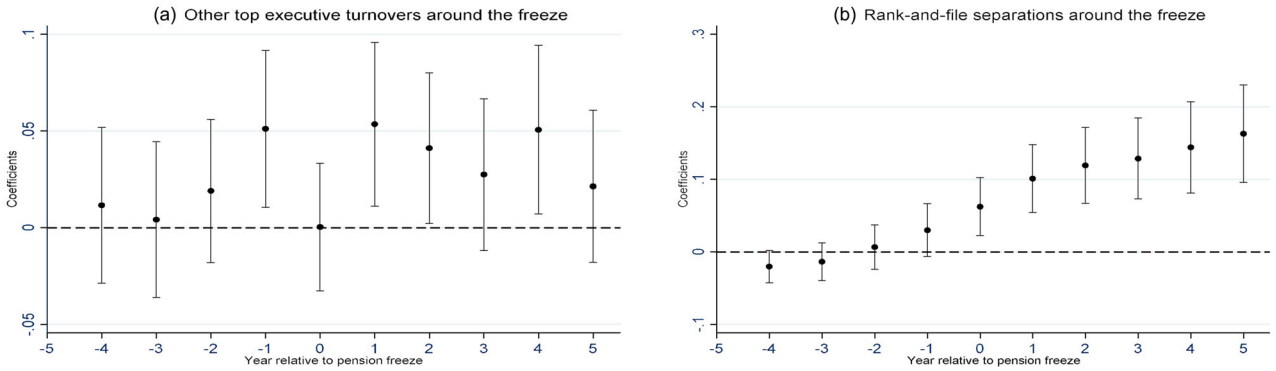

FIGURE 5 | (a) Other top executive turnovers around the freeze. (b) Rank-and-file separations around the freeze. The figure presents the top executive turnovers and rank-and-file employee separations around pension freezes. The dependent variable in Figure 5a takes the value of one in the fiscal year that any top executive other than the CEO departs the firm and zero otherwise. The dependent variable in Figure 5b is the number of retired or separated employees scaled by the total number of employees participating in the qualified pension plan. The explanatory variables of interest are indicator variables that take the value of one when the observation is from the respective year before or after the pension freeze and zero otherwise. The coefficients are estimated using linear probability models with year fixed effects and all control variables used in Table 2. In addition, the regression in Figure 5a includes the age of the top executive and an indicator variable that takes the value of one if the executive is a director and zero otherwise. The regression in Figure 5b includes the logarithm of the total number of employees participating in the qualified pension plan. Standard errors are clustered at the firm level. The coefficients are depicted with 95% confidence intervals.
[Color figure can be viewed at wileyonlinelibrary.com]

consistent with the timing hypothesis (Figure 5a). This finding suggests that the board of directors' efforts to honor the pension promises extend beyond just the CEO to other top executives. Additionally, we observe a significant increase in top executive turnovers in the years following the freeze, supporting the pension incentives hypothesis. This finding indicates that pension freezes significantly impact top management mobility in the post-freeze period. Moreover, the analysis of rank-and-file employees, depicted in Figure 5b, reveals a significant increase in rank-and-file employee separations starting in the year of the freeze. Hence, pension plan freezes accelerate retirements and separations of rank-and-file employees in the post-freeze period.[22,23]

Our results in Figure 5 support the implicit contract theory. We observe a significant increase in employee mobility in the years following the freeze, particularly among rank-and-file employees and, to a lesser extent, among top executives other than the CEO. This observation suggests that employee turnovers increase in cases where firms are reneging on their future pension promises. These findings provide additional evidence that retention concerns play a vital role in the timing of pension freezes, especially concerning top managerial talent retention.

7 | Robustness Tests

We performed several additional tests to validate our main result. To mitigate potential endogeneity and functional form misspecification concerns (e.g., Shipman et al. 2017), we used a propensity score matching (PSM) approach to identify firms that are similar on observables to DB freezing firms but do not freeze their pension plan.[24] In addition to the PSM approach, we employed the entropy balancing technique to address the potential covariate imbalance between freezing and non-DB freezing firms. The entropy balancing technique allows us to maintain the whole sample and ensures a balance in the covariates between the treatment and control groups by reweighting the observations (Hainmueller 2012).

Table 5 presents the results. As shown, the coefficients on *Pre freeze -1* are positive and statistically significant at the 5% level or better in the models for total and voluntary turnovers but not for forced turnovers. Overall, the PSM and entropy balancing results confirm our findings under the linear probability model specifications, showing that boards time the freeze after CEO departures.[25]

Further, we performed several sensitivity tests to ensure the robustness of the results. Specifically, (i) we estimated Equation (1) as a probit or a logit model; (ii) we included all firms with pension plans and available data as the baseline group; (iii) we performed the analysis on a balanced panel of firms; (iv) we used alternative measurements for excess returns, i.e., market-adjusted returns based on either the CRSP equally weighted index or S&P 500 index, or industry-adjusted returns (two-digit SIC); (v) we used alternative classification schemes to classify our turnover sample into voluntary and forced (e.g., Peters and Wagner 2014; Jenter and Kanaan 2015; Gentry et al. 2021); (vi) we used year and industry, or year and firm fixed effects in all tests; (vii) we included several additional control variables that could confound the results, i.e., accounting performance, firm age, number of segments, several measures of distress (Campbell et al. 2008's measure of distance to default, Altman's Z-score, and Zmijewski's Z-score), pension plan funding ratio, underfund indicator, and relative pension size.

Another potential explanation for our findings is that the newly appointed CEO might initiate and freeze the pension plan upon appointment. To explore this explanation, we investigate if the results vary depending on whether the new CEO is an insider or an outsider. Outsider CEOs typically make more firm-level changes after taking over (Denis and Denis 1995; Huson et al.

TABLE 5 | Matching approach.

Panel A: Propensity score matching									
	1			**2**			**3**		
	Total turnovers			**Voluntary turnovers**			**Forced turnovers**		
Pre freeze -1	0.070***	0.069***	0.057**	0.067***	0.066***	0.058**	0.008	0.008	0.005
	(0.026)	(0.026)	(0.026)	(0.025)	(0.025)	(0.025)	(0.013)	(0.013)	(0.014)
Excess returns	−0.031**	−0.033**	−0.036**	−0.010	−0.011	−0.016	−0.025***	−0.025***	−0.022**
	(0.013)	(0.013)	(0.014)	(0.012)	(0.012)	(0.014)	(0.008)	(0.008)	(0.009)
Excess returns lag	−0.051***	−0.049***	−0.041***	−0.018	−0.015	−0.019	−0.038***	−0.038***	−0.026***
	(0.013)	(0.014)	(0.015)	(0.012)	(0.012)	(0.014)	(0.007)	(0.008)	(0.008)
Other controls and year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	No	Yes	No	No	Yes	No
Firm FE	No	No	Yes	No	No	Yes	No	No	Yes
F-statistic	10.45	11.15	15.98	8.99	10.07	15.81	3.60	3.30	2.61
Adjusted *R*-squared	3.54%	4.27%	8.44%	3.70%	4.41%	8.23%	2.30%	2.46%	4.99%
N	3,923	3,923	3,923	3,841	3,841	3,841	3,643	3,643	3,643
Panel B: Entropy balancing									
	1			**2**			**3**		
	Total turnovers			**Voluntary turnovers**			**Forced turnovers**		
Pre freeze -1	0.071***	0.073***	0.068***	0.056***	0.058***	0.053***	0.014	0.015	0.015
	(0.023)	(0.023)	(0.022)	(0.021)	(0.021)	(0.020)	(0.013)	(0.013)	(0.013)
Excess returns	−0.048***	−0.049***	−0.040***	−0.008	−0.009	−0.010	−0.040***	−0.039***	−0.030***
	(0.013)	(0.012)	(0.013)	(0.010)	(0.010)	(0.010)	(0.009)	(0.009)	(0.008)
Excess returns lag	−0.039***	−0.036***	−0.025**	−0.006	−0.004	−0.002	−0.033***	−0.033***	−0.023***
	(0.011)	(0.011)	(0.011)	(0.009)	(0.009)	(0.009)	(0.007)	(0.007)	(0.008)
Other controls and year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	No	Yes	No	No	Yes	No
Firm FE	No	No	Yes	No	No	Yes	No	No	Yes
F-statistic	13.12	18.23	24.75	11.95	15.96	25.20	6.74	7.42	4.35
Adjusted *R*-squared	4.29%	5.49%	8.98%	4.81%	5.85%	9.18%	2.83%	3.63%	7.54%
N	13,992	13,992	13,896	13,992	13,992	13,896	13,992	13,992	13,896

Panel A reports the results of a PSM model for firms that choose to freeze pensions versus firms that do not. Matching is within the same industry (two-digit SIC code) and in the same fiscal year. Each pension freeze firm is matched to one control firm, without replacement, with the closest propensity score within a caliper width of 0.03. More details on the estimation of the propensity score are provided in Online Appendix Section 3. Panel B reports the results of entropy balancing. The dependent variable takes the value of one in the fiscal year that the CEO departs the firm and zero otherwise. *Pre freeze -1* is an indicator variable that takes the value of one if the observation is from the fiscal year immediately prior to the pension freeze fiscal year and zero otherwise; *Excess returns* (*lag*) is the difference between daily firm raw stock returns and the CRSP value-weighted index cumulated over the current (previous) fiscal year. The models include all control variables reported in Table 2 and defined in Appendix I, for which results are not tabulated for brevity. Standard errors (in parentheses) are robust and clustered at the pair match level. ***, **, and * indicate levels of significance of 1%, 5%, and 10%, respectively.

2004), so we expected more voluntary turnovers in the year prior to the freeze if the new CEO is an outsider. However, our analysis (untabulated) found no significant difference in voluntary turnovers before the freeze based on the new CEO's origin.

Finally, given that the purpose of the paper is to examine employee mobility around pension freezes, we used turnovers as the main choice variable influenced by the freeze decision. This modeling choice allows us to analyze CEO and employee mobility both before and after the freeze, which is central to our study. However, our approach assumes that the freeze decision is exogenous (i.e., a business decision made by the board of directors) and that employees react to this decision. While this assumption is reasonable for rank-and-file employees, our observation that firms often time pension freezes to follow planned CEO departures suggests that the two decisions are likely interdependent or that the timing of the freeze is the primary choice variable.

To address this modeling concern, we performed two additional tests. First, we employ three-stage least squares to simultaneously estimate the pension freeze decision and the voluntary turnover decision, which allows us to control for simultaneity and cross-equation correlations in disturbances. The results (untabulated) are consistent with our findings, showing that voluntary turnovers are more likely in the year prior to the freeze, while pension freezes are more likely after voluntary but not forced turnovers. Second, we use a linear probability model with firm fixed effects to directly model the timing of the freeze as a function of turnovers. Again, the results generally support our main findings. Specifically, we find that the timing of the freeze is driven by voluntary but not forced turnovers, and the effect is more pronounced for planned turnovers, when the SERP is also frozen, and when the pension is not a cash balance plan. As governance characteristics do not vary substantially across time for a given firm, CEO power is not a significant predictor of when a freeze will occur.

8 | Conclusions

Traditionally, firms offered executive DB pension plans as a human resource tool to attract and retain top talent. In light of the academic debate on why employer-provided pensions are associated with longer employee job tenures, this paper utilizes the recent shift from DB plans to DC plans to examine the effect of pension plan freezes on CEO turnovers around the freeze.

We document a statistically and economically significant increase in CEO turnovers in the year immediately prior to the freeze, with no change in turnovers in the post-freeze period. Notably, this increase is observed in voluntary but not forced turnovers and is more pronounced in planned turnovers and freezes that could substantially reduce CEO benefits. Our findings indicate that the timing of the freeze is likely to be strategic, with firms protecting the retirement benefits of CEOs while reducing the pension benefits of other employees.

Firms' efforts to honor the pension promises to their CEOs are consistent with the timing hypothesis under the implicit contracts theory, which suggests that firms prioritize retaining their CEOs and avoiding reputational and organizational disruption costs over cost-cutting measures that could negatively impact their top talent. Supporting these arguments, we also observe a significant increase in employee mobility in the years following the pension freeze, particularly among rank-and-file employees. This increase in mobility underscores the importance of retention concerns for firms when making decisions about pension freezes, particularly when it comes to retaining top managerial talent. In closing, our findings uncover the timing of the freeze as a mechanism that firms use to nullify the effect of the freeze on their CEOs and inform the academic debate on the relation between DB plans and employee mobility.

Acknowledgments

We have benefited from comments and suggestions by Catherine Shakespeare, Annette Beatty, Mohan Venkatachalam, Scott Liao, Aaron Yoon, Argyro Panaretou, Igor Kadach, Dion Bongaerts, Philip Joos, Marcin Kacperczyk, Andreas Milidonis, Irene Karamanou, Joshua Ronen, Nikos Vafeas, Roni Michaeli, Andreas Procopiou, Chris Florakis, seminar participants at a University of Cyprus workshop, the 2023 Financial Management and Accounting Research Conference, and the 42nd European Accounting Association annual congress. All remaining errors are our own. The University of Cyprus and the University of Liverpool provided funding for this project.

Endnotes

[1] See the articles in *Morningstar*, March 22, 2023, "Could Defined-Benefit Pension Plans Make a Comeback?"; and *Forbes*, December 18, 2023, "Will 2024 Be the Year of the Pension Comeback?". For a discussion on CEO turnover during 2023, see the article titled "CEOs Quit in Record Numbers in 2023. Here Are 3 Solutions" in *Forbes*, February 26, 2024. For expectations of higher CEO turnover rates in 2024, see "There Will Be Record CEO Turnover This Year, Says Top PwC Boss" in *Business Insider*, January 18, 2024. Finally, regarding the increasing number of employees considering leaving their jobs, see the *CNBC* article dated May 8, 2024, titled "Nearly 50% of People Are Considering Leaving Their Jobs in 2024—More Than During the 'Great Resignation.'"

[2] Pension plans' importance in attracting and retaining top executives is emphasized in firms' proxy statements. These statements highlight pensions' role in promoting stability and continuity in leadership within the competitive managerial labor market. For instance, Avery Dennison articulates this perspective clearly, stating: "The Company believes that it is in the stockholders' best interest to retain key executives in critical roles to provide continuity of leadership and to focus them on the Company's long-term success."

[3] Analogously, Anantharaman et al. (2022) show that firms are highly concerned with their reputation and step up their CSR engagement and CSR disclosures in the post-freeze period.

[4] See, for example, articles in *Forbes*, May 12, 2020, "AT&T's CEO Steps Down With a $64 Million Gold-Plated Retirement Plan"; in *Fortune*, January 5, 2017, "Rex Tillerson Would Head to D.C. With $180 Million Retirement Package From Exxon"; and in *Bloomberg*, May 28, 2002, "GE's Welch, Other Executives Enjoy Retirement Perks," respectively.

[5] Further, the stark contrast between executive pensions, such as SERPs, and those of rank-and-file employees often draws media and other stakeholder attention, highlighting perceptions of "excessive" top executive compensation practices. See, for example, articles by *The Guardian*, July 2, 2021, "FTSE 100 Firms Face Growing Revolt on Executive Pay Amid Covid Crisis"; *CNBC*, October 28, 2015, "Workers struggle to Save While CEOs Set Aside Millions"; *Forbes*, June 26, 2013, "The World's Most Outrageous Pension Deal?"; *The New York Times*, September 11, 2012, "For Top Executives, Richer Retirement Plans"; *WSJ*, August 4, 2008, "Companies Tap Pension Plans to Fund Executive Benefits"; *WSJ*, June 23, 2006 "As Workers' Pensions Wither, Those for Executives Flourish"; *WSJ*, April 24, 2003 "Executives Get Pension Security While Plans for Workers Falter."

[6] Following Anantharaman et al. (2022), we flag firm-years for which the service cost goes from a nonzero value to zero, and firm-years for which the ratio of service cost to pension liabilities (PBO) declines by more than two-thirds of its prior-year value.

[7] Since 2002, there has been a question (check box) on Form 5500 that asks whether the pension plan is hard frozen. Once the plan is reported frozen, all subsequent filings of the pension plan should be reported as frozen. We downloaded data from Form 5500 for all pension plans reported as frozen in the years 2002 to 2015. We linked the plans to Compustat using the employee identification number as the primary identifier.

[8] The use of Form 5500 to verify pension freezes presents several challenges. Rauh (2006) and Rauh et al. (2020), linking Form 5500, highlight the difficulty in accurately linking Form 5500 with firm-level financials in Compustat. Additionally, Form 5500 does not specify

whether CEOs are directly impacted by freezes. In contrast, 10-K reports and proxy statements are generally more reliable for identifying pension freezes, given the frequent inaccuracies found in Form 5500 data—a concern also acknowledged by the IRS in their evaluation of these filings (see https://www.irs.gov/retirement-plans/updating-frozen-defined-benefit-plans-for-current-law-and-other-compliance-issues).

[9] The year 2018 is the most recent year for which data on boards of directors are available in the MSCI GMI Ratings database. However, our findings remain qualitatively similar even when excluding board structure variables and extending our sample period up to the year 2020.

[10] In addition, linear probability models with fixed effects outperform logistic regressions in rare event data (Timoneda 2021). However, we note the results in all specifications are qualitatively similar with a probit or a logit model.

[11] The marginal effects of *Pre freeze -1* in the voluntary turnover analysis using logit and probit models with year fixed effects are 6.2% and 5.9%, respectively. This consistency across different estimation models reinforces the robustness of our findings.

[12] We believe that year −5 is an appropriate baseline group because it is the year further from the pension freeze and the year least likely to be affected by the freeze decision. Our results, however, are robust when any other year around the freeze is used as the baseline group.

[13] In our sample, the minimum retirement age is at 65 in 72% of the cases and is comparable with the 76% reported in Sundaram and Yermack (2007). We obtain similar results using 60 or 62 as the retirement age.

[14] Results are qualitatively similar with total turnovers and with year and industry, or year and firm fixed effects. For economy in presentation, although we include all control variables in this and subsequent models, we do not tabulate coefficients and standard errors for the control variables. Similar to Table 2, all such variables are included in the models with minimal variation in the results.

[15] Out of 264 DB plan freezes with available data, 222 firms offer SERPs to their CEOs. Through a careful proxy statement examination, we ascertain that 162 (73%) of these firms followed the qualified DB plan freeze with a SERP freeze. This figure is similar to the 75% reported by Towers Watson (2014).

[16] From the total of 264 DB plan freezes, 36 or 13.6% are cash balance plans.

[17] Given the critical role of SERPs in executive compensation, we further tested whether personal financial incentives influence turnover decisions and the timing of pension freezes. We divided our sample into two subgroups: firms that froze SERPs and those that did not. Our analysis reveals that the coefficient on *Pre freeze-1* is statistically significant only in the subgroup where SERPs were also frozen, suggesting that CEOs are more likely to depart in the year immediately preceding a pension freeze when their SERPs are affected.

[18] As an additional robustness test, we examine 14 pension freezes in which the CEO does not participate in the affected plan, primarily involving subsidiary or selective freezes that apply to a subset of employees. Unlike our main sample, these cases show no increase in CEO turnover before the freeze, supporting our interpretation that firms time freezes around CEO departures when the impact on retirement benefits is substantial.

[19] The industry unemployment rate is calculated for all jobs within an industry, including rank-and-file employees. We acknowledge that this rate might be an imperfect indicator of the CEOs' labor market tightness, though we anticipate a strong correlation. As an alternative, we use unemployment rates for "Management, professional, and related occupations," which are only at the annual level. This alternative proxy yields qualitatively similar results. Moreover, the findings remain qualitatively similar when using the state-level unemployment rate or evaluating labor tightness using the state-level or industry-level ratio of unemployed individuals per job opening.

[20] While Stefanescu et al. (2018, p. 153) acknowledge both managerial rent-seeking and efficient contracting explanations for safeguarding top executive benefits, they do not explore the efficiency viewpoint further.

[21] This strategy, however, might draw negative media scrutiny for unfair compensation practices (see, e.g., Grantham 2009) and could jeopardize rank-and-file employees' pay and other concessions. A case in point is Delta Airlines' 2002 attempt to safeguard executive pensions from bankruptcy, which hindered negotiations with its pilot union once it became public in 2003 (*PLANSSPONSOR*, August 12, 2003 "Delta Deep-Sixes Executive Pension Plan Payments"). This negative media attention might partly explain why most firms freezing their DB plans also choose to freeze their SERPs, despite SERPs posing minimal liquidity risks to the sponsoring firms.

[22] Although it is anticipated that the percentage of retirements will increase as new individuals are no longer joining the pension plan after the freeze, our analysis reveals a notable increase in retirements and separations during and just after the year of the freeze. This observation might indicate that the pension freeze contributes to accelerating retirements and separations, but we remain cautious about drawing firm conclusions from this test.

[23] To quantify the effect of the pension freeze on employee mobility in the post-freeze period, we use a single post-freeze indicator that takes the value of one if the observation is from one to five years after the freeze and zero otherwise (*Post freeze*). We then estimate the model for total CEO turnovers, top executive turnovers, and rank-and-file separations. This analysis, detailed in Online Appendix Section 3, corroborates our earlier findings.

[24] More details on the estimation of the propensity score, including the first stage results and the imbalance metrics, are provided in Online Appendix Section 4.

[25] As a further robustness check, we conducted a PSM analysis incorporating the funding ratio, relative pension size, firm size, and an underfunded indicator variable. Matching was performed within the same fiscal year and two-digit SIC code. The results of this approach remain consistent with our primary analysis.

[26] The long-standing academic debate between managerial entrenchment and optimal contracting theories on executive compensation has proven to be challenging to distinguish empirically. For example, the variables used in this study to proxy for CEO negotiating power can indicate either an entrenched CEO or a highly successful and valuable CEO, especially if the board composition is endogenously chosen to mitigate agency issues (e.g., Hermalin and Weisbach 1998). Therefore, it is beyond the scope of this study to definitively rule in favor of one explanation over the other.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.

Appendix I: Variable definitions

Dependent variables	Variable description
CEO turnover	Indicator variable that takes the value of one in the fiscal year that the CEO departs the firm and zero otherwise.
CEO turnover forced	Indicator variable that takes the value of one in the fiscal year that the CEO is forced out of the firm and zero otherwise.
	We separate the cases of CEO turnover into forced and voluntary, based on information in the departure announcements and press reports as well as proxy statements, using the Parrino (1997) algorithm. More precisely, we classify turnovers as forced if an article in the business press indicates that the CEO was fired, forced out, or left following a policy disagreement or some other equivalent. For the remaining announcements, we also classify turnovers as forced if the CEO was under 60 and the article does not report the reason for the departure as death or poor health or the acceptance of another position elsewhere, or if the CEO was retiring but did not announce the retirement at least six months before the departure. Finally, all the announcements in the previous step are investigated and classified as voluntary if the CEO remained or became board chair after the turnover.
CEO turnover voluntary	Indicator variable that takes the value of one in the fiscal year that the CEO departs the firm voluntarily and zero otherwise.
Top executive turnover	Indicator variable that takes the value of one in the fiscal year a top executive other than the CEO departs the firm and zero otherwise.
Rank-and-file separations	The total number of separated and retired employees scaled by the total number of employees covered by the pension plan during the fiscal year.
Independent variables	
Pre freeze -1	Indicator variable that takes the value of one if the observation is from the fiscal year immediately prior to the pension freeze fiscal year and zero otherwise.
Control variables	
Excess returns	Difference between daily firm raw stock returns and the CRSP value-weighted index cumulated over the fiscal year.
Std(returns)	Standard deviation of daily raw returns over the fiscal year.
Sales growth	Sales growth rate, measured as current-year sales less prior-year sales scaled by prior sales.
R&D	Ratio of research and development expenditures scaled by total assets.
Market to Book	Market-to-book value of assets, measured as the book value of assets plus the market value of equity less the sum of the book value of equity and deferred assets scaled by the book value of total assets.
Leverage	Firm's leverage, measured as short- and long-term debt scaled by total assets.
Ln (assets)	Firm size, measured as the natural logarithm of total assets.
CEO Chair	Indicator variable that equals one if the CEO is also the Chair of the board and zero otherwise.
Board size	Board size, measured as the log of the total number of directors on the board.
%NE Directors	Fraction of nonexecutive directors on the board.
% insiders' ownership	Fraction of common stock owned by insiders.
%institutional ownership	Fraction of common stock owned by institutional investors.
CEO age	Age of the CEO.
CEO tenure	Number of years that the current CEO served as a CEO.

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Additional variables	
Pension start age	Indicator variable that equals one if the departing CEO's age is equal to the pension plan's minimum retirement age and zero otherwise. The minimum retirement age is the earliest age that an executive can leave the company and obtain 100% of the earned pension benefit. Most firms pay a reduced amount in the event of an early retirement. The minimum retirement age is collected from 10-k reports and proxy statements. In all firms with an available SERP, we use the SERP's minimum retirement age. In the few cases where this information is unavailable, we set the minimum retirement age at 65.
Age65+	Indicator variable that equals one if the departing CEO's age is equal to or greater than 65 and zero otherwise.
SERP freeze	Indicator variable that equals one if the CEO's SERP is also frozen and zero otherwise.
Cash balance plan	Indicator variable that takes the value of one if the pension plan is a cash balance plan and zero otherwise.
Years to retirement	Is the difference between the pension plan's minimum retirement age and the CEO's age.
Many outside CEO hiring	Indicator variable that equals one if the percentage of outside-hired CEOs in the firm's industry during the past three years is above the sample median and zero otherwise. An outside-hired CEO is defined as an individual who assumes the CEO position within one year of joining the firm.
Diversified	Diversified equals one minus the firm's segment Herfindahl index, which is calculated by summing the square of segment sales and dividing by the square of firm sales.
Unemployment rate	The industry (two-digit NAICS) unemployment rate by year.
CEO power	Indicator variable that equals one if the power index is in the top quantile of our sample and zero otherwise. This index is calculated as the equal-weighted index of four power indicators defined relative to the two-digit SIC industry and year mean (CEO and chair duality; board size; fraction of executive directors; fraction of insider ownership).

Appendix II

Indicative cases of firms timing the pension freeze

Our indicator variable, *CEO power*, which reflects CEO negotiating power, could indicate either managerial talent and past performance, or managerial entrenchment. To further explore the interplay between a firm's efficiency considerations and the managerial rent-seeking perspective, we performed additional tests.

First, we split the sample into two subsamples based on CEO power (untabulated), and results show that coefficients on *Pre freeze -1* are statistically significant for both the high and low CEO power subsamples. Second, we examine firm performance, as measured by stock returns and ROA, in the three years leading to the freeze. If managerial entrenchment drives the timing of the freeze, we expect poorer performance in those firms compared with those not engaging in strategic timing. Our results (untabulated) show no such performance gaps. Finally, we conducted a qualitative analysis of online news and sources on departing CEOs (for more information, please refer to Table A1). In our analysis, we find no cases that are indicative of CEO entrenchment. On the contrary, we uncover cases where the departing or retiring CEOs were highly skilled individuals. Thus, while we cannot conclusively rule out managerial entrenchment, the evidence presented suggests that the strategic timing of pension freezes is likely also driven by a desire to retain key executive talent.[26]

TABLE A1 | This Table provides a qualitative analysis of online news and reports regarding departing CEOs.

	CEO Name	Company	Year Left	Freeze Year
1	**William S. Ayer**	**ALASKA AIR GROUP INC**	**2012**	**2013**
	Summary: During William S. Ayer's tenure as CEO of Alaska Air Group Inc, the company had the industry's best on-time performance and grew more than 300% more than 20 times the S&P index. Excerpts: "Alaska Airlines, in fact, had ***the industry's best on-time performance*** for the third consecutive year in 2012, with 87 percent of flights landing on time." "Today, Alaska Airlines has ***the lowest costs*** among the major carriers. It has recalled furloughed pilots and is hiring new ones. Its returns on invested capital, a formula meant to reflect an airline's true financial health, were 13 percent in 2012, a rarity in an industry that historically struggles to turn profits." "The company's ***share price has risen more than 300 percent since 2008***, more than 20 times what the Standard & Poor's 500-stock index has returned in the same period. Its $3.7 billion market capitalization—more than twice that of JetBlue Airways, which has similar revenue—has also shielded it from the consolidation trend, deterring competitors who might be tempted to pursue a hostile takeover." Source: *The New York Times*, March 2, 2013, "Alaska Airlines, Flying Above an Industry's Troubles," https://www.nytimes.com/2013/03/03/business/alaska-airlines-flying-above-an-industrys-troubles.html			

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TABLE A1 | (Continued)

2	**Robert Herman Benmosche**	**AMERICAN INTERNATIONAL GROUP (AIG)**	**2014**	**2015**

Summary: Robert H. Benmosche, who came out of retirement to lead AIG, played a pivotal role in the historic company's historic financial revival, effectively restoring its health following a massive $182 billion taxpayer bailout.
Excerpts: "Robert H. Benmosche, a former MetLife chairman who ***engineered one of the greatest financial turnarounds in American corporate history*** when he took charge of the failed industry giant American International Group and restored it to health after it had been rescued by American taxpayers in a $182 billion bailout."
"The search committee was calling Mr. Benmosche, the former chairman and chief executive of another insurance giant, Metropolitan Life, to entreat him to ***come out of retirement and take the helm of A.I.G***."
Source: *The New York Times*, Feb. 27, 2015, "Robert Benmosche, Rescuer of A.I.G. After Bailout, Dies at 70,"
https://www.nytimes.com/2015/02/28/business/dealbook/robert-benmosche-ex-metlife-chief-who-rescued-aig-dies-at-70.html

3	**Lawrence A. Weinbach**	**UNISYS CORP**	**2005**	**2006**

Summary: When Weinbach took over, Unisys was struggling with $2.3 billion in debt, declining sales of its mainframe line, and disaffected customers. He transformed Unisys, ceasing PC production and cleaning up its balance sheet. Before Unisys, Weinbach had a successful tenure at Andersen Worldwide as managing partner and chief executive.
Excerpts: "Unisys Corp. was in a near shambles when Lawrence A. Weinbach took over in 1997."
"Under Lawrence A. Weinbach, Unisys Corp. ***cleaned up its balance sheet***, stopped making personal computers and became predominantly a provider of information technology services."
"Although the moves indicated that Unisys expected McGrath would succeed Weinbach, the company didn't make that official until October.
The ***transition should go smoothly*** because McGrath and Weinbach have been on the same page for a while, said Anna Danilenko."
Sources: Route Fifty, October 8, 2003, "Industry Executive of the Year: Weinbach's sharpened focus revived Unisys,"
https://www.route-fifty.com/digital-government/2003/10/industry-executive-of-the-year-weinbachs-sharpened-focus-revived-unisys/294273/#:~:text=Unisys%20Corp,homework%20on%20the%20company%2C
Philadelphia Business Journal, Jan 3, 2005, "McGrath assumes top spot at streamlined Unisys Corp.,"
https://www.bizjournals.com/philadelphia/stories/2005/01/03/focus5.html#:~:text=BLUE%20BELL%20,The

4	**H. John Riley, Jr.**	**COOPER INDUSTRIES PLC**	**2005**	**2006**

Summary: H. John Riley Jr., with a ***42-year tenure*** at Cooper Industries and its CEO from 1995 until his retirement in 2005, was ***honored with the Golden Omega Award*** in 2005, acknowledging his significant impact in the electrical and electronic industries.
Excerpts: "He will take over the position held by H. John Riley Jr., who will retire on Dec. 1."
"Riley will continue as the company's chairman until the board of directors meets in February 2006, in accordance with the board's tenure policy. Riley, who has been with the company for 42 years, has served as chairman and CEO since 1996."
"H. John Riley, Jr., Chairman & CEO, Cooper Industries, Inc., was the recipient of the Golden Omega Award."
Sources: *Houston Business Journal*, Apr 26, 2005, "Cooper CEO to retire, successor named,"
https://www.bizjournals.com/houston/stories/2005/04/25/daily16.html
Westlake Chemical, November 30, 2007, "Westlake Chemical Elects John Riley to Board,"
https://investors.westlake.com/news/news-details/2007/Westlake-Chemical-Elects-John-Riley-to-Board/default.aspx#:~:text=For%20over%20two%20decades%20Mr,Mr
IEEE Explore, 2005, "Golden Omega Award," https://ieeexplore.ieee.org/document/1566243

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TABLE A1 | (Continued)

5	**Archie Meyers, Jr.**	**CRAWFORD & CO**	**2001**	**2002**

Summary: Archie Meyers, Jr. retired from CEO of Crawford & Co. at the end of the first quarter of 2001, marking the end of a distinguished ***43-year career***. Meyers notably ***came out of retirement twice*** to assume key management roles at the company.
Excerpts: "Grover L. Davis, Crawford chairman and CEO commented, 'The Board of Directors, officers and employees of Crawford & Company are extremely grateful to Archie for the 43 years of service to the Company, which included his returning twice from retirement to resume key management roles.'"
Sources: *Insurance Journal*, January 31, 2001, "Meyers to Step Down at Crawford & Co.,"
https://www.insurancejournal.com/news/national/2001/01/31/13742.htm
Insurance Journal, November 1, 2002, "Meyers Resigns as Crawford & Company Director,"
https://www.insurancejournal.com/news/southeast/2002/11/01/24048.htm#:~:text=Crawford%20%26%20Company%20announced%20that,of%20Crawford%E2%80%99s%20Board%20of%20Directors

6	**Amos R. McMullian**	**FLOWERS FOODS INC**	**2004**	**2005**

Summary: Amos R. McMullian retired as CEO of Flowers Foods in 2003 after a transformative 22-year tenure, where he ***led the company's evolution from a regional to a national bakery*** through over 60 mergers and acquisitions and the introduction of automated bakeries. He played a ***crucial role in developing Nature's Own into the first billion-dollar bread brand***. McMullian continued as nonexecutive chairman until 2005 and retired as chairman emeritus in 2019. His contributions earned him a place in the ***American Society of Baking's Baking Hall of Fame***.
Excerpts: "For 22 years, Amos served as the company's fourth CEO, guiding Flowers Foods through one of its greatest periods of expansion and growth, during which the company began its transformation from regional baker to a national food company. Under his leadership, built on the values of honor, courage, and commitment he honed during his service in the U.S. Marines, Flowers engaged in more than 60 mergers and acquisitions, embraced the move to more highly automated "next-generation bakeries," expanded into new segments within the bakery category, and helped build the baking industry's first billion-dollar bread brand, Nature's Own."
Sources: American Society of Baking, "Amos R. McMullian,"
https://asbe.org/baking-hall-of-fame-2020-amos-r-mcmullian/
Commercial Baking, 19 Oct 2022, "In Memoriam: Remembering Amos McMullian, former Flowers Foods CEO and chairman," https://commercialbaking.com/in-memoriam-remembering-amos-mcmullian-former-flowers-foods-ceo-and-chairman/#:~:text=He%20was%20named%20CEO%20in,of%20the%20board%20until%202005

7	**Derek C. Hathaway**	**HARSCO CORP**	**Apr. 2008**	**Dec. 2008**

Summary: Derek C. Hathaway, at age 62, concluded his tenure as CEO and Chairman of Harsco Corporation, retiring in April 2008. Since becoming Harsco's CEO and chairman in 1994, he has ***significantly expanded the company's global reach and transformed it into a prominent industrial services provider***. Under his leadership, Harsco saw ***remarkable growth***, with sales increasing from $2 billion to $3.4 billion in just five years.
Excerpts: "Hathaway, 62, has been the CEO and chairman of Harsco since 1994. During his tenure, he has transformed Harsco into a leading industrial services company with a greater global presence. It has grown from $2 billion in sales to $3.4 in sales just in the past five years.".
Source: Pennlive, Aug. 13, 2007, "Harsco's Hathaway will retire next year,"
https://www.pennlive.com/patriotnews/2007/08/harscos_hathaway_retiring_as_c.html

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8	**Bruce S. Chelberg**	**PEPSIAMERICAS INC**	**2000**	**2001**

Summary: In August 2000, Whitman Corporation, the second-largest Pepsi bottler in the United States, announced its intention to ***acquire PepsiAmericas***, Inc. Following this acquisition, 66-year-old Bruce S. Chelberg retired from his position. His tenure at Whitman and later at PepsiAmericas was marked by ***strategic growth, successful diversification, and key acquisitions***, establishing a robust platform for the company's continued success in the beverage sector.
Excerpts: "Under Chelberg's direction, all of Whitman's holdings fared well. Pepsi-Cola's operating profit increasing by 18 percent in 1993, led by its core brands of Pepsi-Cola and Diet Pepsi. Midas operating profits for 1993 were up 7 percent from the previous year, with sales steadily increasing in Mexico. Hussmann operating profits were down, but demand for supermarket refrigerators appeared to be on the rise in Britain, Mexico, and Canada. With its operations so successfully diversified, profitability seemed likely for Whitman as it headed toward the last years of the 20th century even if one or even two of its core businesses began to exhibit problems."
Sources: *The New York Times*, Aug. 22, 2000, 2 of Biggest Pepsi Bottlers Reach $331 Million Deal, https://www.nytimes.com/2000/08/22/business/2-of-biggest-pepsi-bottlers-reach-331-million-deal.html
Company-histories.com, "PepsiAmericas, Inc.," https://www.company-histories.com/PepsiAmericas-Inc-Company-History.html

9	**Richard A. Goldstein**	**INTL FLAVORS & FRAGRANCES**	**2006**	**2007**

Summary: Richard A. Goldstein retired as IFF's CEO and Chairman on May 9, 2006, as part of a previously announced management succession plan. This plan, which was made public on January 17, 2006, aimed ***to ensure a smooth transition of leadership*** upon Goldstein's retirement.
Goldstein's tenure as CEO of IFF was marked by key strategic moves, including the acquisition of Bush Boake Allen Inc., which expanded the company's reach and capabilities in its sector. During the 2003–2005 cycle, the company met 45.5% of its performance goals, leading to Mr. Goldstein receiving 45.5% of his target long-term incentive compensation for that period.
Excerpts: "All of the Company's executive officers participate in the LTIP, although all were not eligible in 2003 as is required to receive payment for the 2003–2005 cycle. For the 2003–2005 cycle, the Company achieved in the aggregate 45.5% of the corporate performance goals, as a result of which each eligible executive officer, including Mr. Goldstein, received for 2003–2005 long-term incentive compensation equal to 45.5% of his or her target incentive compensation for the cycle."
Sources: IFF Press Releases, May 9, 2006, "Richard Goldstein Retires From IFF, as Planned; Arthur Martinez Named Interim Chairman and CEO," https://ir.iff.com/news-releases/news-release-details/richard-goldstein-retires-iff-planned-arthur-martinez-named#:~:text=Richard%20Goldstein%20Retires%20From%20IFF%2C,theIFFFORM8-K, January 17, 2006, https://ir.iff.com/static-files/dbcb0a65-90c2-4324-bba9-9d563d995499
IFF Notice of Annual Meeting of Shareholders to be held May 9, 2006, https://ir.iff.com/static-files/3ca22d81-c231-4e4a-a940-8b9477830180

10	**Francis J. Lunger**	**MILLIPORE CORP**	**2005**	**2006**

Summary:
Francis J. Lunger, Chairman, President, and CEO of Millipore Corporation, announced his resignation upon naming a successor and before March 1, 2005. Lunger remained as Chairman for a transitional period post-succession to ***insure a smooth transition***.
At the time, ***Millipore's sales jumped 14% in 2003, to $800 million, and were expected to climb at least 10% more in 2004***. Notably, its filters were used in high-profile projects like Genentech's and ImClone Systems' production of potential blockbuster cancer drugs, Avastin and Erbitux.
Excerpts: "Francis J. Lunger, Chairman of the Board, President and CEO of Millipore Corporation (NYSE:MIL) announced today that he has decided to step down as President and CEO of the bioscience company when his replacement has been named and before March 1, 2005. The Board of Directors has initiated a search for a new CEO which it hopes to have completed within six months. Mr. Lunger is expected to remain Chairman of the Board for a period of time after his successor is named so as to insure a smooth transition."
"Little wonder that Millipore's sales jumped 14% last year, to $800 million, and are expected to climb at least 10% more this year. Its products are turning up in some enviable places: Genentech and ImClone Systems, for instance, now use Millipore filters to produce Avastin and Erbitux, their potential blockbuster cancer drugs. If those drugs succeed, each could dramatically increase its orders from Millipore."
Sources: SEC Press Release, April 28, 2004, "Millipore CEO to Step Down After Transition Period," https://www.sec.gov/Archives/edgar/data/66479/000119312504071567/dex991.htm#:~:text=Millipore%20CEO%20to%20Step%20Down,and%20before%20March%201%2C%202005
Barron's, June 21, 2004, "Science Wiz," https://www.barrons.com/articles/SB108760743675041864

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11	**D.J. Moore**	**ESCO TECHNOLOGIES INC**	**2002**	**2003**

Summary: DJ Moore ***retired*** from CEO on Oct. 1, 2002. Earlier, on August 5, 2002, the company had established a ***Management Transition Agreement*** with Dennis J. Moore, the Company's Chairman, which outlined compensation for Moore associated with his scheduled retirement in April 2003 and included provisions for ***consulting services post-retirement***.

Excerpts: "ESCO TECHNOLOGIES Inc. (St. Louis) – Victor L. Richey Jr., president and chief operating officer of this maker of filtration products, was selected chief executive, effective Oct. 1, 2002. Dennis J. Moore, who has been the CEO since 1992, will continue to serve as chairman until next April, when he reaches 65 years of age and plans to retire."

"On August 5, 2002, the Company entered into a Management Transition Agreement (MTA) with Dennis J. Moore, the Company's Chairman, which provided for Mr. Moore to receive certain compensation in conjunction with his planned retirement in April 2003 and for consulting services after such retirement."

Sources: The Wall Street Journal, Aug. 13, 2002, "Richey to Become ESCO CEO,"
https://www.wsj.com/articles/SB1029205331227450715

ESCO Technologies 10-K report for year 2002, https://content.edgar-online.com/ExternalLink/EDGAR/0001035704-02-000648.html?hash=fc09c8b376d19ee8329cdb528016e9017930ba7e2e8fd864ec0eb5bdad2192dc&dest=C73728EXV10W28_TXT#C73728EXV10W28_TXT

12	**Michael J. Hegarty**	**FLUSHING FINANCIAL CORP**	**2005**	**2006**

Summary: Michael Hegarty retired as President and CEO in 2005, following a ***structured succession plan***. He continued serving as a director for both the company and Flushing Savings Bank. During his tenure, Flushing evolved into a ***profitable, well-capitalized entity with assets exceeding $2 billion***, showcasing significant growth in a dynamic, multicultural market.

Excerpts: "Under his leadership, Flushing has grown to a well-capitalized and profitable institution of over $2 billion in assets, with a demonstrated ability to grow in a vibrant multicultural market. We are grateful for Mike's long and highly effective service as an officer of the Company and pleased that he has chosen to remain a Director of our Company, allowing us to continue to draw upon the value of his many years of experience."

Sources: MarketWatch, June 30, 2005, "Flushing Financial Corp. CEO Michael Hegarty retires,"
https://www.marketwatch.com/story/flushing-financial-corp-ceo-michael-hegarty-retires

Flushing Bank News Release, 12/21/2004, "Michael J. Hegarty, Flushing Financial Corporation's President and Chief Executive Officer, to Retire; John R. Buran, Executive Vice President and Chief Operating Officer, Named as Successor,"
https://s28.q4cdn.com/653305835/files/doc_news/Michael-J.-Hegarty-Flushing-Financial-Corporations-President-and-Chief-Executive-Officer-to-Retire-John-R.-Buran-Executive-Vice-Presi-GUSYV.pdf