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## **Essays in Workforce Satisfaction and Labor Contracting**

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# ESSAYS IN WORKFORCE SATISFACTION AND LABOR CONTRACTING

## Abstract

In the first chapter, I examine whether disclosures of rival collective bargaining agreements (CBAs) affect workforce treatment. I exploit U.S. CBAs, which specify terms and conditions resulting from labor renegotiations. Using an effectively staggered difference-in-differences design, I find that around the time of rival CBA disclosures, non-unionized firms operating in unionized industries improve their workforce treatment. Their behavior is transitory. My cross-sectional analyses show that their behavior is more pronounced when they operate in the electronics industry, have fewer peers, provide lower pension and retirement benefits, and are headquartered in states without Inevitable Disclosure Doctrine adoption. I also find that they experience a reduction in voluntary employee turnover in the face of rival CBA disclosures. Collectively, my evidence suggests that non-unionized firms in unionized industries strategically improve workforce treatment to retain their workforce around the time of rival CBA disclosures.

In the second chapter (co-authored with Annita Florou, Meng Li, and Peter F. Pope), we examine whether relaxing pension funding requirements affects overall and leadership workforce satisfaction. We exploit the Moving Ahead for Progress in the 21st Century Act (MAP-21) of 2012 as a plausibly exogenous regulatory shock. Easing the funding constraints of defined benefit plans, MAP-21 reduces minimum required pension contributions and impairs employee retirement security. Using a difference-in-differences design, we predict and find that following the enactment of MAP-21, firms with defined benefit plans experience a decrease in overall and leadership workforce satisfaction, relative to firms without defined benefit plans. We also find that firms with non-collectively bargained and underfunded plans drive our results. Our cross-sectional tests indicate that our results are stronger when satisfaction belongs to current employees participating in underfunded plans.

Collectively, our findings are consistent with MAP-21 allowing firms to implicitly underfund their pension plans by reducing mandatory contributions and to shift default risk in the firm from shareholders to employees. More interestingly, our results suggest that we can estimate the shadow price of workforce satisfaction when deferred compensation plays a central role in the tradeoff between the corporate financial and corporate ESG performance.

In the third chapter, I plan to examine whether firm managers use goodwill impairment losses to weaken union bargaining power. While labor unions aim to reduce income inequality through collective bargaining, conflicting incentives pressure firm managers to resist unions' rent extraction. I exploit U.S. labor renegotiations staggered over time to represent the timing of unions' demand for wage increases and benefit improvements. I predict that unionized firms use the announcement of goodwill impairment to reduce union bargaining power around the time of labor renegotiations. I expect to find that unionized firms announcing goodwill impairment around the time of labor renegotiations experience a reduction in union bargaining power. My results are expected to be more salient for unionized firms with low firm age, high union strength, and high employee ownership. Overall, my results suggest that managers may time the announcement of goodwill impairment losses to reduce union bargaining power. However, I caution against interpreting my findings as managers accelerating the recognition of goodwill impairment losses.

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To my father, I dedicate this thesis.

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## CHAPTER 1

# THERE IS NO SUCH THING AS A FREE LUNCH: THE PEER EFFECT OF COLLECTIVE BARGAINING AGREEMENTS ON WORKFORCE TREATMENT

### 1.1 Introduction

Human capital is vital to fostering sustainable competitive advantage (e.g., Hall, 1993). However, it poses a significant challenge to firm managers. In the face of undesirable events, it is likely to leave and bring proprietary knowledge and know-how to rivals, potentially harming the firm's competitive edge (e.g., Coff, 1997; Ganco et al., 2015). Information disclosed by rival firms could trigger human capital turnover. While prior literature abundantly documents the peer effects of information disclosures on investment and financing decisions (e.g., Badertscher et al., 2013; Beatty et al., 2013; Durnev and Mangen, 2009; Shroff et al., 2017), it pays scant attention to their social aspect (Cao et al., 2019). In particular, the social aspect relating to human capital is largely neglected in the existing literature. Therefore, a better understanding of firms' reaction to external negative events to retain their valuable human capital is imperative.

While prior related literature (see Aobdia and Cheng, 2018) focuses on the peer effect of labor renegotiations on disclosure strategy, our understanding of the peer effect of labor renegotiation outcomes on employees is limited. Aobdia and Cheng (2018) find that non-unionized firms in unionized industries (hereafter non-unionized firms) increase disclosures and issue more good news around the time of rival renegotiations to hurt their rivals' bargaining positions. That is, unionized rivals grant more concessions, lose more rent to unionized employees, and, in a world of limited resources, make less investment, which limits business expansion. Ultimately, non-unionized firms gradually seize the market share from their unionized rivals.

I argue that the benefit comes with a price. Rival renegotiations conclude with collective bargaining agreements (hereafter CBAs), which specify terms and conditions of employment. Aobdia and Cheng's (2018) findings suggest that CBAs contain terms and conditions favorable to unionized employees at the expense of rival firms, consistent with CBAs for my sample. As rival renegotiations and CBAs are

publicly known, non-unionized firms' employees are informed about the favorable terms and conditions, feel dissatisfied, and may walk away. To pre-empt this threat, non-unionized firms' managers may improve workforce treatment around the time of rival CBA disclosures.

Seemingly, non-unionized firms may have to accept either the cost of improving workforce treatment or the cost of employee turnover. Aobdia and Cheng's (2018) findings induce me to predict that non-unionized firms shall choose to undertake the former cost, as it seems to be shorter-term and more manageable than the latter cost and tends to be outweighed by the benefit non-unionized firms subsequently receive. To answer this question empirically, I examine the peer effect of collective bargaining agreement disclosures on workforce treatment. In so doing, I extend prior literature by focusing on the patterns of workforce treatment in unionized industries and bridging the gap in the literature by providing evidence for the effect of unionized rivals' CBA disclosures on non-unionized firms' workforce treatment.

I predict that non-unionized firms operating in unionized industries improve workforce treatment around the time of rival CBA disclosures. Receiving the information about rival CBAs from news coverage, union press releases, and corporate disclosures, non-unionized firms' employees may make social comparisons (Tesser et al., 1988), feel unfair and dissatisfied, and then leave (Mobley, 1977; Mobley et al., 1979; Price, 1977, 2001; Price and Mueller, 1981, 1986). To pre-empt employee dissatisfaction and turnover following rival CBA disclosures, non-unionized firms' managers may have incentives to treat their workforce better. In so doing, managers offer a combination of employee-friendly policies that can immediately influence employees' perceptions. However, my prediction is not a forgone conclusion. Employees may not be able to move easily and freely from one firm to another, mitigating the risk of employee turnover.

To test my hypothesis, I exploit CBAs, which specify workforce terms and conditions resulting from labor renegotiations, from 2002 to 2020. I define rivals (or peers) and industries using four-digit standard industrial classification (SIC) codes. My sample includes non-unionized firms in unionized industries that observe CBAs and firms in non-unionized industries that do not observe CBAs. Following Aobdia and Cheng's (2018) staggered difference-in-differences model, I find that around the

time of rival CBA disclosures, non-unionized firms improve their workforce treatment. This result supports my hypothesis. I also find that their behavior does not persist, in that it reverts to the normal level following the years of rival CBA disclosures.

Further, I perform mechanism tests and find that non-unionized firms provide their workforce with flexible hours and day care services around the time of rival CBA disclosures. My additional analysis provides some evidence that non-unionized firms' voluntary employee turnover falls around the same time. Overall, my results suggest that non-unionized firms in unionized industries improve workforce treatment strategically to pre-empt workforce turnover around the time of rival CBA disclosures.

To strengthen my argument, I conduct cross-sectional analyses. I first exploit state-level variations in workforce mobility introduced by the Inevitable Disclosure Doctrine (hereafter IDD). The IDD prohibits employees with proprietary knowledge from working for rivals in the immediate future, reducing turnover. Relative to firms headquartered in IDD states (low mobility), firms in states without IDD enforcement (high mobility) encounter a materially higher risk of workforce turnover around the time of rival CBA disclosures unless they improve workforce treatment. I find that unlike firms in IDD states, firms in states without IDD enactment improve workforce treatment around the time of rival CBA disclosures. This evidence suggests that without mobility restrictions, firms respond to CBA disclosures for retention purposes while they do not in the presence of mobility restrictions, reinforcing my central argument and main results.

Other cross-sectional analyses show that my main results are more salient when non-unionized firms operate in the electronics industry, have fewer peers, and provide lower pension and retirement benefits. These results provide important evidence to support my main argument. In the electronics industry where the cost of workforce turnover could exceed the benefit, firms decide to accept the cost of improving workforce treatment. Second, firms in industries with fewer players closely monitor and better understand information disclosures from their rivals. Third, funds made available from lower workforce benefits allow firms to improve workforce

treatment in the face of external negative events.<sup>1</sup> This finding suggests a substitution (fund switching) strategy.

I also conduct placebo outcome tests to prove that high correlations among disaggregated ESG scores do not drive my main results. I find no relation between rival CBA disclosures and the environmental and governance score that should not be affected by rival CBA disclosures.

Finally, I perform a number of robustness checks. I examine what drives a non-unionized firm to operate in a unionized industry and use the drivers to create entropy-balanced sample. Furthermore, I remove peer firms related to CBAs with unfavorable terms and conditions of employment from my main analysis to rule out the possibility that the peer firms that should not drive my main results drive my main results. In addition, Koh and Reeb (2015) argue that firms that report missing research and development (R&D) values may not necessarily lack innovation activities. Following Koh and Reeb (2015), I replace missing R&D values with zero values and include an indicator variable denoting one for missing R&D values. Last, I use six-digit North American Industry Classification System (NAICS) codes to classify rivals (peers) and industries to refute the possibility that my main results are driven just by a specific industry classification system. In sum, my main results are robust.

My primary contribution to the literature is at least fourfold. First of all, my study contributes to the literature on the real effects of information disclosures. A key part of my hypothesis is based upon the literature on information transfer within industries. Prior literature documents the peer effects of disclosures on investment and financing behavior. Badertscher et al. (2013) find that public firms' disclosure is positively related to private firms' investment. Beatty et al. (2013) document an increase in peer investment after the revelation of accounting frauds. Durnev and Mangen (2009) document changes in peer investment after the announcement of restatements. Shroff et al. (2017) document a negative association between the peer information environment and firms' cost of capital.

I extend this stream of literature in my study. Unionized rivals, news agencies, and unions provide timely disclosures on the terms and conditions of CBAs to non-

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<sup>1</sup> The Refinitiv workforce score that measures workforce treatment does not consider retirement benefits and pensions.

unionized firms' managers and employees. Connecting the disclosure channels with social comparisons by employees, I provide evidence that non-unionized firms in unionized industries improve workforce treatment in response to rival CBA disclosures. In so doing, they highlight the improvement of flexible hours and day care services.

Second, my paper contributes to the literature on employee-related policies and on the strategic roles of ESG practices. Cao et al. (2019) find that CSR practices induce peer firms to adopt similar CSR practices. I contribute to this branch of literature by providing consistent evidence focused on employee benefits and working conditions.

I also contribute to prior literature on the roles of ESG engagements. Prior literature documents that firms step up environmental or social engagements, for example, to reduce employee turnover (Bode et al., 2015), to alleviate shirking and absenteeism (Flammer and Luo, 2017), and to restore the good reputation of firms freezing pension plans (Anantharaman et al., 2022). I exhibit that non-unionized firms in unionized industries improve workforce treatment just temporarily to address the effect of rival CBA disclosures and return it to the normal level in the following period. Moreover, I shed some light on a consequence of improving workforce treatment. I provide evidence for a decrease in their voluntary employee turnover in the event of rival CBA disclosures. Likewise, I show that my main results are stronger for firms in states without IDD enactment, where the risk of turnover is relatively high. My collective evidence suggests that non-unionized firms in unionized industries strategically use workforce treatment around the time of rival CBA disclosures for retention purposes.

Third, my article contributes to the literature on organized labor. Building my research setting on unionized industries, I extend prior literature by investigating the effect of rival CBA disclosures on workforce treatment. I identify a research gap in Aobdia and Cheng (2018) and provide evidence to bridge the gap. While Aobdia and Cheng (2018) sparingly discuss the cost of employee turnover as the potential cost of increased disclosures, I enrich the discussion by adding the cost of improving workforce treatment and test which cost non-unionized firms in unionized industries

opt to undertake. I empirically show that they accept the cost of improving workforce treatment to pre-empt workforce turnover.

My results suggest that their cost of improving workforce treatment is less than their unionized rivals' cost of wage increases and working condition betterment due to labor renegotiations. Whereas non-unionized firms are pressured by non-unionized employees, their unionized rivals are more rigorously pressured by unions. Thus, unionized rivals make more concessions, lose more rent, and invest less in business expansion. Consequently, non-unionized firms in unionized industries retain more rent for investment and subsequently see their market share grow. My results highlight that the benefit non-unionized firms gain is not free but comes with the cost of workforce retention.

Last, my paper contributes to the literature on strategic human capital. Seminal strategy theory stresses that skilled employees can be a source of sustained competitive advantage (e.g., Coff, 1997; Hall, 1993) if the firm can retain them. I provide evidence that unionized firms in unionized industries opt to improve workforce treatment to pre-empt workforce turnover and maintain their competitive advantage, advocating the theory. This evidence is especially prominent when they operate in the industry that requires labor with specialized skillsets, such as the electronics industry shown in my cross-sectional analysis. I also show that retirement benefits and employee-friendly policies could substitute, providing managers with flexibility to optimize the use of scarce resources. My evidence suggests techniques for strategic human capital management, responding to Bode et al.'s (2015) call for further research on workforce management strategy.

## **1.2 Institutional Setting and Literature Review**

### **1.2.1 Institutional Setting**

I exploit publicly known collective bargaining agreements (CBAs) that are staggered over time. Only firms in unionized industries observe CBAs. An industry is unionized when a firm within the industry and a labor union reach a CBA. A unionized industry includes unionized firms, which reach at least one CBA, and non-unionized firms, which neither renegotiate nor reach a CBA but operate in unionized industries.

In my setting, unionized firms operating in unionized industries are rivals who reach and disclose CBAs. Non-unionized firms operating in unionized industries observe CBA disclosures.

A labor renegotiation or collective bargaining is the process in which labor unions on behalf of workers negotiate over wages, benefits, and working conditions with managers on behalf of shareholders. In enforcing the outcome of a labor renegotiation legally, a collective bargaining agreement is created to set terms and conditions following the renegotiation. Unions representing workers and firm managers representing shareholders are required by law to conform to the collective bargaining agreement. The National Labor Relations Act regulates collective bargaining in the U.S. private sector. In the United States, CBAs are typically characterized by single-employer bargaining, rather than by multi-employer or sectoral bargaining (OECD, 2019). Typically, the duration of CBAs is between three and five years (Chava et al., 2020; Rich and Tracy, 2004).

Prior literature documents that CBAs are usually renegotiated within 90 days prior to or after the expiration date of current CBAs (Cramton and Tracy, 1992; Rich and Tracy, 2004). Information about changes in workforce terms and conditions is generally disclosed around the effective dates of new CBAs. For example, General Electric Company (GE) publicizes its negotiation timeline with unions. As its CBAs expire in June, it commences renegotiating new CBAs with unions in April. In 2019, GE negotiated over the substantive part of new CBAs in May before reaching and disclosing the conclusion of the new CBAs in June. Union members ratified these CBAs in July. Although CBAs may be prematurely renegotiated, premature renegotiation often occurs in times of inflation and employment shocks (Rich and Tracy, 2004, 2013). According to Rich and Tracy (2013), only 7 percent of CBAs undergo premature renegotiation.

Unionization has an important role to play in the U.S. economy although it appears to have contracted over time (OECD, 2017). Academic research investigates how unionization affects economic factors, e.g., profitability (Hirsch, 1991) and cost of equity (Chen et al., 2010). Using CBAs as the unit of analysis, Chava et al. (2020) report that unionized workers face a decline in their wages following the adoption of the right-to-work laws. In addition to academic work, labor renegotiations make

headlines both statewide and nationwide. To communicate with their members, labor unions report the important details of labor renegotiations and CBAs in a comprehensible manner. Firms disclose workforce terms and conditions of CBAs on their websites and file their CBAs with the Department of Labor, which will make them publicly available. It is worth investigating whether CBAs are a source of significant risk for peer firms operating in unionized industries.

### **1.2.2 Workforce Treatment and Collective Bargaining Agreements**

Once unionized, employees will collectively be more powerful and can extract wage concessions (Hirsch, 1991, 2008). Labor economics theory posits that labor unions representing employees seek to extract a greater share of economic rent through labor renegotiations from managers representing shareholders. This action inevitably creates perpetual tension between shareholders and employees. In theory, economic rent represents discrepancy in income between players in an economy. For example, a worker earns \$110 per day although the worker is in fact willing to accept \$100 for this job. \$10 per day (the difference between \$110 and \$100) is the economic rent that the worker receives, while -\$10 per day is the economic rent that shareholders receive. Labor unions play a central role in extracting more economic rent through collective bargaining, whereas managers seek to reduce the economic rent given to workers in order to maximize rent for shareholders.

Prior literature on organized labor documents different behaviors of unions and managers when labor renegotiations are ongoing. Unions leverage corporate disclosures of competitiveness, survival, and profitability (Barlev and Haddad, 2003; Tinker et al., 1982) to bargain collectively for better remunerations (Blanchflower et al., 1996; Bova, 2013; Christofides and Oswald 1992; Reynolds, 1978). On the other hand, managers have strong incentives to weaken unions' bargaining position through withholding relevant information from corporate disclosures (Cheng, 2017; Chung et al., 2016; Hilary, 2006; Kleiner and Bouillon, 1988; Reynolds et al., 1998; Scott, 1994) or releasing bad news about firm competitiveness, profitability, and survival (Bova, 2013; DeAngelo and DeAngelo, 1991; D'Souza and Jacob, 2001; Matsa, 2010).

Linking the literature on organized labor to that on peer effects, recent literature investigates the peer effects of labor renegotiations on disclosure policies in



unionized industries. Aobdia and Cheng (2018) find that in the face of rivals' labor renegotiations, non-unionized firms in unionized industries release more (positive) disclosures to strengthen the bargaining position of their rivals' labor unions but undermine the bargaining position of their rivals. That is to say, non-unionized firms disadvantage unionized rivals being engaged in renegotiations, pressuring them to make more concessions and lose a larger share of rent to labor unions. Later, non-unionized firms see their market share rise as a result of their disclosure strategy.

Aobdia and Cheng (2018) posit in their hypothesis development that non-unionized firms may lose their employees to unionized rivals whose renegotiations produce terms and conditions favorable to employees. While Aobdia and Cheng (2018) provide evidence for non-unionized firms' advantage, their related cost is not well understood. I argue that non-unionized firms must take certain costly action to hinder the loss of their employees to unionized rivals. One could question why peer firms disclose more around the time of rival renegotiations despite knowing that they will also have to pay the price. I would reason that they may consider the benefit from increased disclosures to be longer-term but the related cost to be shorter-term and potentially manageable. When CBAs are favorable to employees, non-unionized firms' employees who make comparisons may feel unfair and dissatisfied. Anticipating that dissatisfaction can lead to turnover, non-unionized firms may have incentives to strategically improve their workforce treatment to mitigate the risk of employee turnover.

### **1.3 Hypothesis Development**

I expect that non-unionized firms' employees start learning about the workforce terms and conditions of rival CBAs through news and media coverage, labor unions' press releases, and rivals' public disclosures.<sup>2</sup> Employees may investigate further from the Department of Labor, which publicizes collective bargaining agreements.

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<sup>2</sup> Appendix C illustrates two collective bargaining agreements reported by firms, news agencies, and unions.

Knowing workforce terms and conditions at rival firms, employees may make social comparisons (Tesser et al., 1988), feel unfair and dissatisfied, and then leave.<sup>3</sup> Advocating this argument, literature on employee turnover (e.g., Mobley, 1977; Mobley et al., 1979; Price, 1977, 2001; Price and Muller, 1981, 1986) shows a consistently positive association between job dissatisfaction and employee turnover. Even more worrying is the consequence of turnover. It is disruptive (Hausknecht et al., 2009; Shaw et al., 2005), costly (Allen et al., 2010; Fisher, 1917; Heavey et al., 2013; Park and Shaw, 2013), antagonistic to ESG performance (Hom et al., 2008), and conducive to the loss of proprietary knowledge (Eckardt et al., 2014). However, it is not impossible for non-unionized firms' managers to pre-empt this undesirable behavior.

Prior literature suggests that firms use ESG initiatives to address the consequences of negative events. Anantharaman et al. (2022) document that after announcing pension plan freezes, firms are viewed as bad employers and therefore increase environmental and employee engagements to regain good reputations. Exploiting changes to state unemployment insurance (UI) benefits, Flammer and Luo (2017) report the positive relationship between UI benefits and investment in employee welfare programs to mitigate adverse behavior in the workplace. Bode et al. (2015) find that firms participating in social initiatives can reduce employee turnover through increased employee identification and sorting effects. Relatedly, CSR engagements provide insurance against equity and debt price risk in the face of negative events (Jia et al., 2019; Shiu and Yang, 2017).

Anticipating such employee behavior in the face of rival CBA disclosures, non-unionized firms may improve workforce treatment to pre-empt employee dissatisfaction and turnover.<sup>4</sup> The role of workforce treatment is consistent with prior evidence showing that ESG activities enhance employee satisfaction and reduce

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<sup>3</sup> Appendix B shows the workforce terms and conditions of collective bargaining agreements in my sample, most of which are favorable to employees.

<sup>4</sup> While I do not deny the possibility that non-unionized firms may increase wages around the time of rival CBA disclosures, the lack of data on firm-level wages prevents me from examining this factor empirically. Still, it is worth discussing the relative value of monetary benefits and non-monetary benefits. I argue that non-unionized firms' employees tend to value non-monetary benefits (employee-friendly practices, such as work from home and health and safety policy) more than monetary benefits (wages). Employees cannot spend money buying time wasted while commuting to the workplace or safety in the workplace. In contrast, if employees have more time and stay healthy, they can make more money, for example, by doing part-time jobs to compensate.

turnover through employees' perceived morality of the firm (Ellemers et al., 2011), increased employee identification, and sorting effects (Bode et al., 2015). In addition, modifications to workforce treatment are likely to have an immediate, direct impact on workforce perceptions. Strategically speaking, improving workforce treatment is investing more in a unique combination of employee-friendly policies that is difficult for others to imitate (Flammer and Luo, 2017). A differentiated combination of employee-friendly policies also makes it difficult for employees to compare with other firms' employee welfare policies. This concept is akin to a competitive advantage. As a consequence, I propose my hypothesis as follows:

**H1:** Non-unionized firms operating in unionized industries improve workforce treatment around the time of their unionized rivals' collective bargaining agreement disclosures.

Nonetheless, my prediction is not conclusive but comes with tension. Job switching can be costly to employees. Employees incur costs relating to job searches, applications, and relocation. Moreover, many states adopt laws, such as the Inevitable Disclosure Doctrine, whose effect mitigates workforce turnover. Thus, employees may not consider it easy to move from one firm to another—particularly to one of their rivals.

## **1.4 Data, Variables, and Research Design**

### **1.4.1 Sample Construction and Measure of Union Industry**

Following Chava et al. (2020), I first obtain U.S. CBA data from the Settlement Summaries dataset of Bloomberg BNA. The sources of the Settlement Summaries dataset are the National Labor Relations Board's reported settlements and self-reported settlements. The dataset contains 8,049 public and private CBAs from 2002 to 2020. I merge it with Compustat using company names, yielding 447 CBAs at the plant-year level or 287 CBAs at the firm-year level.<sup>5</sup> Then, I merge the resulting data with data on firm characteristics from Compustat and data on the workforce score from Refinitiv ESG, which launched its database in 2002.

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<sup>5</sup> Some firms have several plants. During a year, more than one plant of the same firm may reach CBAs with unions.

My unit of analysis is at the firm-year level. I use the 287 firm-year CBAs to classify industries by four-digit SIC code. I define unionized industries statically in accordance with Aobdia and Cheng (2018), Bova (2013), and Comprix and Muller (2011). I classify an industry as unionized when at least one firm in that industry reaches a CBA during the sample period. A firm is unionized when it reaches a CBA during the sample period, whereas a firm is non-unionized if it does not reach a CBA during the sample period. If a firm renegotiates and reaches a CBA, it is a unionized rival firm. As my main analysis focuses on peer firms, I follow Aobdia and Cheng (2018) and remove unionized rival firms from my sample. My treatment group comprises non-unionized firms in unionized industries.

On the other hand, my control group includes firms operating in non-unionized industries. I classify an industry as non-unionized when no firm in that industry reaches a CBA during the sample period. I remove observations without control variables and positive market to book ratios. My sample comprises 10,580 firm-year observations from 2002 to 2020. Figure 1.1 visualizes the setting of my study. Table 1.1 reports sample selection. Table 1.2 presents two panels. Panel A outlines the sample by year. The sample by year increases with time because the coverage of Refinitiv has expanded over time. Panel B outlines the sample by industry.

[Insert Figure 1.1]

[Insert Table 1.1]

[Insert Table 1.2]

#### **1.4.2 Measure of Workforce Treatment**

Refinitiv ESG is a leading ESG rater in the industry. Underscoring the leading status of Refinitiv ESG, Berg et al. (2021) document that more than 1,500 academic studies have used Refinitiv ESG data over the past two decades and that major asset managers have used it widely for their sustainability investment. Refinitiv ESG raw data is collected from both self-reported sources—including annual reports, company websites, stock exchange filings, and CSR reports—and third parties—including NGO websites and news sources. Recent literature shows that Refinitiv ESG data is value-relevant (Berg et al., 2021) and ESG news-relevant (Serafeim and Yoon, 2023). Prior literature refers to Refinitiv ESG as Thomson Reuter Asset 4. One

limitation of Refinitiv ESG is that the coverage was not extensive before 2017. It has covered firms in the Russell 1000 index since 2011 and the Russell 3000 index since 2017.

I use the Refinitiv ESG workforce score, one of the four categories that constitute the social score, to measure workforce treatment. The workforce score is a percentile rank score, ranging from 0 (worst) to 100 (best). Refinitiv continues updating the score, if new data is available, for the next five years, at which point the score becomes definitive. I divide the workforce score by 10 for my analysis. Since the Refinitiv ESG score is relevant to both academics and practitioners, I safely infer that the workforce score (one of the ten categories that constitute the aggregate ESG score) is also useful.

The workforce score measures “a company’s effectiveness in terms of providing job satisfaction, a healthy and safe workplace, maintaining diversity and equal opportunities, and development opportunities for its workforce” (Refinitiv, 2021, p. 22). Simply put, the workforce score measures how well or fairly a firm treats its workforce. As this score evaluates several important elements of workforce treatment (as described in its definition) and captures multiple key performance indicators relevant to each element, it meets the definition of a differentiated combination of employee-friendly policies in my hypothesis development.<sup>6</sup> Key performance indicators include two groups: (1) the more the firms do, the better the score—such as flexible hours, internal promotion, and day care services—and (2) the more the firms do, the worse the score—such as employee injuries and announced layoffs.

### **1.4.3 Empirical Design**

Following Aobdia and Cheng (2018), I use an ‘effectively’ staggered difference-in-differences model to test whether non-unionized firms in unionized industries improve workforce treatment around the time of rival CBA disclosures.

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<sup>6</sup> I use the Refinitiv workforce score as my dependent variable because it appropriately answers my research question, i.e., how fairly do ‘firms’ treat their workforce to alleviate the effect of rival CBA disclosures on their workforce’s perceptions and behaviors? I consider the workforce score a direct measure for what firms do to satisfy their workforce. On the other hand, Glassdoor ratings measure the degree to which employees are satisfied with firms. I therefore consider Glassdoor ratings a direct measure for workforce satisfaction but a less direct measure for what firms do to make their workforce happy.

$$\begin{aligned}
\text{Workforce score}_{it} &= \beta_0 + \beta_1 \text{Union industry}_i \times \text{Rival CBA}_{it} + \\
&\quad \sum \beta_k \text{Controls}_{it} + \gamma_i + \delta_t + \varepsilon_{it},
\end{aligned}
\tag{1}$$

where  $i$  indexes firms and  $t$  indexes years.  $\text{Workforce score}_{it}$  is Refinitiv workforce score ranging from 0 to 100 of a firm in the fiscal year scaled by 10.  $\text{Union industry}_i$  is an indicator variable equal to one if a firm operates in a unionized industry and zero otherwise. An industry is defined by the four-digit SIC code and unionized when at least one firm in the industry reaches a CBA during the sample period.  $\text{Rival CBA}_{it}$  is an indicator variable equal to one for the fiscal year when unionized rivals' collective bargaining agreements are effective and publicly known to a non-unionized firm and zero otherwise. Rivals are defined at the four-digit SIC code level.

According to prior literature (e.g., Bae et al., 2011),  $\text{Controls}_{it}$  is a vector of firm-specific control variables—including total assets, leverage, return on assets, market-to-book ratios, free cash flows, Kaplan and Zingales (1997) measure of financing constraints, sales, and research and development intensity. Appendix A defines all the variables.  $\gamma_i$  is firm fixed effects, which control for time-invariant firm-specific characteristics that could affect workforce treatment.  $\delta_t$  is year fixed effects, which control for specific-time events that could affect workforce treatment. The  $\text{Union industry}_i$  main effect is subsumed by firm fixed effects as in Aobdia and Cheng (2018). Standard errors are clustered at the industry level. My unit of analysis is at the firm-year level. I predict  $\beta_1$  to be positive and significant, consistent with non-unionized firms in unionized industries improving workforce treatment in the face of rival CBA disclosures.

## 1.5 Results

### 1.5.1 Descriptive Statistics and Correlations

Table 1.3 presents three panels. I report the descriptive statistics of the full sample in Panel A. Workforce score has a mean value of 4.823 and a median value of 4.504. According to Refinitiv, these values denote that average firms have satisfactory relative workforce performance and moderate degree of transparency in reporting material workforce data publicly. My binary variable of interest Union industry has a mean value of 0.339, indicating that 33.9 percent of my sample is treated observations. Another binary variable of interest, Rival CBA, has a mean

value of 0.034, meaning that 3.4 percent of firm-year observations are non-unionized firms that observe unionized rivals' CBAs.

I report the descriptive statistics of the unionized industry in Panel B. Workforce score has a mean value of 5.277 and a median value of 5.111. My binary variable of interest, Rival CBA, has a mean value of 0.100, meaning that 10 percent of non-unionized firm-year observations in unionized industries observe unionized rivals' CBAs. I report the correlations matrix of the full sample in Panel C. I find that my above variables of interest are positively and significantly correlated with Workforce score.

[Insert Table 1.3]

### **1.5.2 Main Results**

Columns (1) and (2) of Table 1.4 report the results of estimating the effect of rival CBA disclosures on the workforce score using the staggered difference-in-differences design shown in equation (1). I use the specification without control variables in Column (1) and the specification with firm-specific control variables in Column (2). I find that the coefficients on Union industry  $\times$  Rival CBA are positive and significant at the 1 percent level in Column (1) and at the 5 percent level in Column (2). My results are consistent with non-unionized firms in unionized industries improving workforce treatment around the time of rival CBA disclosures. In economic terms, the workforce score of non-unionized firms in unionized industries increases by 1.83 in Column (1) and 1.71 in Column (2) around the time of rival CBA disclosures, relative to firms in non-unionized industries.

[Insert Table 1.4]

### **1.6 Analysis of Timing of Workforce Treatment Improvement**

Table 1.5 reports the results of the analysis of the timing of workforce treatment improvement. Given the approximate mean and median CBA duration of 4 years, I incorporate Union industry  $\times$  Rival CBA[-1], Union industry  $\times$  Rival CBA[+1], and Union industry  $\times$  Rival CBA[+2] into equation (1). Union industry  $\times$  Rival CBA[-1] is an indicator variable equal to one if unionized rivals' collective bargaining agreements are effective and publicly known to a non-unionized firm one year after. Union

industry × Rival CBA[+1] and Union industry × Rival CBA[+2] are indicator variables equal to one if unionized rivals' collective bargaining agreements are effective and publicly known to a non-unionized firm one year and two years before, respectively. I use the specification with firm-specific control variables.

[Insert Table 1.5]

I find that the coefficient on Union industry × Rival CBA are positive and significant at the 5 percent level. The coefficients on Union industry × Rival [-1], Union industry × Rival CBA[+1], and Union industry × Rival CBA[+2] are positive but insignificant. I also find that the coefficient on Union industry × Rival CBA is similar in magnitude to that on Union industry × Rival CBA[-1] but is greater in magnitude than that on Union industry × Rival CBA[+1]. My results suggest that improving workforce treatment in response to rival CBA disclosures is a strategic action because only in the year of rival CBA disclosures do non-unionized firms take the action. Corroborating this suggestion, the coefficient begins to rise one year preceding the year of rival CBA disclosures and becomes significant in the year of rival CBA disclosure before it reverts to the normal level in the following year in accordance with Figure 1.2. Collectively, my evidence suggests that such a strategic action has an immediate, positive impact on workforce perceptions and behaviors.

[Insert Figure 1.2]

## 1.7 Mechanism Tests

To produce the workforce score, Refinitive ESG collates numerous key performance indicators (KPIs) associated with workforce treatment. I examine what KPI firms highlight to form a differentiated combination of employee-friendly policies to please and retain their workforce in the face of rival CBA disclosures. All else being equal, I replace Workforce score in equation (1) with two KPIs—namely Flexible hours and Day care services. Following my main results, I predict  $\beta_1$  to be positive and significant for both of the KPIs. In addition to these tests, I perform mediation analyses in Appendix D.



Table 1.6 reports two panels. Missing data reduces the number of observations. Panel A reports the effects of rival CBA disclosures on Flexible hours in Column (1) and Day care services in Column (2). Appendix A defines all the variables. I use the specification with firm-specific control variables. I find that the coefficients on Union industry  $\times$  Rival CBA are positive and significant at the 5 percent level in Columns (1) and (2). My results are consistent with non-unionized firms improving employee-friendly policies around the time of rival CBA disclosures.

[Insert Table 1.6]

Panel B of Table 1.6 reports dynamics of the effects on Flexible hours in Column (1) and Day care services in Column (2). Given the approximate mean and median CBA duration of 4 years, I incorporate Union industry  $\times$  Rival CBA[-1], Union industry  $\times$  Rival CBA[+1], and Union industry  $\times$  Rival CBA[+2] into equation (1). I define these interaction terms in section 1.6. For Flexible hours in Column (1), I find that the coefficient on Union industry  $\times$  Rival CBA and is positive and significant at the 5 percent level. In terms of daycare services in Column (2), I find that the coefficients on Union industry  $\times$  Rival CBA and on Union industry  $\times$  Rival CBA[+1] are positive and significant at the 5 percent level. The coefficients on Union industry  $\times$  Rival CBA[-1] and Union industry  $\times$  Rival CBA[+2] are positive but insignificant in both columns.

My results indicate that non-unionized firms bring these employee-friendly policies into effect in the face of rival CBA disclosures and undo them in the years following rival CBA disclosures. In other words, non-unionized firms provide flexible hours and day care services just for a certain period of time. They undo flexible hours immediately after the year of rival CBA disclosures. On the other hand, it takes another year for them to undo day care services. An explanation for this behavior could be that it normally takes some time for day care centers to screen and accept children, the senior, or the disabled while firms offer limited-time vouchers (e.g., vouchers valid for one year) or partner temporarily with day care centers. It is possible that vouchers and partnership agreements expire in the following year when day care services end.

This behavior suggests that non-unionized firms transitorily implement certain employee welfare policies that can have an immediate impact on workforce

perceptions and behaviors to address the effect of negative events while incurring only short-term costs. Nevertheless, my results do not suggest that firms implement just these two employee welfare policies around the time of rival CBA disclosures. Rather, firms implement many standard employee-friendly policies and practices but strategically highlight certain policies that can impact workforce perceptions and behaviors immediately in the face of adverse events. Moreover, putting special policies into effect in addition to standard policies in the face of rival CBA disclosures forms a differentiated combination of employee-friendly policies.

### **1.8 Consequences of Improving Workforce Treatment**

I examine the effect of rival CBA disclosures on voluntary turnover of employees to strengthen my argument. All things being equal, I replace the workforce score in equation (1) with voluntary employee turnover. I obtain the data from Refinitiv ESG. I expect non-unionized peer firms to experience a decrease in voluntary employee turnover in the presence of rival CBA disclosures. I predict  $\beta_1$  to be negative and significant.

Table 1.7 presents two panels. Panel A reports estimates of regressions of Voluntary employee turnover on Union industry  $\times$  Rival CBA. I use the specification with firm-specific control variables. I find that the coefficient on Union industry  $\times$  Rival CBA is negative and significant at the 5 percent level. Around the time of rival CBA disclosures, non-unionized firms in unionized industries experience a 1.81 percent reduction in workforce turnover, relative to firms in non-unionized industries. My finding corroborates my argument that non-unionized firms opt to undertake the cost of improving workforce treatment to reduce the risk of losing employees rather than the cost of workforce turnover. Likewise, my inference from this analysis is that firms improve workforce treatment around the time of rival CBA disclosures to pre-empt workforce turnover.

[Insert Table 1.7]

Panel B reports the dynamics of the effect. As there is a concern that employees may depart after firms undo employee-friendly policies, I incorporate Union industry  $\times$  Rival CBA[+1], Union industry  $\times$  Rival CBA[+2], and Union industry

× Rival CBA[+3] into the augmented equation in Panel A. Union industry × Rival CBA[+1], Union industry × Rival CBA[+2], and Union industry × Rival CBA[+3] are indicator variables equal to one if unionized rivals' collective bargaining agreements are effective and publicly known to a non-unionized firm one year, two years, and three years before, respectively. I find that the coefficient on Union industry × Rival CBA is negative and significant at the 5 percent level. However, the coefficients on Union industry × Rival CBA[+1] and Union industry × Rival CBA[+3] are positive but insignificant whereas the coefficient on Union industry × Rival CBA[+2] is negative and insignificant. This evidence indicates that workforce turnover does not increase following the undoing of employee-friendly policies. An explanation would be that employees understand and accept the duration of ad hoc employee-friendly policies. For instance, employers and employees agree on the limited one-year period of work-from-home policy implementation from the outset. Dissatisfaction arising from rivals' favorable workforce terms and conditions is likely to be strongest in the first year before it subsides over time. Thus, after firms undo the work-from-home policy, employees will not feel mistreated and walk away.

## **1.9 Cross-Sectional Analyses**

### **1.9.1 Labor Mobility**

In substantiating my argument that non-unionized firms improve workforce treatment in the face of rival CBA disclosures to deter workforce turnover, I exploit the Inevitable Disclosure Doctrine (IDD) as a deterrent against labor mobility. The IDD forbids employees with trade secrets to join rival firms (and reveal their former employers' proprietary knowledge) in the immediate future although employees do not sign non-compete agreements. The IDD reduces the likelihood of workforce turnover. I investigate the effect of rival CBA disclosures on workforce treatment among firms headquartered in states with IDD adoption (low labor mobility) independently of firms headquartered in states without IDD adoption (high labor mobility). I obtain data on IDD adoption and rejection from Klasa et al. (2018).

Table 1.8 presents four panels. Panel A of Table 1.8 reports the results of estimating my specifications in subsamples based on whether firms are

headquartered in states with IDD adoption. In Column (1) is the subsample of firms headquartered in states without IDD adoption. In Column (2) is the subsample of firms headquartered in states with IDD adoption. I use the specification with firm-specific control variables. I find that the coefficient on Union industry  $\times$  Rival CBA is positive and significant at the 5 percent level for firms headquartered in states without IDD adoption in Column (1) but negative and insignificant for firms headquartered in states with IDD adoption in Column (2).

[Insert Table 1.8]

My results show that improvements in workforce treatment are observed in firms headquartered in states without IDD adoption. The absence of the IDD facilitates employee mobility and increases the risk of workforce turnover. Thus, non-unionized firms headquartered in states without IDD adoption have more incentives to improve workforce treatment to reduce the risk of workforce turnover, strengthening my argument and main results.

### **1.9.2 Electronics Industry**

I examine whether my main results are more salient when non-unionized firms operate in the electronics industry. Panel B of Table 1.8 reports the results of estimating the effect of Union industry  $\times$  Rival CBA  $\times$  Electronics on Workforce score. I extend the analysis in equation (1) by incorporating a moderator “Electronics,” which takes a value of one if a firm operates in the electronics industry and zero otherwise. I use the specification with firm-specific control variables. I find that the coefficient on Union industry  $\times$  Rival CBA  $\times$  Electronics is positive and significant at the 5 percent level.

My main results are pronounced when non-unionized firms operate in the electronics industry. This evidence suggests that workforce retention is less costly than workforce turnover in the industry that requires workers with specialized skillsets. Moreover, the electronics industry is R&D intensive and thus requires a large amount of investment in R&D activities. Therefore, it is reasonable that non-unionized firms in this industry disclose more around the time of rival renegotiations to reduce unionized rivals’ investment and weaken unionized rivals’ competitive edge. In this circumstance, it is probable that the revenue that non-unionized firms

seize from unionized rivals will outweigh non-unionized firms' cost of improving workforce treatment.

### **1.9.3 Number of Peers**

I investigate the effect of rival CBA disclosures on workforce treatment among fewer peer firms separately from more peer firms. Fewer peer firms are firms with fewer industry peers than (or equal to) the median of the whole sample. More peer firms are firms with more industry peers than the median of the whole sample. While industries with fewer peers enable firms to track major rivals closely, industries with more peers experience competition for skilled workers.

Panel C of Table 1.8 reports the results of estimating my specifications in subsamples based upon the number of peers. In Column (1) is the subsample of fewer peer firms. In Column (2) is the subsample of more peer firms. I use the specification with firm-specific control variables. I find that the coefficient on Union industry  $\times$  Rival CBA is positive and significant at the 1 percent level for fewer peer firms in Column (1) but insignificant for more peer firms in Column (2).

My results show that workforce treatment improves for non-unionized firms with fewer non-unionized peers in the industry. My results suggest that firms in industries with fewer non-unionized peers are more likely to improve workforce treatment because this industry attribute facilitates the transfer of information within the industry and allows firms to monitor their major rivals closely and easily.

### **1.9.4 Level of Pensions and Retirement Benefits**

I investigate the effect of rival CBA disclosures on workforce treatment among firms providing higher pensions and retirement benefits separately from those providing lower pensions and retirement benefits. I scale pensions and retirement benefits by beginning total assets and use the median of the whole sample to separate between higher and lower pensions and retirement benefits.

Panel D of Table 1.8 reports the results of estimating my specifications in subsamples based upon the level of pensions and retirement benefits. In Column (1) is the subsample of firms providing lower pensions and retirement benefits. In Column (2) is the subsample of firms providing higher pensions and retirement

benefits. I use the specification with firm-specific control variables. I find that the coefficient on Union industry  $\times$  Rival CBA is positive and significant at the 10 percent level for firms providing lower pensions and retirement benefits in Column (1) but insignificant for firms providing higher pensions and retirement benefits in Column (2).

My results show that the improvement in workforce treatment occurs for firms providing lower pensions and retirement benefits. My inference is that employees at firms providing lower pensions and benefits are more likely to walk away. Therefore, these firms have more incentives to improve workforce treatment to retain their employees. My results also suggest that employee-friendly policies and pensions seem to be substitutes.<sup>7</sup> Hence, firms may switch funds between these two employee welfare elements to optimize resource utilization.

### **1.10 Placebo Tests**

I perform placebo tests to verify the validity of my research design by checking for an association that should not be present (Eggers et al., 2023). In other words, if my research design is sound, then there should be no association between my variable of interest and dependent variables that should not be affected by my variable of interest. Accordingly, I conduct placebo outcome tests by replacing Workforce score with Environmental and Governance score to prove that my main results are valid. I obtain data on Environmental and Governance score from Refinitiv ESG. Although Workforce score is highly correlated with Environment score (0.68) and Governance score (0.42), I expect that these two scores are unaffected by rival CBA disclosures.

Table 1.9 reports estimates of regressions of Environmental and Governance score on Union industry  $\times$  Rival CBA. In Columns (1) and (3) are specifications without control variables. In Columns (2) and (4) are specifications with firm-specific control variables. As expected, I find no association between my interaction terms of interest and the environment or governance score. The coefficients on Union industry  $\times$  Rival CBA are insignificant across all the columns. These results also indicate that

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<sup>7</sup> The Refinitiv workforce score does not consider pensions and retirement benefits.

correlations among disaggregated ESG scores do not determine my main results. In conclusion, my research design is valid because the association that should be absent is indeed absent.

[Insert Table 1.9]

## 1.11 Robustness Tests

### 1.11.1 Drivers of a Non-unionized Firm Operating in a Unionized Industry

I examine the determinants of a non-unionized firm operating in a unionized industry. Following Aobdia and Cheng (2018), I perform the following regression using a logit model.

$$\begin{aligned}
 \text{Union industry}_i &= \beta_0 + \beta_1 \text{Industry PPE}_{it} + \beta_2 \text{Industry book-to-market} \\
 &\quad \text{ratio}_{it} + \beta_3 \text{Industry sales}_{it} + \beta_4 \text{Herfindahl index}_{it} + \\
 &\quad \beta_5 \text{Industry price-cost margin}_{it} + \beta_6 \text{Industry age}_{it} + \\
 &\quad \beta_7 \text{Industry R\&D}_{it} + \beta_8 \text{Industry CAPEX}_{it} + \beta_9 \text{Industry} \\
 &\quad \text{employees}_{it} + \varphi_i + \delta_t + \varepsilon_{it}, \tag{2}
 \end{aligned}$$

where  $i$  indexes firms and  $t$  indexes years. *Union industry<sub>i</sub>* is an indicator variable equal to one for a firm operating in a unionized industry and zero otherwise. I incorporate the following independent variables into the model. *Industry PPE* proxies for industry capital intensity; *Industry book-to-market ratio* for industry growth potential; *Industry sales* for industry size; *Herfindahl index* for industry competitiveness or concentration; *Industry price-cost margin* for industry differentiation; *Industry age* for industry maturity; *Industry CAPEX* for industry tangible investment; and *Industry employees* for industry workforce. Appendix A defines all the variables. I also include state fixed effects ( $\varphi_i$ ) and year fixed effects ( $\delta_t$ ). I cluster standard errors at the industry level.

Table 1.10 presents five panels. Panel A reports the results of my analysis. Panel A-1 reports descriptive statistics. The number of observations is 9,099 because of missing data on some of the determinants. 35 percent of my sample is non-unionized firms in unionized industries. Panel A-2 reports the results of Model (2). I find that *Industry PPE* and *Industry book-to-market ratio* are positively associated with *Union industry* while *Industry sales* and *Herfindahl index* are negatively

associated with *Union industry*. These findings indicate that the likelihood that a non-unionized firm operates in a unionized industry increases when the industry is more capital intensive and has fewer growth opportunities but decreases when the industry is larger in size and more competitive.

[Insert Table 1.10]

### **1.11.2 Entropy Balancing**

I implement entropy balancing to address differences between treatment and control units. A distinct advantage of this matching technique is retaining observations while weighting observations to attain a high degree of covariate balance (Hainmueller, 2012). My covariates are all the determinants of a non-unionized firm operating in a unionized industry. I use this technique to re-estimate equation (1).

Panel B reports the entropy-balanced sample. Panel B-1 reports weighting balance. After being balanced, the determinants are comparable between treatment units (Union industry) and control units (Non-union industry). Both of the groups have identical mean and variance values. Panel A-2 reports the results of regressions based on the entropy-balanced sample. In Column (1) is the specification without control variables. In Column (2) is the specification with firm-specific control variables. I find that the coefficients on Union industry  $\times$  Rival CBA are positive and significant at the 5 and 1 percent level in Columns (1) and (2), respectively. Thus, these results are similar to my main results. To conclude, my main results are robust to using the entropy-balanced sample.

### **1.11.3 Peer Firms Observing CBAs with Favorable Terms and Conditions**

To ensure that CBAs without favorable terms and conditions do not drive my main results, I exclude firm-year observations observing rival CBAs without favorable terms and conditions from my analysis.<sup>9</sup> Panel C of Table 1.10 reports the regression results. In Column (1) is the specification without control variables. In Column (2) is the specification with firm-specific control variables. I find that the coefficients on Union industry  $\times$  Rival CBA are positive and significant at the 1 percent level, which is better than the 5 percent level in my main results. This evidence suggest that

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<sup>9</sup> This exclusion is in line with Appendix B.



excluding observations that observe unfavorable CBAs renders a false positive less likely. In short, my main results are robust to the sample without unfavorable CBAs.

#### **1.11.4 Alternative Treatment of Missing R&D Values**

Koh and Reeb (2015) argue that the presence of missing R&D expenditures may not necessarily indicate the absence of innovation. To address this issue, they propose alternative treatments for missing R&D expenditures. Following Glaeser (2018) and Koh and Reeb (2015), I replace missing R&D values with zero values and include Missing R&D, an indicator variable equal to one for missing R&D in the fiscal year. I modify equation (1) by replacing R&D intensity with Alternative R&D intensity and Missing R&D.

Panel D of Table 1.10 reports the regression results based on Koh and Reeb's (2015) alternative treatment of missing R&D values. Panel D-1 reports the descriptive statistics. Panel D-2 reports the regression results. In Column (1) is the specification without control variables. In Column (2) is the specification with firm-specific control variables. I find that the coefficients on Union industry  $\times$  Rival CBA are positive and significant at the 1 percent level in Columns (1) and (2). To conclude, my main results are robust to using the sample whose missing R&D values are replaced with zero values.

#### **1.11.5 NAICS Code to Categorize Rivals and Industries**

To ensure that my main results are not sensitive to a change in rival (peer) and industry categorization, I use NAICS codes to classify rivals (or peers) and industries and examine the effect of rival CBA disclosures on workforce treatment. Panel E of Table 1.10 presents two panels. Panel E-1 reports the descriptive statistics. Panel E-2 reports the regression results based on the classification by the NAICS code level. In Column (1) is the specification without control variables. In Column (2) is the specification with firm-specific control variables. I find that the coefficients on Union industry  $\times$  Rival CBA are positive and significant at the 1 percent level in Columns (1) and (2). In summary, my main results are robust to using the rival and industry classification based on the NAICS code level.

## 1.12 Conclusion

In this paper, I examine whether and how rival CBA disclosures affect workforce treatment. I posit that non-unionized firms in unionized industries improve workforce treatment around the time of rival CBA disclosures. Better workforce terms and conditions in rival CBAs could cause their employees to feel unfair and dissatisfied, and then walk away. Therefore, improving workforce treatment may pre-empt the undesirable behavior.

Using Aobdia and Cheng's (2018) effectively staggered difference-in-differences model, I find that non-unionized firms in unionized industries improve workforce treatment around the time of rival CBA disclosures. Their behavior is prominent only in the years of rival CBA disclosures and reverts to normal in the following year. In so doing, they use a combination of less sticky and stickier employee-friendly policies. I find some evidence that they experience a decline in voluntary employee turnover in the face of rival CBA disclosures. In sum, my results suggest that non-unionized firms in unionized industries improve workforce treatment to pre-empt employee dissatisfaction and turnover. I also perform cross-sectional analyses, placebo tests, and robustness tests. Despite all these tests, I cannot rule out all possible confounds. Another limitation of my study is the coverage of Refinitiv ESG that has expanded over time.

My study has twofold implications. On the one hand, it contributes primarily to the literature on the real effects of voluntary disclosures, the strategic role of ESG practice, organized labor, and strategic human capital management. I bridge the gap in Aobdia and Cheng (2018) by providing evidence that non-unionized firms in unionized industries opt to undertake the cost of workforce retention rather than the cost of workforce turnover in the face of rival CBA disclosures. My results suggest that improvements in workforce treatment is a short-term, costly consequence for non-unionized firms that disclose more around the time of rival renegotiations and that the benefit they later receive outweighs the cost of improving workforce treatment.

On the other hand, my results suggest that workforce terms and conditions at rivals could influence workforce perceptions and behaviors. Hence, firms should monitor their rivals closely and stand poised to react promptly to retain their valuable

human capital. In retaining human capital, firms should design a unique combination of employee-friendly policies to differentiate themselves. To add novel insights to this stream of literature, future researchers may investigate how executives design workforce treatment for retention purposes in the face of external negative events by using primary data from a questionnaire survey and interviews.

## 1.13 Tables

Table 1.1

### Sample Selection

	<b>Contracts</b>	<b>Firm-years</b>
<b>Unionized industries</b>		
Collective bargaining agreements from Bloomberg Settlement Summaries 2002-2020	8,049	
Matched with Compustat	447	
Collective bargaining agreements at the firm-year level	287	
Observations in unionized industries with firm data available		4,347
<u>Less</u> Unionized rivals in unionized industries		<u>(762)</u>
Non-unionized observations in unionized industries with firm data available		3,585
<b>Non-unionized industries</b>		
Observations in non-unionized industries with firm data available		<u>6,995</u>
<b>Total observations</b>		<b>10,580</b>

**Table 1.2**

**Sample Distribution**

Table 1.2 presents two panels. Panel A reports the number of observations by year. My unit of analysis is firm-year. For example, there were 192 firms in 2002. Panel B reports the number of observations by industry. For example, there are 6,982 firm-year observations in the manufacturing industry.

**Panel A: Sample by Year**

<b>Year</b>	<b>Firm-years</b>	<b>Percent</b>
2002	192	1.81
2003	214	2.02
2004	282	2.67
2005	313	2.96
2006	307	2.90
2007	320	3.02
2008	389	3.68
2009	437	4.13
2010	457	4.32
2011	460	4.35
2012	457	4.32
2013	437	4.13
2014	426	4.03
2015	660	6.24
2016	889	8.40
2017	1,043	9.86
2018	1,074	10.15
2019	1,109	10.48
2020	1,114	10.53
<b>Total</b>	<b>10,580</b>	<b>100.00</b>

**Panel B: Sample by Industry**

<b>Industry</b>	<b>Firm-years</b>	<b>%</b>
Agriculture, Forestry, and Fishing	12	0.11
Construction	18	0.17
Finance and Insurance	73	0.69
Manufacturing	6,982	65.99
Mining	197	1.86
Real Estate	102	0.96
Retail Trade	908	8.58
Services	1,655	15.64
Transportation and Public Utilities	313	2.96
Wholesale Trade	280	2.65
Other	40	0.39
<b>Total</b>	<b>10,580</b>	<b>100.00</b>

**Table 1.3****Sample Characteristics**

Table 1.3 presents three panels. Panel A reports the descriptive statistics of the full sample. Panel B reports the descriptive statistics of the union industry. My sample period spans 19 years from 2002 to 2020. All continuous control variables are winsorized at 1st and 99th percentiles to mitigate the effect of outliers. Panel C reports correlation matrix. In bold are all correlations that are statistically significant at the 0.10 level or better (two-tailed). All variables are defined in Appendix A.

**Panel A: Descriptive Statistics of the Full Sample**

<b>Variables</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>25th</b>	<b>Median</b>	<b>75th</b>
Workforce score	10,580	4.823	2.875	2.349	4.504	7.321
Flexible hours	10,337	0.216	0.411	0.000	0.000	0.000
Day care services	10,323	0.136	0.343	0.000	0.000	0.000
Voluntary employee turnover	376	0.090	0.073	0.050	0.075	0.100
Union industry	10,580	0.339	0.473	0.000	0.000	1.000
Rival CBA	10,580	0.034	0.181	0.000	0.000	0.000
Total assets	10,580	8.137	1.856	6.949	8.079	9.332
Market to book ratios	10,580	4.913	6.802	1.831	3.047	5.043
Returns on assets	10,580	0.011	0.179	-0.002	0.045	0.090
Leverage	10,580	0.261	0.222	0.089	0.232	0.376
Free cash flows	10,580	0.039	0.157	0.018	0.061	0.109
Kaplan & Zingales index	10,580	0.724	1.319	0.094	0.781	1.532
Sales	10,580	7.732	2.152	6.610	7.884	9.141
R&D intensity	10,580	0.071	0.113	0.005	0.027	0.088
Electronics	10,580	0.113	0.317	0.000	0.000	0.000

**Panel B: Descriptive Statistics of the Union Industry**

<b>Variables</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>25th</b>	<b>Median</b>	<b>75th</b>
Workforce score	3,585	5.277	2.987	2.663	5.110	8.138
Flexible hours	3,499	0.255	0.436	0.000	0.000	1.000
Day care services	3,486	0.178	0.383	0.000	0.000	0.000
Voluntary employee turnover	173	0.073	0.045	0.040	0.060	0.090
Union industry	3,585	1.000	0.000	1.000	1.000	1.000
Rival CBA	3,585	0.100	0.301	0.000	0.000	0.000
Total assets	3,585	8.700	1.936	7.468	8.662	10.041
Market to book ratios	3,585	4.368	6.419	1.562	2.681	4.378
Returns on assets	3,585	0.033	0.137	0.009	0.046	0.090
Leverage	3,585	0.274	0.207	0.131	0.249	0.381
Free cash flows	3,585	0.052	0.121	0.020	0.058	0.103
Kaplan & Zingales index	3,585	0.641	1.387	-0.017	0.748	1.538
Sales	3,585	8.384	2.028	7.275	8.543	9.714
R&D intensity	3,585	0.060	0.093	0.004	0.027	0.078
Electronics	3,585	0.210	0.407	0.000	0.000	0.000



### Panel C: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Workforce score	1.00														
(2) Flexible hours	<b>0.48</b>	1.00													
(3) Day care services	<b>0.46</b>	<b>0.43</b>	1.00												
(4) Voluntary employee turnover	<b>-0.30</b>	<b>-0.13</b>	<b>-0.20</b>	1.00											
(5) Union industry	<b>0.11</b>	<b>0.07</b>	<b>0.09</b>	<b>-0.22</b>	1.00										
(6) Rival CBA	<b>0.08</b>	<b>0.06</b>	<b>0.05</b>	-0.02	<b>0.26</b>	1.00									
(7) Total assets	<b>0.60</b>	<b>0.36</b>	<b>0.39</b>	<b>-0.26</b>	<b>0.22</b>	<b>0.13</b>	1.00								
(8) Market to book ratios	0.00	0.01	0.01	0.06	<b>-0.06</b>	<b>-0.02</b>	<b>-0.14</b>	1.00							
(9) Returns on assets	<b>0.14</b>	<b>0.09</b>	<b>0.10</b>	0.00	<b>0.09</b>	<b>0.04</b>	<b>0.38</b>	<b>-0.09</b>	1.00						
(10) Leverage	<b>0.04</b>	<b>0.02</b>	0.01	<b>0.21</b>	<b>0.04</b>	0.01	<b>0.16</b>	<b>0.22</b>	<b>-0.07</b>	1.00					
(11) Free cash flows	<b>0.12</b>	<b>0.09</b>	<b>0.09</b>	0.05	<b>0.06</b>	<b>0.03</b>	<b>0.33</b>	<b>-0.04</b>	<b>0.84</b>	<b>-0.09</b>	1.00				
(12) Kaplan & Zingales index	<b>-0.12</b>	<b>-0.08</b>	<b>-0.09</b>	<b>0.14</b>	<b>-0.05</b>	<b>-0.03</b>	<b>-0.09</b>	<b>0.24</b>	<b>-0.27</b>	<b>0.45</b>	<b>-0.25</b>	1.00			
(13) Sales	<b>0.51</b>	<b>0.31</b>	<b>0.34</b>	<b>-0.17</b>	<b>0.22</b>	<b>0.13</b>	<b>0.92</b>	<b>-0.13</b>	<b>0.55</b>	<b>0.11</b>	<b>0.49</b>	<b>-0.11</b>	1.00		
(14) R&D intensity	<b>-0.06</b>	<b>-0.06</b>	<b>-0.06</b>	-0.06	<b>-0.07</b>	<b>-0.07</b>	<b>-0.40</b>	<b>0.21</b>	<b>-0.60</b>	<b>-0.13</b>	<b>-0.49</b>	<b>0.05</b>	<b>-0.54</b>	1.00	
(15) Electronic	<b>0.03</b>	0.00	0.00	<b>-0.11</b>	<b>0.22</b>	<b>-0.03</b>	0.00	<b>-0.07</b>	<b>0.02</b>	<b>-0.12</b>	<b>0.02</b>	<b>-0.10</b>	0.00	<b>0.09</b>	1.00

**Table 1.4****Main Results**

Table 1.4 provides estimates of regressions of Workforce score on Union industry × Rival CBA. In Columns (1) is the specification without control variables. In Columns (2) is the specification with firm-specific control variables. All continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the industry level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.

Dependent variable	(1) Workforce score	(2) Workforce score
Union industry × Rival CBA	0.183*** (2.677)	0.171** (2.575)
Total assets		0.603*** (5.072)
Market to book ratios		0.012** (2.184)
Returns on assets		0.757*** (3.302)
Leverage		0.007 (0.048)
Free cash flows		-0.631** (-2.379)
Kaplan & Zingales index		-0.020 (-0.657)
Sales		0.104 (0.863)
R&D intensity		0.830*** (2.779)
Constant	4.816*** (2,070.303)	-0.981 (-1.292)
Observations	10,580	10,580
Adjusted R-squared	0.783	0.789
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Industry	Industry

**Table 1.5****Timing of Workforce Treatment Improvement**

Table 1.5 extends the analysis of equation (1) to the years preceding and following the disclosures of collective bargaining agreements. Union industry  $\times$  Rival CBA[-1] is an indicator variable equal to one if unionized rivals' collective bargaining agreements are effective and publicly known to a non-unionized firm one year after. Union industry  $\times$  Rival CBA[+1] and Union industry  $\times$  Rival CBA[+2] are indicator variables equal to one if unionized rivals' collective bargaining agreements are effective and publicly known to a non-unionized firm one year and two years before, respectively. I use the specification with firm-specific control variables. All continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the industry level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.

Dependent variable	Workforce score
Union industry $\times$ Rival CBA[-1]	0.064 (0.728)
Union industry $\times$ Rival CBA	0.181** (2.427)
Union industry $\times$ Rival CBA[+1]	0.029 (0.287)
Union industry $\times$ Rival CBA[+2]	0.071 (0.763)
Constant	-0.976 (-1.284)
Observations	10,580
Adjusted R-squared	0.789
Controls	Yes
Year fixed effects	Yes
Firm fixed effects	Yes
Clustering	Industry
<u>Test: Union industry <math>\times</math> Rival CBA[-1] = Union industry <math>\times</math> Rival CBA</u>	
F-statistics	2.090
p-value	0.150
<u>Test: Union industry <math>\times</math> Rival CBA = Union industry <math>\times</math> Rival CBA[+1]</u>	
F-statistics	5.270**
p-value	0.023**

## Table 1.6

### Mechanism Tests

Table 1.6 presents two panels. Panel A reports estimates of regressions of Flexible hours and Daycare services on Union industry  $\times$  Rival CBA. Panel B reports the dynamics of the effect. Union industry  $\times$  Rival CBA[-1] is an indicator variable equal to one if unionized rivals' collective bargaining agreements are effective and publicly known to a non-unionized firm one year after. Union industry  $\times$  Rival CBA[+1] and Union industry  $\times$  Rival CBA[+2] are indicator variables equal to one if unionized rivals' collective bargaining agreements are effective and publicly known to a non-unionized firm one year and two years before, respectively. I use the specifications with firm-specific control variables. All continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the industry level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.

**Panel A: Effect of Rival CBA Disclosures on Key Performance Indicators**

Dependent variables	(1) Flexible hours	(2) Day care services
Union industry × Rival CBA	0.035** (1.978)	0.046** (2.302)
Total assets	0.023 (1.454)	0.018 (1.118)
Market to book ratios	0.001 (1.133)	0.001 (1.052)
Returns on assets	0.041 (0.831)	0.006 (0.190)
Leverage	-0.026 (-0.936)	-0.012 (-0.545)
Free cash flows	-0.064 (-1.285)	-0.024 (-0.584)
Kaplan & Zingales index	-0.006 (-1.161)	-0.009* (-1.793)
Sales	-0.018 (-1.190)	-0.012 (-1.065)
R&D intensity	-0.088 (-0.700)	-0.217** (-2.296)
Constant	0.177 (1.212)	0.100 (0.688)
Observations	10,337	10,323
Adjusted R-squared	0.663	0.619
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Industry	Industry

**Panel B: Dynamics of the Effect**

Dependent variables	(1) Flexible hours	(2) Day care services
Union industry × Rival CBA[-1]	0.024 (0.910)	0.035 (1.491)
Union industry × Rival CBA	0.041** (2.097)	0.053** (2.396)
Union industry × Rival CBA[+1]	0.041 (1.482)	0.046** (2.315)
Union industry × Rival CBA[+2]	0.027 (1.206)	0.025 (1.244)
Constant	0.180 (1.229)	0.104 (0.709)
Observations	10,337	10,323
Adjusted R-squared	0.663	0.620
Controls	Yes	Yes
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Industry	Industry
<u>Test: Union industry × Rival CBA[-1] = Union industry × Rival CBA</u>		
F-statistics	0.540	0.810
p-value	0.462	0.369
<u>Test: Union industry × Rival CBA = Union industry × Rival CBA[+1]</u>		
F-statistics	0.000	0.180
p-value	0.982	0.674

## **Table 1.7**

### **Consequences of Improving Workforce Treatment**

Table 1.7 presents two panels. Panel A reports estimates of regressions of Voluntary employee turnover on Union industry  $\times$  Rival CBA. Panel B reports the dynamics of the effect. Union industry  $\times$  Rival CBA[+1] and Union industry  $\times$  Rival CBA[+2] are indicator variables equal to one if unionized rivals' collective bargaining agreements are effective and publicly known to a non-unionized firm one year and two years before, respectively. I use the specification with firm-specific control variables. All continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the industry level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.

**Panel A: Effect of Rival CBA Disclosures on Key Performance Indicators**

Dependent variable	Voluntary employee turnover
Union industry x Rival CBA	-0.018** (-2.457)
Total assets	-0.020 (-1.184)
Market to book ratios	0.000 (0.857)
Returns on assets	-0.012 (-0.461)
Leverage	0.040 (1.432)
Free cash flows	-0.055 (-1.076)
Kaplan & Zingales index	-0.001 (-0.296)
Sales	0.022 (1.403)
R&D intensity	-0.129* (-1.988)
Constant	0.086 (0.831)
Observations	376
Adjusted R-squared	0.892
Year fixed effects	Yes
Firm fixed effects	Yes
Clustering	Industry



## Panel B: Dynamics of the Effect

Dependent variable	Voluntary employee turnover
Union industry × Rival CBA	-0.021*** (-3.360)
Union industry × Rival CBA[+1]	-0.002 (-0.235)
Union industry × Rival CBA[+2]	0.001 (0.114)
Union industry × Rival CBA[+3]	-0.011 (-0.973)
Constant	0.091 (0.872)
Observations	376
Adjusted R-squared	0.891
Controls	Yes
Year fixed effects	Yes
Firm fixed effects	Yes
Clustering	Industry
<u>Test: Union industry × Rival CBA = Union industry × Rival CBA[+1]</u>	
F-statistics	4.220**
p-value	0.043**

## Table 1.8

### Cross-Sectional Analyses

Table 1.8 presents four panels. Panel A reports the results of estimating my specifications in subsamples based upon whether firms are headquartered in states that adopt the Inevitable Disclosure Doctrine (IDD). Panel B extends equation (1) by incorporating the moderator “Electronics” into the analysis. It provides the estimates of regressions of Workforce score on Union industry  $\times$  Rival CBA  $\times$  Electronics. I use the specification with firm-specific control variables. Panel C presents the results of estimating my specifications in subsamples based upon whether the number of peers exceeds the median of the whole sample. In Column (1), I use firms with fewer peers than (or equal to) the median as my subsample. In Column (2), I use firms with more peers than the median as my subsample. Panel D presents the results of estimating my specifications in subsamples based upon whether the amount of pension and retirement benefits scaled by beginning total assets exceeds the median of the whole sample. In Column (1), I use firms with higher pension and retirement benefits than the median as my subsample. In Column (2), I use firms with lower pensions and retirement benefits than (or equal to) the median as my subsample. In all the panels, I use specifications with firm-specific control variables. All continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the industry level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.

**Panel A: Whether Firms Are Headquartered in IDD-Adopting States**

	States without IDD	States with IDD
Dependent variable	(1) Workforce score	(2) Workforce score
Union industry x Rival CBA	0.202** (2.323)	-0.012 (-0.083)
Total assets	0.733*** (6.749)	0.427* (1.863)
Market to book ratios	0.019*** (2.739)	0.001 (0.137)
Returns on assets	0.515* (1.741)	0.938*** (3.044)
Leverage	0.016 (0.093)	-0.006 (-0.023)
Free cash flows	-0.718** (-2.004)	-0.370 (-1.094)
Kaplan & Zingales index	-0.034 (-0.923)	-0.013 (-0.216)
Sales	0.044 (0.498)	0.155 (0.768)
R&D intensity	1.112*** (3.249)	0.902* (1.799)
Constant	-1.356 (-1.599)	-0.330 (-0.247)
Observations	6,208	4,372
Adjusted R-squared	0.812	0.730
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Industry	Industry
<u>Test: Union industry x Rival CBA between Columns (1) and (2)</u>		
F-statistics	1.380	
p-value	0.240	

### Panel B: Electronics Industry

Dependent variable	Workforce score
Union industry × Rival CBA × Electronics	0.366** (2.045)
Union industry × Rival CBA	0.142** (2.062)
Constant	-0.980 (-1.290)
Observations	10,580
Adjusted R-squared	0.789
Controls	Yes
Year fixed effects	Yes
Firm fixed effects	Yes
Clustering	Industry

**Panel C: Number of Peers**

	Fewer peer firms	More peer firms
Dependent variable	(1) Workforce score	(2) Workforce score
Union industry × Rival CBA	0.273*** (2.871)	0.131 (1.081)
Total assets	0.413** (2.482)	0.748*** (7.176)
Market to book ratios	0.004 (0.399)	0.010 (1.614)
Returns on assets	1.679*** (4.335)	0.365* (1.937)
Leverage	0.421** (2.010)	-0.231* (-1.788)
Free cash flows	0.263 (0.525)	-0.910*** (-3.199)
Kaplan & Zingales index	-0.035 (-0.787)	0.007 (0.221)
Sales	0.225 (1.383)	0.004 (0.034)
R&D intensity	3.010*** (3.589)	0.229 (1.367)
Constant	-0.894 (-0.859)	-0.945 (-1.000)
Observations	5,781	4,799
Adjusted R-squared	0.781	0.823
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Industry	Industry
<u>Test: Union industry × Rival CBA between Columns (1) and (2)</u>		
F-statistics		0.077
p-value		0.380

## Panel D: Level of Pension and Retirement Benefits

	Lower pension and retirement benefits	Higher pension and retirement benefits
Dependent variable	(1) Workforce score	(2) Workforce score
Union industry × Rival CBA	0.212* (1.928)	0.155 (1.035)
Total assets	0.417*** (2.603)	0.546*** (3.615)
Market to book ratios	0.012 (1.377)	0.007 (1.018)
Returns on assets	1.256*** (3.233)	0.046 (0.181)
Leverage	0.188 (0.962)	-0.009 (-0.051)
Free cash flows	-0.649* (-1.848)	-0.668* (-1.810)
Kaplan & Zingales index	-0.060 (-1.420)	-0.000 (-0.007)
Sales	0.331** (2.106)	0.019 (0.143)
R&D intensity	1.265** (2.442)	0.415 (0.694)
Constant	-1.587* (-1.730)	0.605 (0.553)
Observations	6,302	4,278
Adjusted R-squared	0.778	0.813
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Industry	Industry
<u>Test: Union industry × Rival CBA between Columns (1) and (2)</u>		
F-statistics		0.060
p-value		0.801

**Table 1.9****Placebo Tests**

Table 1.9 reports the estimates of regressions of my placebo outcome variables Environmental and Governance score on Union industry × Rival CBA. In Columns (1) and (3) are specifications without control variables. In Columns (2) and (4) are specifications with firm-specific control variables. All continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the industry level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.

Dependent variable	(1) Environmental score	(2) Environmental score	(3) Governance score	(4) Governance score
Union industry × Rival CBA	0.094 (1.160)	0.080 (0.998)	-0.036 (-0.353)	-0.044 (-0.432)
Total assets		0.306** (2.469)		0.229** (2.242)
Market to book ratios		0.006 (1.620)		-0.001 (-0.269)
Returns on assets		-0.453** (-2.166)		-0.311 (-1.196)
Leverage		-0.217 (-1.275)		-0.095 (-0.653)
Free cash flows		0.024 (0.103)		0.190 (0.754)
Kaplan & Zingales index		-0.022 (-0.889)		0.012 (0.413)
Sales		0.175 (1.530)		0.179*** (2.748)
R&D intensity		-0.446 (-0.796)		-0.449 (-0.943)
Constant	2.989*** (1,084.366)	-0.781 (-0.909)	5.013*** (1,499.516)	1.822** (2.236)
Observations	10,580	10,580	10,305	10,305
Adjusted R-squared	0.854	0.856	0.650	0.653
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Clustering	Industry	Industry	Industry	Industry

## **Table 1.10**

### **Robustness Tests**

Table 1.10 presents five panels. Panel A reports the determinants of a non-unionized firm operating in a unionized industry. Panel B reports the results of entropy balancing and the estimates of regressions of Workforce score on Union industry  $\times$  Rival CBA using the entropy balancing approach. Panel C reports the estimates of regressions of Workforce score on Union industry  $\times$  Rival CBA using only peer firms that observe favorable collective bargaining agreements. Panel D reports the estimates of regressions of Workforce score on Union industry  $\times$  Rival CBA using Koh and Reeb's (2015) alternative treatment of missing R&D values. Panel E reports the estimates of regressions of Workforce score on Union industry  $\times$  Rival CBA using six-digit NAICS to categorize industries and rivals. In panels B to E, all continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The z-statistics or t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the industry level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.



## Panel A: Propensity of a Non-Unionized Firm to Operate in a Unionized Industry

### Panel A-1: Descriptive Statistics

	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>p25</b>	<b>Median</b>	<b>p75</b>
Union industry	9,099	0.352	0.478	0.000	0.000	1.000
Industry PPE	9,099	9.250	2.043	7.892	9.390	10.838
Industry book-to-market ratio	9,099	0.375	0.279	0.194	0.288	0.448
Industry sales	9,099	10.610	1.750	9.373	10.788	12.068
Herfindahl index	9,099	0.421	0.261	0.231	0.342	0.551
Industry price-cost margin	9,099	1.293	0.189	1.157	1.257	1.406
Industry age	9,099	18.067	10.539	11.305	16.105	20.463
Industry R&D	9,099	2,313.555	3,255.413	56.251	589.746	3,805.493
Industry CAPEX	9,099	2,558.126	4,488.314	189.918	630.860	2,406.532
Industry employees	9,099	4.784	1.629	3.837	4.811	6.196

## Panel A-2: Regression Results

Dependent variable	Union industry
Industry PPE	1.097*** (2.606)
Industry book-to-market ratio	1.268** (2.011)
Industry sales	-1.195** (-2.085)
Herfindahl index	-1.692* (-1.746)
Industry price-cost margin	-0.694 (-0.575)
Industry age	-0.009 (-0.493)
Industry R&D	-0.000 (-0.424)
Industry CAPEX	-0.000 (-0.705)
Industry employees	0.667 (1.533)
Constant	0.600 (0.187)
Observations	9,099
Pseudo R-squared	0.251
Year fixed effects	Yes
State fixed effects	Yes
Clustering	Industry

**Panel B: Entropy-Balanced Sample**

**Panel B-1: Weighting Balance**

	Union industry (N=3,200)			Non-Union industry (N= 5,899)					
	Mean	Variance	Skewness	Before balancing			After balancing		
				Mean	Variance	Skewness	Mean	Variance	Skewness
Industry PPE	10.300	3.839	-0.577	8.682	3.438	-0.449	10.300	3.842	-2.660
Industry book-to-market ratio	0.442	0.091	2.233	0.339	0.067	3.127	0.442	0.091	1.354
Industry sales	11.350	2.869	-0.865	10.210	2.711	-0.349	11.350	2.870	-2.937
Herfindahl index	0.330	0.068	1.232	0.471	0.061	0.994	0.331	0.068	1.752
Industry price-cost margin	1.311	0.034	-0.031	1.284	0.036	1.529	1.311	0.034	-0.910
Industry age	18.970	117.500	2.042	17.580	106.900	2.199	18.970	117.500	1.753
Industry R&D	2,606	8,117,189	0.883	2,155	11,900,000	2.122	2,606	8,118,809	0.719
Industry CAPEX	3,955	35,000,000	2.569	1,800	10,400,000	2.699	3,955	35,000,000	2.427
Industry employees	5.549	2.051	-1.310	4.368	2.490	-0.429	5.549	2.052	-3.022

### Panel B-2: Regression Results Based on Entropy Balancing

Dependent variable	(1) Workforce score	(2) Workforce score
Union industry × Rival CBA	0.187** (2.493)	0.181*** (2.655)
Total assets		0.837*** (4.359)
Market to book ratios		0.010 (1.592)
Returns on assets		0.562 (1.637)
Leverage		-0.186 (-0.849)
Free cash flows		-0.349 (-0.582)
Kaplan & Zingales index		0.032 (0.939)
Sales		0.036 (0.298)
R&D intensity		0.131 (0.471)
Constant	5.211*** (1,369.188)	-2.169 (-1.433)
Observations	9,099	9,099
Adjusted R-squared	0.870	0.874
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Industry	Industry

**Panel C: Regression Results Based on Peer Firms Observing Favorable Terms**

Dependent variable	(1) Workforce score	(2) Workforce score
Union industry × Rival CBA	0.200*** (2.782)	0.196*** (2.908)
Total assets		0.606*** (5.118)
Market to book ratios		0.012** (2.245)
Returns on assets		0.744*** (3.253)
Leverage		-0.008 (-0.059)
Free cash flows		-0.606** (-2.267)
Kaplan & Zingales index		-0.023 (-0.763)
Sales		0.104 (0.867)
R&D intensity		0.833*** (2.780)
Constant	4.809*** (2,329.911)	-1.006 (-1.326)
Observations	10,522	10,522
Adjusted R-squared	0.783	0.789
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Industry	Industry

## Panel D: Sample with Alternative Treatment of Missing R&D values

### Panel D-1: Descriptive Statistics

	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>25th</b>	<b>Median</b>	<b>75th</b>
Workforce score	17,993	4.613	2.827	2.204	4.241	6.956
Union industry	17,993	0.365	0.481	0.000	0.000	1.000
Rival CBA	17,993	0.060	0.237	0.000	0.000	0.000
Total assets	17,993	8.360	1.785	7.228	8.306	9.523
Market to book ratios	17,993	4.118	5.603	1.513	2.505	4.336
Returns on assets	17,993	0.023	0.139	0.005	0.038	0.082
Leverage	17,993	0.281	0.221	0.113	0.256	0.400
Free cash flows	17,993	0.040	0.128	0.009	0.051	0.098
Kaplan & Zingales index	17,993	0.806	1.301	0.216	0.925	1.603
Sales	17,993	7.838	1.918	6.797	7.945	9.103
Alternative R&D intensity	17,993	0.041	0.088	0.000	0.000	0.040
Missing R&D	17,993	0.412	0.492	0.000	0.000	1.000

**Panel D-2: Regression Results Based on Alternative Treatment of Missing R&D**

Dependent variable	(1) Workforce score	(2) Workforce score
Union industry × Rival CBA	0.194*** (2.956)	0.172*** (2.730)
Total assets		0.534*** (6.525)
Market to book ratios		0.013*** (2.654)
Returns on assets		0.488** (2.479)
Leverage		0.150 (1.238)
Free cash flows		-0.320 (-1.424)
Kaplan & Zingales index		-0.027 (-1.174)
Sales		0.072 (0.931)
Alternative R&D intensity		0.778* (1.888)
Missing R&D		0.080 (0.552)
Constant	4.601*** (1,178.016)	-0.568 (-1.027)
Observations	17,993	17,993
Adjusted R-squared	0.775	0.780
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Industry	Industry

## Panel E: Sample Using Six-Digit NAICS to Categorize Industries and Rivals

### Panel E-1: Descriptive Statistics

	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>25th</b>	<b>Median</b>	<b>75th</b>
Workforce score	10,580	4.823	2.875	2.349	4.504	7.321
Union industry	10,580	0.288	0.453	0.000	0.000	1.000
Rival CBA	10,580	0.025	0.157	0.000	0.000	0.000
Total assets	10,580	8.138	1.857	6.949	8.079	9.332
Market to book ratios	10,580	4.910	6.783	1.831	3.047	5.043
Returns on assets	10,580	0.011	0.177	-0.002	0.045	0.090
Leverage	10,580	0.261	0.222	0.089	0.232	0.376
Free cash flows	10,580	0.040	0.156	0.018	0.061	0.109
Kaplan & Zingales index	10,580	0.725	1.312	0.094	0.781	1.532
Sales	10,580	7.733	2.147	6.610	7.884	9.141
R&D intensity	10,580	0.071	0.112	0.005	0.027	0.088



**Panel E-2: Regression Results Based on Classification by the NAICS Code Level**

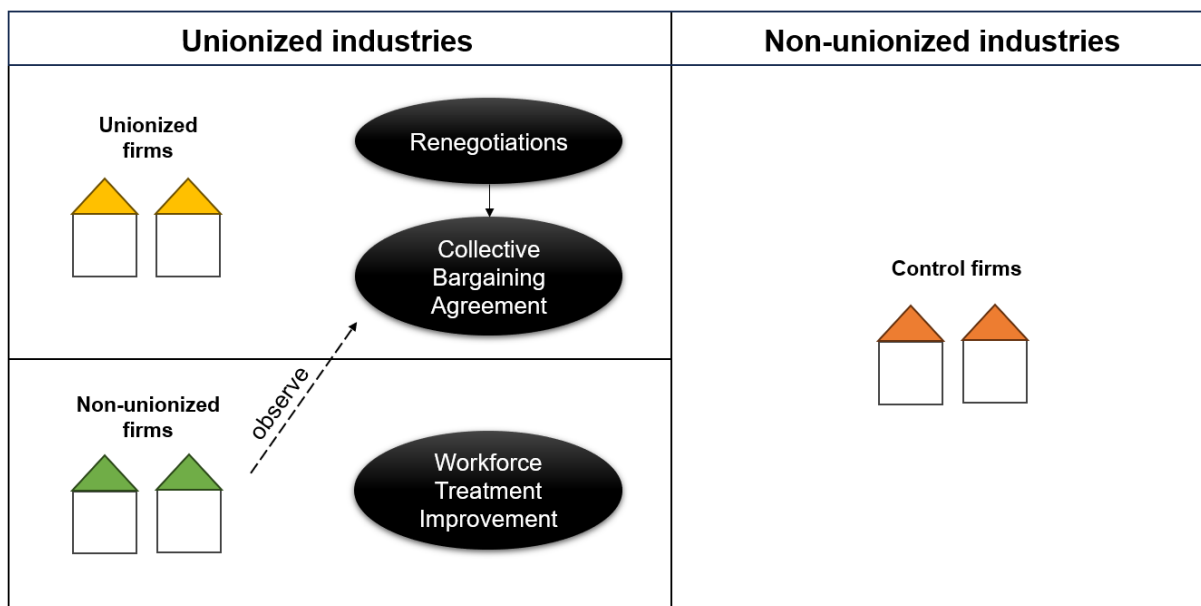
Dependent variable	(1) Workforce score	(2) Workforce score
Union industry × Rival CBA	0.248*** (2.820)	0.219*** (2.707)
Total assets		0.596*** (4.903)
Market to book ratios		0.012** (2.241)
Returns on assets		0.756*** (3.076)
Leverage		0.009 (0.065)
Free cash flows		-0.631** (-2.410)
Kaplan & Zingales index		-0.021 (-0.668)
Sales		0.112 (0.932)
R&D intensity		0.855** (2.261)
Constant	4.816*** (2,160.858)	-0.984 (-1.298)
Observations	10,580	10,580
Adjusted R-squared	0.783	0.789
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Industry	Industry

## 1.14 Figure

Figure 1.1

### Research Setting

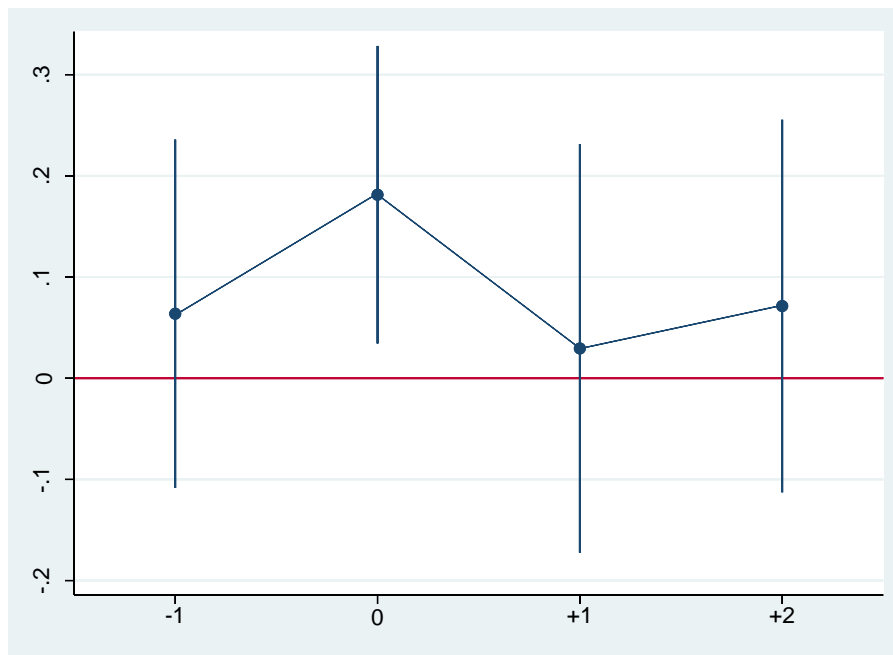
Figure 1.1 illustrates the setting of my study. There are unionized and non-unionized industries. Unionized industries comprise unionized firms and non-unionized firms. Unionized firms involve in labor renegotiations with unions every three to five years. Labor renegotiations typically occur three months prior to the expiration of the existing contracts. Upon the completion of renegotiations, firms and unions create a collective bargaining agreement, which details resulting changes in wages and working conditions and becomes publicly available through news, union and firm press releases, and the Department of Labor website. Together with their workforce, non-unionized firms, which do not involve renegotiations, observe the disclosure of the collective bargaining agreement. To pre-empt workforce dissatisfaction and turnover, non-unionized firms improve workforce treatment as soon as they observe the collective bargaining agreement. Since my study focuses on non-unionized firms in unionized industries, I exclude unionized firms (known as unionized rivals) from my sample. My treatment group is non-unionized firms in unionized industries. My control group is firms in non-unionized industries.



**Figure 1.2**

**Plot of Changes in Workforce Treatment around Rivals' Labor Renegotiations**

Figure 1.2 plots the estimated coefficients on Union industry  $\times$  Rival CBA one year before, during the year of, one year after, and two years after rival disclosures of collective bargaining agreements. The coefficients are taken from Table 1.5. The vertical axis represents the coefficients. The horizontal axis represents the timing of workforce treatment improvement. To evaluate statistical significance, I plot the two-tailed 95 percent confidence interval. The coefficient at time zero is significant as its confidence interval does not touch the zero line.



## 1.15 Appendices

### Appendix A. Variable Definitions

<b>Variables</b>	<b>Definitions</b>	<b>Sources</b>
<u>Dependent variables</u>		
Workforce score	A company's effectiveness in terms of providing job satisfaction, a healthy and safe workplace, maintaining diversity and equal opportunities, and development opportunities for its workforce. Workforce score ranges from 0 (minimum) to 100 (maximum). I divide the score by 10 for my analysis.	Refinitiv ESG
Day care services	Indicator variable equal to one for the firm that provides day care services for its employees during the fiscal year and zero otherwise. Adult, elderly, and disabled care is also considered.	Refinitiv ESG
Flexible hours	Indicator variable equal to one for the firm that provides working hours that promote a work-life balance during the fiscal year and zero otherwise.	Refinitiv ESG
Voluntary turnover	Employees leaving voluntarily/Average number of employees.	Refinitiv ESG
Environmental score	The weighted average relative rating of a firm based on the reported environmental information and the resulting three environmental category scores. The environment score ranges from 0 (minimum) to 100 (maximum). I divide the score by 10 for my analysis.	Refinitiv ESG
Governance score	The weighted average relative rating of a firm based on the reported governance information and the resulting three governance category scores. The governance score ranges from 0 (minimum) to 100 (maximum). I divide the score by 10 for my analysis.	Refinitiv ESG
<u>Main independent variables</u>		
Union industry	Indicator variable equal to one if a firm operates in a unionized industry. An industry is defined by the Compustat four-digit SIC code and unionized when at least one firm in the industry reaches a collective bargaining agreement during the sample period.	Bloomberg BNA, Compustat
Rival CBA	Indicator variable equal to one for the fiscal year when unionized rivals' collective bargaining agreements are effective and publicly known to a non-unionized firm in unionized industries. Rivals are defined by the four-digit SIC code.	Bloomberg BNA, Compustat
<u>Other variables</u>		
Electronics	Indicator variable equal to one if a firm operates in the electronics industry.	Compustat
Total assets	Natural logarithm of ending total assets.	Compustat
Market to book ratio	Market to book ratio of equity	Compustat
Return on assets	Income before extraordinary items less pension and retirement expense scaled by beginning total assets	Compustat

<b>Variables</b>	<b>Definitions</b>	<b>Sources</b>
Leverage	Long-term debt plus debt in current liabilities scaled by beginning total assets.	Compustat
Free cash flows	Cash flows from operations less capital expenditure scaled by beginning total assets.	Compustat
Kaplan & Zingales index	$-1.002 \times \text{cash flow from operations}/\text{beginning total assets} - 39.368 \times \text{cash dividends}/\text{beginning total assets} - 1.315 \times \text{ending cash balance}/\text{beginning total assets} + 3.139 \times \text{book leverage ratio} + 0.283 \times \text{Tobin's Q}$ . A higher Kaplan & Zingales index means a higher capital constraint.	Compustat
Sales	Natural logarithm of sales	Compustat
R&D intensity	Research and development (R&D) expense scaled by beginning total assets.	Compustat
Alternative R&D expense	R&D expenditures scaled by beginning total assets, with missing R&D values being replaced by zeroes.	Compustat
Missing R&D expense	Indicator variable equal to one if R&D expenditure is missing.	Compustat
Industry PPE	Natural logarithm of total industry net property, plant, and equipment.	Compustat
Industry book-to-market ratio	Total industry book value of equity divided by total industry market value of equity.	Compustat-CRSP
Industry sales	Natural logarithm of total industry sales.	Compustat
Herfindahl index	Industry Herfindahl-Hirschman Index.	Compustat
Industry price-cost margin	Total industry sales divided by total industry operating expenses (Li, 2010).	Compustat
Industry age	Average age of industry firms.	Compustat
Industry R&D	Weighted average of R&D of firms in the industry using sales as the weight (Li, 2010).	Compustat
Industry CAPEX	Weighted average of capital expenditures of firms in the industry using sales as the weight (Li, 2010).	Compustat
Industry employees	Natural logarithm of total industry employees.	Compustat

## Appendix B. Workforce Terms and Conditions

The below table shows the workforce terms and conditions in my sample at the firm-year level. I define the workforce terms and conditions of a collective bargaining agreement (CBA) as favorable when the first-year wage change is positive or when employee benefits are improved. Changes in wages and in employee benefits are subject to the availability of relevant information. That is, if a CBA obtained from Bloomberg BNA does not show the prior year's wages, I cannot compute wage changes. On the other hand, I consider employee benefits better if the terms and conditions contain the following words: add, expand, strengthen, increase, improve, and enhance. For example, the four-year collective bargaining agreement between General Electric Company and its union effective in June 2015 denotes "addit \$1-5 per mo per yr serv pens, 7-2015, improved dental benefits, enhanced vision plan, 1-2017". While there are 287 firm-level contracts, 224 firm-level contracts provide relevant information for determining the collective bargaining outcomes. 194 firm-level contracts are favorable, whereas 30 firm-level contracts are not favorable according to Appendix B Table 1.

**Appendix B Table 1: Terms and Conditions of CBAs**

Year	Favorable terms	
	No	Yes
2002	2	13
2003	4	6
2004	2	8
2005	1	10
2006	2	11
2007	3	17
2008	2	16
2009	1	8
2010	4	19
2011	4	12
2012	2	19
2013	1	12
2014	0	10
2015	1	10
2016	1	10
2017	0	5
2018	0	3
2019	0	4
2020	0	1
Total	30	194

## **Appendix C. Collective Bargaining Agreements**

The following are two examples of collective bargaining agreements between employers and unions.

### **Renegotiation 1**

Sources: New York Times on August 10, 2008; Verizon on August 10, 2008; Communications Workers of America on August 8, 2008

Employer: Verizon Communications Inc.

Unions: The Communications Workers of America and the International Brotherhood of Electrical Workers

Contract duration: August 1, 2008–August 1, 2011

Coverage: 65,000 workers

Workforce terms and conditions: 11% pay raise over the contract duration and 100% contribution to current workers' and retirees' health premiums.

### **Renegotiation 2**

Sources: General Electric on June 26, 2019; Times Union on August 6, 2019; Reuter on August 14, 2019; Communications Workers of America on August 15, 2019

Employer: General Electric Company

Union: IUE-CWA (the Industrial Division of the Communications Workers of America)

Contract duration: June 24, 2019–June 18, 2023

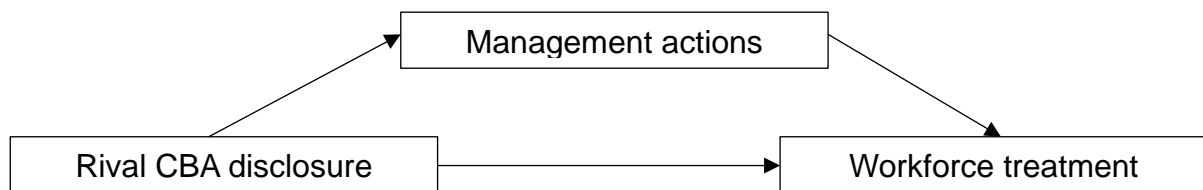
Coverage: 6,600 workers

Workforce terms and conditions: \$2.08 in hourly wage growth (\$1.80 in the old contract), 4.9% healthcare premium increase (5.9% in the old contract), \$14,000 in new cash compensation over the contract duration (\$12,000 in the old contract).

## Appendix D. Mediation Analyses

I conduct Baron and Kenny's (1986) mediation analyses using management actions, including flexible hours and day care services, as mediators, according to Appendix D Figure 1. Appendix D Table 1 presents the results of mediation analyses. In panel A, I use flexible hours as the mediator. I find that the coefficients on Union industry  $\times$  Rival CBA are positive and significant at the 5 percent level or better in all the columns while the coefficient on Union industry  $\times$  Rival CBA in column (3) is materially lower in magnitude than that in column (1). My results suggest that flexible hour policy partially mediates the effect of rival CBA disclosure on workforce treatment. In panel B, I use day care services as the mediator. I find that the coefficients on Union industry  $\times$  Rival CBA are positive and significant at the 5 percent level or better in all the columns while the coefficient on Union industry  $\times$  Rival CBA in column (3) is materially lower in magnitude than that in column (1). My results suggest that day care services policy partially mediates the effect of rival CBA disclosure on workforce treatment. This evidence supports my causal argument.

### Appendix D Figure 1: Framework



### Appendix D Table 1

#### Mediation Analyses

Appendix D Table 1 presents two panels. Panel A reports the results of mediation analysis using flexible hours as the mediator. Panel B the results of mediation analysis using day care services as the mediator. All continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the industry level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.



### Panel A: Flexible Hours as Mediator

Dependent variables	(1) Workforce score	(2) Flexible hours	(3) Workforce score
Union industry × Rival CBA	0.199*** (2.770)	0.035** (1.978)	0.151** (2.071)
Flexible hours	-	-	1.337*** (12.880)
Total assets	0.620*** (4.936)	0.023 (1.454)	0.589*** (4.673)
Market to book ratios	0.012** (2.166)	0.001 (1.133)	0.010** (2.018)
Returns on assets	0.788*** (3.238)	0.041 (0.831)	0.732*** (2.914)
Leverage	-0.004 (-0.026)	-0.026 (-0.936)	0.031 (0.207)
Free cash flows	-0.620** (-2.273)	-0.064 (-1.285)	-0.534** (-2.011)
Kaplan & Zingales index	-0.023 (-0.707)	-0.006 (-1.161)	-0.015 (-0.494)
Sales	0.094 (0.754)	-0.018 (-1.190)	0.118 (0.913)
R&D intensity	0.789** (2.229)	-0.088 (-0.700)	0.906*** (3.024)
Constant	-1.043 (-1.362)	0.177 (1.212)	-1.279* (-1.697)
Observations	10,337	10,337	10,337
Adjusted R-squared	0.787	0.663	0.799
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Clustering	Industry	Industry	Industry
<u>Test: Union industry × Rival CBA between Columns (1) and (3)</u>			
F-statistics		3.750*	
p-value		0.053*	

**Panel B: Day Care Services as Mediator**

Dependent variables	(1) Workforce score	(2) Day care services	(3) Workforce score
Union industry × Rival CBA	0.198*** (2.811)	0.046** (2.302)	0.152** (2.078)
Day care services	-	-	1.007*** (7.642)
Total assets	0.619*** (4.944)	0.018 (1.118)	0.601*** (5.034)
Market to book ratios	0.012** (2.150)	0.001 (1.052)	0.011** (2.013)
Returns on assets	0.783*** (3.221)	0.006 (0.190)	0.776*** (3.235)
Leverage	-0.020 (-0.134)	-0.012 (-0.545)	-0.008 (-0.055)
Free cash flows	-0.616** (-2.263)	-0.024 (-0.584)	-0.591** (-2.178)
Kaplan & Zingales index	-0.019 (-0.608)	-0.009* (-1.793)	-0.011 (-0.340)
Sales	0.093 (0.748)	-0.012 (-1.065)	0.105 (0.823)
R&D intensity	0.798** (2.252)	-0.217** (-2.296)	1.016*** (3.153)
Constant	-1.019 (-1.329)	0.100 (0.688)	-1.120 (-1.492)
Observations	10,323	10,323	10,323
Adjusted R-squared	0.787	0.619	0.793
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Clustering	Industry	Industry	Industry
<b>Test: Union industry × Rival CBA between Columns (1) and (3)</b>			
F-statistics		5.170**	
p-value		0.023**	

## CHAPTER 2

# THE SHADOW PRICE OF WORKFORCE SATISFACTION: EVIDENCE FROM DEFINED BENEFIT PENSION PLANS

### 2.1 Introduction

Policy makers recognize pensions as one leg of the “three-legged stool” for American workers’ retirement security. We examine the effect of relaxing minimum pension contribution requirements on overall and leadership workforce satisfaction.<sup>10</sup> While prior literature advances our knowledge of how minimum required contributions impact financing and investment decisions (e.g., Bakke and Whited, 2012; Campbell et al., 2012; Dambra, 2018; Rauh, 2006) as well as equity valuation (Campbell et al., 2010; Franzoni, 2009), our understanding of the effect of changes in minimum contribution requirements on employee perceptions is still limited.

Taking effect in late 2012, the Moving Ahead for Progress in the 21st Century Act (hereafter MAP-21) relaxes minimum contribution constraints on defined benefit plans (hereafter pension plans) through temporarily increasing segment rates for measuring pension liabilities in the extremely low interest rate environment.<sup>11</sup> This legislation, thus, reduces pension liabilities and minimum required pension contributions substantially. After the effect of MAP-21 phases out, pension plans will be more underfunded. We posit that employees perceive that this new legislation benefits firms at their expense, leading to a sense of retirement insecurity. In this article, we extend prior literature by establishing causal evidence for the effect of alleviating mandatory contribution constraints on workforce satisfaction and, in so doing, identifying the shadow price of workforce satisfaction.

We first predict that firms with defined benefit plans (hereafter pension firms) encounter a decline in overall workforce satisfaction following the enactment of MAP-21, relative to firms without defined benefit plans (hereafter non-pension firms). We expect that employees know about MAP-21 and its adverse impact on their retirement

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<sup>10</sup> We use minimum required (pension) contributions and mandatory (pension) contributions interchangeably.

<sup>11</sup> Segment rates are the averages of the yields over different blocks of maturity periods of the Treasury high quality corporate bond yield curves averaged over 24 months. When MAP-21 takes effect, they are constrained by applicable percentage limits on the 25-year average yield curve segment rates.

security through news coverage, retirement planners' analysis, pension plan administrators' communications, and significant deviations between discount rates in 10-K filings and segment rates in Form 5500 filings. We argue that by increasing segment rates notwithstanding no change in nominal retirement income, MAP-21 permits pension firms to implicitly underfund their pension plans and shift default risk in the firm from shareholders to employees (Anantharaman and Lee, 2014; Bartram, 2017, 2018; Goto and Yanase, 2021; Ippolito, 2002). That is, firms benefit from significant reductions in minimum required pension contributions at the expense of employees. Knowing this bad news, employees may therefore have a sense of retirement insecurity and feel dissatisfied with firms after the enactment of MAP-21. However, the Pension Benefit Guaranty Corporation (PBGC) provides insurance for plan participants. With PBGC in place, overall workforce satisfaction may not fall after the enactment of MAP-21.

Second, we hypothesize that pension firms face a decline in leadership workforce satisfaction following the enactment of MAP-21, relative to non-pension firms. A decrease in minimum required pension contributions under MAP-21 increases cash flows available to firms in the form of pension funding relief. Realizing the availability of pension funding relief, employees expect senior managers to make investment that can increase future revenue, cash inflows, and profits—rather than distributing shareholders payouts. A rise in revenue and profits is likely to improve earnings-contingent employee compensations, e.g., bonuses or wages. Dambra (2018) nevertheless reports that senior managers divert MAP-21 pension funding relief to shareholder payouts. Shareholder payouts reduce cash available for investment. Following managers' opportunistic behavior from news and 10-K filings, employees may have worse perceptions of senior managers who pay dividends or repurchase shares. Conversely, Kubick et al. (2021) document an increase in investment after MAP-21 enactment, making our hypothesis deserve an empirical investigation.

To test our hypotheses, we exploit the enactment of MAP-21 in 2012 as a plausibly exogenous shock to pension funding requirements and employ a difference-in-differences model. Our sample spans 10 years from 2008 to 2017. We find that pension firms experience a decrease in overall and leadership workforce satisfaction following the enactment of MAP-21, relative to non-pension firms. Our main results

suggest that pensions create retirement security instrumental in achieving workforce satisfaction and that pension firms must pay the shadow price of workforce satisfaction when firms adopt MAP-21 and divert cash flows available away from making pension contributions.

A critical assumption of our identification strategy is the parallel trends assumption, i.e., the same trends in overall and leadership workforce satisfaction for pension and non-pension firms prior to the enactment of MAP-21 in 2012. We find that the trends are the same for pension and non-pension firms, indicating that the parallel trends assumption holds. Further, we perform a channel analysis to shed light on the mechanism underlying our second hypothesis. We find that pension firms with high shareholder payouts and those with low investments encounter a decline in leadership workforce satisfaction after the enactment of MAP-21 whereas the effect is insignificant among those with low payouts and those with high investments.

Our cross-sectional analysis conditional on plan characteristics shows that firms with underfunded and non-collectively bargained pension plans drive our main results. The findings suggest that MAP-21 worsens retirement security of employees participating in underfunded pension plans and grants senior managers of firms with underfunded plans an opportunity to utilize pension funding relief for shareholders' benefits. It also implies that the suggestions are inapplicable to unionized firms in which labor unions representing employees are actively involved in firms' decision-making on employee retirement security and the allocation of pension funding relief.

Our additional cross-sectional analysis conditional on employment status demonstrates that overall and leadership satisfaction of current employees participating in underfunded plans fall following the enactment of MAP-21 unlike overall and leadership satisfaction of former employees participating in underfunded plans. Our finding suggests that current employees are more likely than former employees to react negatively to changes in pension funding requirements. Current employees' projected benefits still grow with their salaries and years of service whereas former employees' benefits have stopped growing since their departures. Thus, current employees' retirement benefits are at greater stake than those of former employees. This greater stake is especially prominent when current employees participate in underfunded plans, consistent with the theory that

underfunded pension plans make employees partially secured long-term debtholders in the firm (Ippolito, 1985).<sup>12</sup>

Next, we perform an analysis to validate the constraining effect of MAP-21 on pension contributions. We test whether pension contributions decline following the enactment of MAP-21. We find that firms contribute less to their pension plans after the enactment of MAP-21, consistent with Dambra (2018) and Kubick et al. (2021). We also find that firms make fewer contributions when their pension plans are more underfunded following the enactment of MAP-21. Our findings suggest that firms reduce not only minimum required but also voluntary contributions.

Finally, we conduct several robustness tests. We use entropy balancing, whereby the covariate distributions of the treatment and control group are reweighted, to create a balanced sample for estimating treatment effects. Our further robustness checks hinge on variations in the treatment group to rule out the possibility that our results are not driven by certain treatment firms that should not drive our main results. In conclusion, our main results are robust to the entropy-balanced sample and all the more restrictive samples.

Our study makes at least three primary contributions to the literature. First and foremost, it contributes to the literature on the economic consequences of changes in pension regulations. Campbell et al. (2021) find that pension firms increase tax savings to address investment shortfalls following the adoption of Pension Protection Act of 2006. Dambra (2018) documents that pension firms divert pension funding relief to shareholder payouts rather than investments after the adoption of MAP-21, a finding contradicting policymakers' prediction. Conversely, Kubick et al. (2021) find that pension firms increase investment after MAP-21 enactment.

We contribute to this stream of literature by showing that leadership workforce satisfaction drops following the enactment of MAP-21 for pension firms with low investments and high shareholder payouts. Consistent with Dambra (2018), our evidence sheds some light on the effect of MAP-21 on firm investment through the

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<sup>12</sup> In an underfunded defined benefit plan, employees are "partially" secured long-term debtholders. Although PBGC insures against the loss of retirement income, the amount of retirement income for which PBGC will be responsible is limited by law. In contrast, employees in a fully funded plan are "fully" secured long-term debtholders in theory because such a plan has adequate dedicated assets to settle benefit obligations.

lens of workforce perceptions of senior managers. While prior literature investigates the effects of changes in pension regulations on corporate financial outcomes, we focus on the effects of changes in pension regulations on a corporate social outcome directly linked to employees—a major stakeholder group of a firm. We extend the literature by providing direct casual evidence that pension firms experience a fall in overall and leadership workforce satisfaction following MAP-21 enactment.

Second, our study contributes to the literature on valuable human capital. Strategy theory emphasizes that human capital is fundamental to acquiring and maintaining competitive advantage (Coff, 1997; Hall, 1993). Therefore, it is imperative to understand what could impact workforce satisfaction. Lee et al. (2021) find that firms face a decline in workforce satisfaction following tax avoidance news. Teoh et al. (2023) document that fraud announcements lead to a fall in workforce satisfaction and an increase in employee turnover risk. We contribute to this branch of literature by exhibiting causally how increased default risk of pension plans diminishes workforce satisfaction. In so doing, we propose a novel mechanism by which pensions impact workforce satisfaction. We base our underlying mechanism upon the literature on pension underfunding (Anantharaman and Lee, 2014; Bartram, 2017, 2018; Goto and Yanase, 2021; Ippolito, 2002) and connect it with employee retirement insecurity.<sup>13</sup>

Last, our article has economic implications for investors and other stakeholders interested in the trade-off between the corporate financial and ESG performance. Lately, corporate ESG performance has been the center of attention. On average, 11% of the Refinitiv ESG score comes from workforce treatment, underscoring the importance of workforce to ESG performance.<sup>14</sup> We argue that managers must make pension contributions as their first priority if they desire to enhance workforce satisfaction. Nonetheless, making pension contributions constrains investments fundamental to developing firms' competitive advantage (e.g., Shaver, 2011) and limits shareholders payouts that firms use to release positive private information (see

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<sup>13</sup> The 2015 White House Conference on Aging stressed the importance of retirement (in)security as one of the four major challenges faced and handled by older adults today and into the future. This issue is increasingly more pressing as mortality rates and longevity have improved continually among older adults.

<sup>14</sup> Alongside MSCI and Sustainalytics, Refinitiv (Thomson Reuters) is a leading ESG database provider in the industry.

e.g., Bhattacharya, 1980), thereby worsening firms' financial performance. In contrast, if firms reduce pension contributions, make investment (or disbursement), and improve financial performance, then they will pay the price for doing so by failing to achieve workforce satisfaction and ESG performance. We consider this trade-off the shadow price of workforce satisfaction.

## **2.2 Institutional Setting and Literature Review**

### **2.2.1 Institutional Setting**

We investigate the effect of alleviating pension funding requirements on workforce perceptions of firms and senior managers. In so doing, we exploit the Moving Ahead for Progress in the 21st Century Act as a plausibly exogenous shock to minimum pension funding requirements. Pension plans in our setting refer solely to defined benefit plans unless otherwise stated. Correspondingly, MAP-21 impacts the funding requirements of defined benefit plans. To assist in understanding our institutional setting, we elaborate on defined benefit plans, MAP-21, pension funding rules, financial reporting of pension liabilities, and their linkage in the following sections.

#### **2.2.1.1 Defined Benefit Plans**

Pensions are future income that is tied to employment contracts and that employees will receive at retirement. Employees defer part of their compensation as implicit contributions to the pension plan throughout their careers with the firm in exchange for pensions upon retirement. Pensions are important to both employers and employees whose incentives are different (Gustman et al., 1994). Employers use pension plans to induce work effort, control employee quality, and regulate employee turnover and retirement. Employees demand pension plans because pension plans serve as retirement savings with tax benefits, insurance-like programs, economies of scale programs, and benefits that labor unions can renegotiate periodically.

Defined benefit (DB) plans play a principal role in our setting. Officially called the plan sponsor, the firm with a DB plan is committed to providing employees with the pledged amount of monthly income at retirement. The amount is a function of



final (average) wages, age, and years of service. Once the labor contract with a pension is enforced, the firm assumes long-term pension liabilities representing the ‘present’ obligation of all current and future benefits entitled to employees at retirement. The firm must dedicate assets to the plan in a trust. On an annual basis, the firm is legally obliged to make monetary contributions—called minimum required contributions—to the plan according to pension laws. However, DB plans have become less popular and been replaced by defined contribution (DC) plans over time.<sup>15</sup>

DB and DC plans are materially different. First, DB plans insure against the loss of income at retirement, whereas DC plans are designed to accumulate savings for retirement. Second, the firm makes mandatory contributions to DB plans in accordance with pension laws, while both the firm and the employee make pre-determined contributions to DC plans. Third, the firm bears investment risk under DB plans. In contrast, the employee carries investment risk under DC plans. Fourth, benefits of DB plans depend on final average wages, yet those of DC plans depend on wages over the employee’s entire career. Last, the benefits of DB plans are frozen when the employee becomes a terminating member. Unlike DB plans, DC plans may be portable, in that the employee may transfer her account to another plan. Although DB plans are now less prevalent in the private sector, DB plans’ mandatory contribution requirements are still a non-trivial source of risk for the firm.

### **2.2.1.2 Moving Ahead for Progress in the 21st Century Act and Pension Funding Rules**

Pension funding is governed primarily by three regulations: the Employee Retirement Income Security Act of 1974 (ERISA), the Pension Protection Act of 2006 (PPA), and the Moving Ahead for Progress in the 21st Century Act (MAP-21). Passed by Congress in 1974, ERISA was designed to safeguard the benefits of individuals participating in pension plans in the private sector. Central to our research setting are ERISA minimum pension contributions that pension firms—or defined benefit plan sponsors—must make annually to their pension plans. Minimum required pension

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<sup>15</sup> An employer firm may have either a DB or a DC plan, or both a DB and a DC plan at the same time. For instance, a firm with a DB plan may decide to freeze its DB plan to new employees and create a DC plan for new employees. In this situation, this firm has two pension plans—a DB plan for current members and a DC plan for new members.

contributions comprise the target normal cost and the shortfall amortization installments.<sup>16,17</sup> The former element is the present value of all benefits expected to accrue or be earned during the plan year. The latter is unfunded pension liabilities—or the excess of pension liabilities over pension plan assets—as of the beginning of the plan year amortized equally over seven years or less.<sup>18</sup> Pension liabilities (funding target in Form 5500) are the present value of all benefits accrued or earned.<sup>19</sup> Pension firms shall use segment rates announced by the Internal Revenue Service (IRS) as the discount rates for determining pension liabilities and the target normal cost. In addition to this provision, the Pension Benefit Guaranty Corporation (PBGC) was founded under ERISA to protect workers' retirement benefits when firms terminate defined benefit plans or are bankrupt. In return, pension firms are legally required to make premium payment to the PBGC.

Signed into law in 2006, PPA mandates that pension firms fund their underfunded pension plans entirely within seven years beginning in 2008. As ERISA previously required 90% funding over 30 years, this new law tightened the funding period and therefore constrained pension firms financially. Meanwhile, a real estate bubble due to subprime lending and housing speculation led to the financial crisis. To address the financial crisis, the Federal Reserve implemented quantitative easing, continually reducing interest rates to almost zero. Low interest rates increased pension liabilities, causing pension firms to make greater contributions than ever at the end of fiscal year 2011 (Norris, 2012). Many pension firms collectively solicited pension funding relief (Bradford, 2012). To address this pressing issue, Congress introduced a pension funding stabilization program into a new legislation MAP-21.

MAP-21 played a pivotal role in stabilizing pension funding in the unusually low interest rate environment. In 2011, Congress legislated MAP-21 to authorize federal surface transportation projects and their funding. MAP-21 was claimed to strengthen public transportation systems of the nation, improve employment opportunities, and fuel economic growth. In the meantime, pension firms demanded

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<sup>16</sup> A pension firm shall make additional contributions if the adjusted funding target attainment percentage in Form 5500 falls below 60 or 80 percent, at which point benefit restrictions apply.

<sup>17</sup> Pension firms with fully funded plans do not have shortfall amortization installments, so these firms' minimum required contribution is just the target normal cost.

<sup>18</sup> PPA modified the ERISA period of shortfall amortization from 30 to seven years.

<sup>19</sup> Defined benefit plan sponsors must file Form 5500s to comply with ERISA and the Internal Revenue Code.

effective pension funding relief. Aligning both parties' incentives, Congress amended ERISA pension funding rules by temporarily increasing segment rates used to determine pension liabilities for funding purposes. MAP-21 segment rates are the 25-year average of segment rates as opposed to the 24-month average of segment rates under PPA. On the one hand, pension firms would benefit from reductions in mandatory contributions. This pension funding relief would cover investment shortfalls and create jobs. On the other hand, reductions in tax-deductible pension contributions would increase taxable income and tax payment.<sup>20</sup> Increased tax payment would supply funds to surface transportation projects, as intended by Congress. Finally, the president signed the MAP-21 into law in July 2012. The Internal Revenue Service released MAP-21 segment rates in August 2012. Appendix B compares the segment rates prior to MAP-21 and those amended by MAP-21.

Both practitioners and academic researchers provide evidence on decreases in pension contributions after the enactment of MAP-21. The Society of Actuaries (2012) forecasts significant reductions in required pension contributions—\$35 billion in 2012, \$70 billion in 2013, and \$60 billion in 2014. Blackrock analysts also predict that the years 2012 and 2013 could witness a decline in required pension contributions of approximately \$50 billion (Novick et al., 2012). Academic findings corroborate these predictions. Analyzing plan-level data from Form 5500 filings, Kissner et al. (2017) and Dambra (2018) find that post-MAP-21 mandatory contributions are materially lower than the pre-MAP-21 amount on average. Likewise, Kubick et al. (2021) report the constraining effect of the MAP-21 on pension contributions using pension data from 10-K disclosures.

### **2.2.1.3 MAP-21 and Financial Reporting of Pension Liabilities**

Whereas MAP-21 decreases pension liabilities for funding purposes (ERISA pension liabilities) through increased segment rates, it does not impact pension liabilities for financial reporting purposes in the 10-K filings. Pension firms use IRS segment rates as the discount rates for ERISA pension liabilities. However, they use the rates of return currently available on high quality fixed income securities whose cash flows match the timing and amount of future benefit payments of the pension

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<sup>20</sup> Under PPA, pension contributions are tax deductible up to 1.5 times pension liabilities.

plans as the discount rates for financial reporting purposes (hereafter GAAP discount rates).

IRS segment rates were substantially higher than GAAP discount rates. For example, Olin Corporation used 6.22% as the effective IRS segment rate in its Form 5500 filing for plan year 2013 whose valuation date was January 1, 2013. Its pension plan was overfunded (plan assets exceeding pension liabilities) in its Form 5500 filing. However, it used 3.90% as the GAAP discount rate and showed that its pension plan was underfunded (pension liabilities exceeding plan assets) in its 10-K filing as of December 31, 2012. It also reported that there would be no pension contributions for the next five years. Clearly, different discount rates may provide a pension plan with different funded status. Appendix C shows important information relating to pension from Olin Corporation's Form 10-K for the year ended December 31, 2013, Form 5500 for plan year 2013, and the IRS website.

### **2.2.2 Consequences of Pension Regulation Changes**

Prior literature documents that ERISA pension contribution requirements shape firm behavior. As pension contributions reduce internal funds, pension firms contributing to pension plans reduce investment. Exploiting minimum required contributions from Form 5500 filings, Rauh (2006) finds that required contributions constrain firm capital expenditures. Consistent with Rauh (2006), Campbell et al. (2012) document that as the cost of capital increases with required pension contributions, it explains the constraining effect of pension contributions on firm investment. On the contrary, Bakke and Whited (2012) use a threshold event technique and report no causal evidence for the effect of required pension contributions on firm capital expenditures but on receivables, research and development expenditures, and employment.

Prior literature also examines capital market reactions to required pension contributions. Following Rauh's (2006) identification strategy, Franzoni (2009) documents the inverse relation between mandatory contributions and abnormal stock returns. This finding suggests that the market assesses internal funds positively and perceives mandatory contributions as a constraint on internal funds that, in turn, inhibits corporate investment. Using PPA 2006, Campbell et al. (2010) find negative market reactions around the legislative process. This finding confirms the belief that

the market views increased pension contributions as a deterrent against firm investment.

Recent literature investigates the real effects of changes in pension funding rules. Exploiting PPA as an exogenous shock to corporate financing capacity, Campbell et al. (2021) find that pension firms increase tax planning and obtain tax savings following the enactment of PPA. This finding suggests that resultant tax savings alleviate financial constraints of PPA that hinder firm investment. Congress passed MAP-21 in 2012 to relax pension funding rules by raising the segment interest rates and therefore decreasing minimum required pension contributions. Leveraging prior research that indicates the constraining effect of mandatory contributions on investment, MAP-21 proponents argued that after the passage of the bill firms would increase corporate investment for the benefit of the U.S. economy.

Dambra (2018) empirically tests the argument by exploiting MAP-21 as an exogenous positive shock to internal cash flows. Dependent on data from Form 5500 filings, his finding disproves MAP-21 proponents' argument. Rather, firms experience an increase in liquid assets and shareholder payouts. Dambra (2018) also assesses the exogeneity of MAP-21 and concludes that the passage of MAP-21 is unanticipated given significant market reactions around the key dates of the legislative event. Kubick et al. (2021) examine the effect of unexpected pension funding relief under MAP-21 on firm investment using pension data from 10-K filings. Unlike Dambra (2018), Kubick et al. (2021) find that firms with financial constraints increase non-pension investment after the enactment of MAP-21.

While much of the literature on pension funding sheds light on the effect of mandatory pension contributions on financing and investment decisions and on equity valuation, it appears to neglect completely whether and how mandatory pension contributions affect employee perceptions of firms and managers. The reasons that we explore employee perceptions are plentiful. First, strategy theory posits that employees are a source of sustained competitive advantage (Coff, 1997; Hall, 1993) if firms can incentivize them to stay and not to shirk. Our research setting is compatible with the fundamental attribute of this theory. Prior literature argues that firms use defined benefit plans to retain their employees, motivate them to work for firms' interests, and induce them to monitor peers' behavior in the workplace (Ippolito,

1985, 2002). By underfunding their pension plans, firms make employees implicit long-term creditors who hold default risk in the firm. Accordingly, if firms are bankrupt, employees' retirement benefits will be at risk.

Furthermore, prior research documents that employee perceptions are linked to firm performance. On the one hand, employee perceptions of firms are positively associated with financial performance using Fortune's best U.S. employer list (Edmans, 2011, 2012) and Glassdoor ratings (Huang et al., 2015; Huang et al., 2020; Green et al., 2019) to measure employee perceptions. On the other hand, researchers and practitioners have lately shifted the focus of their discussion to corporate ESG performance. While employees are a centerpiece of the social pillar in corporate ESG performance, prior literature concentrates just on the economic impacts of employee perceptions. Scarcely were the causal drivers of employee perceptions studied until recently. Lee et al. (2021) find that the revelation of tax avoidance worsens employee satisfaction. We aim to advance this emerging stream of literature. In particular, we may be able to estimate the shadow price of employee satisfaction when such employee benefits as pensions are implicated in variations of employee perceptions.

### **2.3 Hypothesis Development**

We expect that employees start learning about MAP-21 and its constraining impact on minimum required contributions and their retirement security through news and media coverage (See Austin, 2013; Berkowitz, 2013; Koba, 2013, for example). Then, they may obtain additional information from pension plan administrators' communications mandated by ERISA and investment managers or retirement planners' analysis (See Novick, 2012; Cullen, 2012, for example). Employees may also compare discount rates in 10-K filings and segment rates in Form 5500 filings or communications from plan administrators. They will instantly notice that the discount rates in 10-K filings are considerably lower than the segment rates in Form 5500 filings. In so doing, they will understand that MAP-21 allows pension firms to implicitly enlarge the underfunded status of their pension plans through making fewer contributions, given that nominal employee benefits at retirement remain unchanged. In other words, MAP-21 produces artificially lower pension liabilities. When the effect

of MAP-21 phases out in the near future, pension plans will become more underfunded.<sup>21</sup>

Realizing such bad news, employees may have a sense of retirement insecurity and feel dissatisfied with firms after the enactment of MAP-21 because firms benefit from significant reductions in minimum required pension contributions at the expense of employees.<sup>22,23</sup> This argument is congruent with firms underfunding pension plans to transfer default risk in the firm from shareholders to employees (Anantharaman and Lee, 2014; Bartram 2017, 2018; Goto and Yanase, 2021; Ippolito, 2002). Using the U.S. data from 1999 to 2010, Anantharaman and Lee (2014) find that executive compensation packages that align chief officers' risk attitude with that of shareholders are positively related to risk shifting through pension underfunding.

Using data across countries, Bartram (2017) finds that pension firms borrow from their employees by underfunding pension plans to invest more in research and development projects, relative to non-pension firms. Using U.S. data around the passage of PPA, Bartram (2018) reports that financially distressed firms underfund pension plans to survive economic recessions. Analyzing Japanese firms with defined benefit plans, Goto and Yanase (2021) find that managers with risk-shifting preference underfund their pension plans to acquire an internal source of flexible financing. Firms' incentives to borrow from employees by underfunding pension plans are to avoid agency costs and monitoring, to retain employees and deter them from shirking (Ippolito, 1985, 2002), and probably to avoid less flexible loans that may require shorter-term repayment periods, collaterals, and debt covenants. As a consequence, our first hypothesis is as follows:

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<sup>21</sup> The effect of MAP-21 on pension liabilities and minimum required contributions will phase out over time. Ultimately, the segment rates that reflect current market conditions will be applicable to the measurement of ERISA pension liabilities.

<sup>22</sup> In the U.S., three common sources of retirement income is typically referred to as "the three-legged stool", including social security, pension plans, and personal savings. Thus, when one stool (i.e., pension plans) is broken, it is not surprising that workers will feel extremely insecure about their lives after retirement and, in turn, dissatisfied with firms adopting MAP-21.

<sup>23</sup> See Cullen (2012) for feedback on MAP-21 provided by an employee participating in a defined benefit plan.

**H1:** Following the enactment of MAP-21, firms with defined benefit plans experience a decrease in overall workforce satisfaction, relative to firms without defined benefit plans.

However, our prediction is not a forgone conclusion. Founded in 1974 under ERISA, PBGC safeguards retirement benefits of participants in defined benefit plans. Firms that sponsor defined benefit plans are required to pay PBGC premiums. MAP-21 increases PBGC premiums and stipulates that PBGC premiums be adjusted for inflation. If plans go bankrupt or default, then PBGC will assume responsibility for continuation of the pension plans. That is, PBGC will pay monthly retirement benefits according to the provisions of the plan and federal laws, thereby mitigating a sense of retirement insecurity among employees significantly. With PBGC in place, overall workforce satisfaction may not fall after the enactment of MAP-21.

Next, we assess whether the enactment of MAP-21 affects workforce perceptions of senior managers. According to Glassdoor.com, senior managers are those with executive or upper management positions who provide high-level leadership and direction for a firm's daily operations. They oversee and authorize budget management, major capital expenditures, and strategic alliances. Following our explanation in our first hypothesis, MAP-21 reduces minimum required pension contributions and thus increases cash flows available to firms (hereafter pension funding relief). MAP-21 supporters argue that senior managers will use pension funding relief to make investment. Prior literature documents that corporate investment is essential to developing and sustaining a firm's competitive advantage (Shaver, 2011), performance, market value (Modigliani and Miller, 1958), and long-term growth (Birhanu et al., 2016). In fact, senior managers have an alternative to investment: shareholder payouts in the form of dividends or share repurchases.

Employees typically prefer investments to shareholder payouts. Although investment may reduce cash on hand and short-term profitability, it translates into smaller payouts to shareholders and can increase future revenue, cash inflows, and profitability. Generally, bonuses and wage adjustments are positively linked to corporate earnings. Once unionized, employees can use firm profitability to renegotiate their compensation (Reynolds, 1978). Therefore, employees are likely to have better perceptions of senior managers who invest. On the other hand, dividend payments and share repurchases displace investment, potentially heightening conflict



between shareholders and employees. Shareholder payouts deplete cash on hand and consequently reduce funds for investment, potentially hindering an increase in revenue, cash inflows, and profitability that could arise. Without increased profitability, employees lose one important tool for wage renegotiations. Hence, employees are likely to have worse perceptions of senior managers paying dividends or repurchasing shares.

Dambra (2018) finds that managers use MAP-21 pension funding relief to repurchase shares rather than making investment. The result suggests that corporate investment may already be at an optimal level and that managers are more likely to align their interests with those of shareholders than those of employees. It also agrees with firms adjusting financial decisions rather than investment decisions in response to cash flow increases (Gatchev et al., 2010). We expect that employees learn in a timely manner that senior managers allocate pension funding relief for shareholder payouts through 8-K filings, news, and media coverage, as managers usually disclose such a major activity as share buybacks to the public. In a less timely manner, employees may learn about these transactions from 10-K filings or corporate annual reports. As a consequence, we propose our second hypothesis as follows:

**H2:** Following the enactment of MAP-21, firms with defined benefit plans experience a decrease in leadership workforce satisfaction, relative to firms without defined benefit plans.

Nonetheless, our prediction is not conclusive. Unlike Dambra (2018), Kubick et al. (2021) find no evidence that pension firms use pension funding relief to pay dividends and repurchase shares. Instead, they report an increase in pension-unrelated investment after the enactment of MAP-21. As senior managers use pension funding relief to finance investments without diverting it towards shareholder payouts, leadership workforce satisfaction may not fall following the enactment of MAP-21.

## 2.4 Data, Variables, and Research Design

### 2.4.1 Sample

To construct our sample, we first obtain the universe of Compustat and merge it with Glassdoor data. The availability of Glassdoor data restricts our sample period to the period 2008 to 2017. We then merge the resultant data with data on defined benefit plans and financials from Compustat, data on stock returns from CRSP, and data on defined contribution plans, defined benefit plans, single-employer plans, collectively bargained plans, and plan freezes from Form 5500 filings. We exclude the railroad and road transportation industries benefiting directly from MAP-21 from our sample. We remove observations whose market-to-book ratios are not positive and whose data is insufficient for calculating control and partitioning variables. We then retain firms with at least one observation in both the pre-MAP-21 and the post-MAP-21 periods. Our unit of analysis is at the firm-year level. Our final sample consists of 13,117 firm-year observations and 1,699 unique firms for overall ratings and 13,027 firm-year observations and 1,693 unique firms for senior leadership ratings. Table 2.1 outlines our sample selection procedure. Table 2.2 reports our sample distribution. Our sample increases with time, consistent with the fact that Glassdoor has become more popular among employees over time. Our sample is densely concentrated in the manufacturing industry.

[Insert Table 2.1]

[Insert Table 2.2]

MAP-21 affects pension funding of firms with defined benefit plans. Our analysis therefore focuses on workforce satisfaction of firms with defined benefit plans and relies on a control group of firms without defined benefit plans. Following Campbell et al. (2021) and Kubick et al (2021), we define our treatment group as firms with projected benefit obligation in 2012 and our control group as firms without projected benefit obligation every year throughout our sample period.<sup>24</sup>

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<sup>24</sup> Our definition allows firms that set up defined benefit plans between 2008 and 2012 to be treatment firms in our setting.

## 2.4.2 Glassdoor Ratings as Dependent Variables

As firm-year is our unit of analysis, we use the average of overall and senior leadership ratings on Glassdoor.com as our dependent variables. Overall ratings measure workforce satisfaction with firms, which we label “overall workforce satisfaction”. Senior leadership ratings measure workforce satisfaction with senior managers, which we label “leadership workforce satisfaction”. Glassdoor ratings range from one (minimum or worst) to five (maximum or best). Data from Glassdoor.com has gained popularity and credibility in recent studies, including Huang et al. (2020) and Lee et al. (2021).

Originated in 2007, Glassdoor is an online community in which both former and current employees express their views on their employers anonymously through ratings and written reviews. To start using Glassdoor, users are required to answer questions related to their professional identity. Users are allowed to submit one review per employer annually. One distinct advantage is Glassdoor’s “give to get” policy that mitigates potential bias due to employees at the two ends of the happiness spectrum more likely reviewing their employers (Marinescu et al., 2018) and therefore reduces non-random selection problems (Teoh et al., 2023). To “get” the most out of information shared on Glassdoor, users are required to “give” by rating their employers and writing their personal reviews. In rating employers, users evaluate their overall perceptions, together with their perceptions of culture and values, diversity and inclusion, work/life balance, senior management, compensation and benefits, and career opportunities. Overall ratings are compulsory while other workplace factor ratings are optional. Overall ratings are not calculated on optional workplace factor ratings.<sup>25</sup>

Users can also recommend, approve of the CEO, and assess the business outlook. In narrative reviews, they provide their personal experiences about employer firms and advice to management. Another advantage is Glassdoor’s data credibility. To promote review credibility, Glassdoor implements technological and human measures that detect, investigate, and eliminate dubious or illegitimate content and encourages users to identify any content that violates the community guidelines.

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<sup>25</sup> For more information, please access [https://help.glassdoor.com/s/article/Ratings-on-Glassdoor?language=en\\_US#:~:text=Company%20ratings%20on%20Glassdoor%20are,the%20over all%20rating%20on%20Glassdoor](https://help.glassdoor.com/s/article/Ratings-on-Glassdoor?language=en_US#:~:text=Company%20ratings%20on%20Glassdoor%20are,the%20over all%20rating%20on%20Glassdoor).

Illegitimate content comprises employer-incentivized reviews and those that are associated with specific persons other than top management, gambling, or abuse. Under no circumstances does Glassdoor allow employers to remove user ratings or reviews. For these reasons, information that users share on Glassdoor is truthful.<sup>26</sup>

### 2.4.3 Empirical Design

We test our two hypotheses using MAP-21 as our identification strategy. Performing generalized difference-in-differences regressions around MAP-21 enactment, we examine whether firms with defined benefit plans (treatment firms) experience a decrease in workforce satisfaction following the enactment of MAP-21, relative to firms without defined benefit plans (control firms).<sup>27</sup>

$$Ratings_{it} = \beta_0 + \beta_1 Treat_i \times Post_t + \sum \beta_k Controls_{it} + \gamma_i + \delta_t + \varepsilon_{it}, \quad (1)$$

where  $i$  indexes firm and  $t$  indexes years.  $Ratings_{it}$  is either average overall ratings from Glassdoor or average senior leadership ratings from Glassdoor of a firm during the fiscal year.  $Treat_i$  is an indicator variable denoting one if a firm has projected benefit obligation in 2012 and zero otherwise.  $Post_t$  is an indicator value equal to one for the period after 2012, in which MAP-21 was enacted, and zero otherwise. Our variable of interest,  $Treat_i \times Post_t$ , captures treatment firms' incremental effect versus control firms in the post-MAP-21 period relative to the pre-MAP-21 period.

$Controls_{it}$  is a vector of firm-specific control variables—including total assets, market-to-book ratios, leverage, returns on assets, buy-and-hold returns (Lee et al., 2021), and defined contribution plans. We use these variables to control for what may influence Glassdoor ratings. Particularly, buy-and-hold returns capture any public information or sentiment that may affect Glassdoor ratings. Defined contribution plans is an indicator variable equal to one if a firm reports that it has a defined contribution plan on its Form 5500 filing during the fiscal year and zero otherwise. We control for defined contribution plans, another popular type of pension plan that may affect Glassdoor ratings. Appendix A defines all the variables.

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<sup>26</sup> For more information, please watch the video from [https://help.glassdoor.com/s/article/Can-you-really-trust-Glassdoor-Reviews?language=en\\_US](https://help.glassdoor.com/s/article/Can-you-really-trust-Glassdoor-Reviews?language=en_US).

<sup>27</sup> We use firms with (without) defined benefit plans, pension (non-pension) firms, and treatment (control) firms interchangeably.

$\gamma_i$  is firm fixed effects, which control for differences in time-invariant characteristics between the treatment and control groups.  $\delta_t$  is year fixed effects, which control for changes over time in regulations except MAP-21 that have a similar effect on the treatment and control groups. The  $Treat_t$  and  $Post_t$  main effects are subsumed by firm and year fixed effects structures, respectively. Standard errors are clustered at the firm level where treatment is assigned. Our unit of measurement is at the firm-year level. We predict  $\beta_1$  to be negative and significant, consistent with our hypotheses that treatment firms encountering a decrease in overall and leadership workforce satisfaction after the enactment of MAP-21 relative to control firms.

## 2.5 Results

### 2.5.1 Descriptive Statistics and Correlations

Table 2.3 presents sample characteristics. We report descriptive statistics in Panel A. Overall ratings have a mean value of 3.124 and a median value of 3.128. Senior leadership ratings have a mean value of 2.816 and a median value of 2.812. According to Glassdoor, these values mean that firms and senior managers are 'OK' (neither satisfied nor dissatisfied) from employees' perspectives.  $Treat$  has a mean value of 0.490, indicating that 49% of our sample is treated observations. Thus, 51% of our sample is control observations.  $Post$  has a mean value of 0.581, denoting that 58.10% of our sample is in the period 2013 to 2018.

$Underfunded$  has a mean value of 0.445, while  $Fully\ funded$  has a mean value of 0.045. 44.50% of our sample is treated observations with underfunded pension plans, and 4.50% of our sample is treated observations with fully funded pension plans.  $Collective\ bargaining$  has a mean value of 0.017, while  $Non-collective\ bargaining$  has a mean value of 0.472. 1.70% of our sample is treated observations with collectively bargained pension plans, and 47.20% of our sample is treated observations with non-collectively bargained pension plans. Collectively bargained pension plans involve labor unions on behalf of employees renegotiating with management.  $Defined\ contribution$  plans have a mean value of 0.650, indicating that 65% of our sample has a defined contribution plan.

We report correlations in Panel B. We find that Overall ratings and Senior leadership ratings are significantly and positively correlated. Treat is positively and significantly correlated with Overall and Senior leadership ratings. Post is positively and significantly correlated with Overall ratings but negatively and significantly correlated with Senior leadership ratings.

[Insert Table 2.3]

## 2.5.2 Main Results

Table 2.4 reports the results of estimating the effect of MAP-21 on overall and senior leadership ratings using generalized difference-in-differences regressions. Our dependent variables are Overall ratings in Columns (1) and (2) and Senior leadership ratings in Columns (3) and (4). In Columns (1) and (3), we use specifications without control variables. In Columns (2) and (4), we use specifications with firm-specific control variables. We find that the coefficients on  $Treat \times Post$  are negative and significant at the 5 percent level or better across all the columns. Our results are congruent with treatment firms experiencing a fall in overall and leadership workforce satisfaction following the enactment of MAP-21 relative to control firms. In economic terms, overall ratings of treatment firms in Columns (1) and (2) fall by 0.070 and 0.062, respectively, following the enactment of MAP-21. Leadership ratings of treatment firms in Columns (3) and (4) fall by 0.096 and 0.084, respectively, following the enactment of MAP-21.<sup>28</sup> In sum, these results support our two hypotheses.

[Insert Table 2.4]

## 2.6 Validation of Parallel Trends Assumption

Our identification strategy is the difference-in-differences design around the enactment of MAP-21 as a plausibly exogenous shock to minimum required pension contributions. The presence of the parallel trends assumption is critical to our identification strategy. Accordingly, we test whether the trends of the treatment and

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<sup>28</sup> Our coefficients are similar in magnitude to those of Lee et al. (2021). Lee et al (2021) report that overall ratings decline by 0.07 and 0.073 while leadership ratings decline by 0.09 and 0.086 after the revelation of tax avoidance. Employees probably perceive changes in pension funding rules and tax avoidance to be of similar severity.

control groups are parallel in the pre-MAP-21 period. For this analysis, we substitute  $Treat \times Year[-4]$ ,  $Treat \times Year[-3]$ ,  $Treat \times Year[-1]$ ,  $Treat \times Year[0]$ ,  $Treat \times Year[1]$ ,  $Treat \times Year[2]$ ,  $Treat \times Year[3]$ ,  $Treat \times Year[4]$ , and  $Treat \times Year[5]$  for  $Treat \times Post$  in equation (1). We set  $Year[-2]$  as our benchmark year.<sup>29</sup>  $Year[-4]$  ( $Year[-3]$ ,  $Year[-2]$ , and  $Year[-1]$ ) is an indicator variable coded as one for the fourth (third, second, and first) year prior to the MAP-21 enactment year and zero otherwise.  $Year[0]$  is an indicator variable coded as one for the MAP-21 enactment year.  $Year[1]$  ( $Year[2]$ ,  $Year[3]$ ,  $Year[4]$ , and  $Year[5]$ ) is an indicator variable coded as one for the first (second, third, fourth, and fifth) year after the MAP-21 enactment year and zero otherwise. The  $Treat$  and  $Year$  main effects are subsumed by firm and year fixed effects structures. Table 2.5 reports the results of testing the parallel trends assumption. We use the specification with firm-specific control variables in Column (1) whose dependent variable is overall ratings and Column (2) whose dependent variable is senior leadership ratings.

[Insert Table 2.5]

Column (1) and (2) of Table 2.5 report the results of estimating the effect of MAP-21 on overall and leadership workforce satisfaction, respectively, by year. We find that the coefficients on  $Treat \times Year[-4]$ ,  $Treat \times Year[-3]$ ,  $Treat \times Year[-1]$  are all insignificant in both columns. Our results indicate that the differences in overall and leadership workforce satisfaction between the treatment and control groups for  $Year[-4]$ ,  $Year[-3]$ , and  $Year[-1]$  are indistinguishable from the difference for the benchmark year or  $Year[-2]$ , supporting the parallel trends assumption of our identification strategy. We also find that the coefficients on  $Treat \times Year[0]$  are insignificant in both columns. While the coefficient on  $Treat \times Year[1]$  is insignificant in Column (1), it is significant at the 10 percent level in Column (2). The coefficients on  $Treat \times Year[2]$ ,  $Treat \times Year[3]$ ,  $Treat \times Year[4]$ , and  $Treat \times Year[5]$  are significant at the 5 or 10 percent level in both columns.

Figure 2.1 provides a visual presentation of the coefficients in Columns (1) and (2) of Table 2.5. We use overall and senior leadership ratings as our dependent

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<sup>29</sup> We choose  $Year[-2]$  rather than  $Year[-1]$  as our benchmark year.  $Year[-1]$  or 2011 witnessed the record-high amount of unfunded pension liabilities in the private sector (Norris, 2012). Hence, many S&P 500 firms publicly solicited a pension funding relief package from Congress (Bradford, 2012). Thus, we expect that an anticipation effect could arise in 2011 and bias our results.

variables in Panels A and B, respectively. In both of the panels, the confidence intervals in the pre-MAP-21 period from 2008 to 2011 cross the zero line, meaning that the dependent variables of our treatment and control groups progress in parallel prior to MAP-21 enactment in 2012. Our results support the parallel trends assumption.

[Insert Figure 2.1]

We have compelling evidence to explain the results of Year[0] or 2012 onwards. MAP-21 was enacted in July 2012. The IRS announced MAP-21 segment rates near the end of 2012. Although MAP-21 segment rates applied to plan year beginning 2012, Form 5500 filings for plan year 2012 were due after mid-2013.<sup>30</sup> It is likely that employees would not appreciate the true economic consequences of MAP-21 until late 2013. While news agencies, government agencies, actuaries, analysts, and retirement planners started to cover MAP-21 and its (forecasted) negative effect on minimum required pension contributions in late 2012, the coverage almost doubled in 2013, reinforcing our statement.<sup>31</sup> As the information was not simple, it was not unusual that employees spent some time absorbing, digesting, and sharing such information before collectively understanding the true implications for their retirement security. Taken together, our results indicate that employees reacted gradually to the effect of MAP-21 in 2013 (Year [1]) and, after collectively appreciating its implications, reacted strongly from 2014 (Year [2]) onwards.

## 2.7 Channel Analysis

We investigate the channel through which MAP-21 affects leadership workforce satisfaction. As discussed in the development of our second hypothesis, we base our mechanism on Dambra's (2018) main finding—senior managers divert pension funding relief to shareholders' payouts as opposed to investment. Relatively speaking, employees may be more dissatisfied with managers paying dividends and

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<sup>30</sup> Some firms postponed the application of MAP-21 until 2013. Therefore, they would submit their first Form 5500 filings adopting MAP-21 segment rates in 2014.

<sup>31</sup> We google using two keywords: "MAP-21" and "pension". We find 64 and 100 relevant articles in 2012 and 2013, respectively.



buying back shares than with managers making investment. However, Kubick et al. (2021) document opposite findings.

We test whether leadership workforce satisfaction declines following the enactment of MAP-21 for treatment firms in the high payouts group and for those in the low investments group, relative to their corresponding control firms. We partition our sample into high and low subsamples using the median investments and payouts of the whole sample.<sup>32,33</sup> Table 2.6 reports the effects of MAP-21 on leadership workforce satisfaction partitioned by the median payouts and investments of the whole sample.<sup>34</sup> We find that the coefficients on  $Treat \times Post$  are significant and negative at the 1 percent level in the high payouts group and at the 5 percent in the low investments group. However, the coefficients on  $Treat \times Post$  are insignificant in the low payouts and the high investments groups. Our results are consistent with the mechanism on which we build our second hypothesis.

[Insert Table 2.6]

## 2.8 Cross-Sectional Analyses

Cross-sectional factors could influence incentives for treatment firms' workforce to react more or less strongly to the enactment of MAP-21. We therefore conduct analyses conditional on pension plan characteristics and on employment status.

### 2.8.1 Funded Status of Pension Plans

The funded status is the difference between plan assets and pension liabilities. A pension plan is underfunded (fully funded) when plan assets are less than (exceed or equal) pension liabilities. MAP-21 increases segment rates, thereby reducing pension liabilities and minimum required contributions. While nominal employee benefits at retirement remain the same, pension firms with underfunded plans can legally make significantly fewer minimum required contributions (equal to the sum of

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<sup>32</sup> Investments = {R&D expense (with missing valued replaced by zero) + Capital expenditures + Acquisitions} ÷ Beginning total assets (Dambra, 2018; Kubick et al., 2021)

<sup>33</sup> Payouts = {Share repurchases (see Almeida et al., 2016 for the formula) + Cash dividends} ÷ Beginning total assets (Dambra, 2018; Kubick et al., 2021)

<sup>34</sup> The observations do not add up to 13,027 because of missing data on investments and payouts.

shortfall amortization installment and target normal cost) in the presence of MAP-21 than they would have to in the absence of MAP-21. It should follow that only employees participating in underfunded plans react negatively to the enactment of MAP-21. This conclusion may not necessarily be correct. As a rule, pension firms with fully funded plans must also make minimum required contributions (equal to target normal cost). With MAP-21, pension contributions to fully funded plans fall likewise although these firms do not generally make cash contributions but use the brought-forward prefunding balance to offset target normal cost. Therefore, it is inconclusive that only underfunded pension plans drive our main results.

We examine which funded status drives our main results. In so doing, we partition our Treat variable into Underfunded and Fullyfunded and substitute Underfunded $\times$ Post and Fullyfunded $\times$ Post for Treat $\times$ Post in equation (1). The Underfunded main effect is not subsumed by firm fixed effects because it is time-variant. Table 2.7 reports our cross-sectional analyses. Panel A of Table 2.7 reports the effect of MAP-21 on overall and leadership workforce satisfaction partitioned by the funded status of pension plans in Columns (1) and (2), respectively. We find that the coefficients on Underfunded $\times$ Post are negative and significant at the 5 percent level in Column (1) and at the 1 percent level in Column (2). In contrast, the coefficients on Fullyfunded $\times$ Post are insignificant in both of the columns. To summarize, our results are consistent with underfunded pension plans driving our main results. They suggest that employees participating in underfunded pension plans may feel comparatively intimidated by MAP-21 and retirement insecurity it creates and that senior managers of firms with underfunded plans may not appropriate pension funding relief for employee relations or investments but for shareholders' payouts.

[Insert Table 2.7]

### **2.8.2 Collectively Bargained Pension Plans**

Prior literature argues that employees participating in pension plans are a source of flexible funds for pension firms (e.g., Ippolito, 1985; Goto and Yanase, 2021). Non-unionized employees have weak bargaining power against firm managers. If pension firms need flexible internal financing, they will just underfund pension plans. Once unionized, employees renegotiate wages and benefits

collectively and strategically through labor unions. Therefore, when labor unions collectively bargain for retirement benefits, employees are more likely to gain concessions than they would without unions. However, managers may withhold (good) news and release bad news around the time of collective bargaining to weaken the bargaining position of unions (see Scott, 1994, for example). For these reasons, it is possible that employees participating in collectively bargained pension plans and employees participating in non-collectively bargained pension plans may react similarly or differently to the enactment of MAP-21.

We investigate whether either collectively bargained or non-collectively bargained plans, or both drive our main results. In so doing, we partition our Treat variable into Collective Bargaining and Non-Collective Bargaining and substitute Collective Bargaining $\times$ Post and Non-Collective Bargaining $\times$ Post for Treat $\times$ Post in equation (1). The Collective Bargaining main effect is not subsumed by firm fixed effects because it is time-variant.

Table 2.7 reports our cross-sectional analyses. Panel B of Table 2.7 reports the effect of MAP-21 on overall and leadership workforce satisfaction partitioned by whether pension plans are collectively bargained in Columns (1) and (2), respectively. We find that the coefficients on Non-Collective Bargaining $\times$ Post are negative and significant at the 5 percent level in Column (1) and at the 1 percent level in Column (2). In contrast, the coefficients on Collective Bargaining $\times$ Post are insignificant in both of the columns. Our results agree with non-collective bargaining pension plans driving our main results. They suggest that non-unionized employees may feel comparatively intimidated by MAP-21 and retirement insecurity it creates and that senior managers of non-unionized firms may not appropriate pension funding relief for employee relations or investments but for shareholders' payouts.

### **2.8.3 Employment Status**

We examine the effect of MAP-21 on overall satisfaction among current employees independently of former employees. Current employees have deferred a portion of their salaries or wages over time and implicitly accumulated such deferred compensation in pension plans with the aim of receiving it, together with interests, upon retirement. Their projected benefits increase with their salaries and years of service at retirement. The longer they work, the higher the pension benefits at

retirement will be. One motive of pension firms is to use pension plans to incentivize workers to stay and keep working until their retirement. It is likely that most current employees have worked for pension firms for a long period of time. Hence, they have a large stake in pension plans and may react negatively to MAP-21, which reduces mandatory pension contributions. By contrast, former employees have stopped accumulating benefits since their departures. Therefore, we expect that current employees' overall satisfaction decreases more than that of former employees and drives our main results. Nonetheless, if former employees had worked for a long time before they left, they may have reacted to MAP-21 enactment as strongly as current employees.

Panel C of Table 2.7 presents the effect of MAP-21 on overall satisfaction among current employees in Column (1) independently of former employees in Column (2). We find that the coefficients on  $Treat \times Post$  are negative and significant at the 1 percent level for current employees but insignificant for former employees. Moreover, the two coefficients are significantly different from each other at the 10 percent level, denoting that current employees' overall satisfaction falls more than that of former employees following MAP-21 enactment.

Panel D of Table 2.7 presents the effect of MAP-21 on overall workforce satisfaction partitioned by the funded status of pension plans among current employees in Column (1) independently of former employees in Column (2). We find that the coefficients on  $Underfunded \times Post$  are negative and significant at the 1 percent level for current employees but insignificant for former employees. Moreover, the two coefficients are significantly different from each other at the 10 percent level, denoting that overall satisfaction of current employees participating in underfunded plans falls more heavily than that of former employees participating in underfunded plans after MAP-21 enactment. The coefficients on  $Fullyfunded \times Post$  are insignificant across the two columns.

Our results suggest that current employees participating in underfunded plans react more negatively to MAP-21. Our suggestion is consistent with the theory that underfunded pension plans make employees partially secured long-term debtholders

in the firm (Ippolito, 1985).<sup>35</sup> Current employees have a greater stake in the firm. Some former employees may be retirees who have received pensions, at which point firms' pension obligations to these retirees have diminished. Carrying more default risk in the firm, current employees therefore react more negatively than former employees. All in all, current employees participating in underfunded plans drive our main results.

We also examine the effect of MAP-21 on leadership satisfaction among current employees independently of former employees. Given the channel through which MAP-21 affects leadership satisfaction, we expect that current employees are more likely than former employees to drive our main results. Current employees typically feel dissatisfied with senior managers diverting cash flows from pension funding relief to shareholders' payouts. Whether former employees are dissatisfied with this practice is ambiguous.

Panel C of Table 2.7 reports the effect of MAP-21 on leadership satisfaction among current employees in Column (3) independently of former employees in Column (4). We find that the coefficients on  $Treat \times Post$  are negative and significant at the 5 percent level in Column (3) and at the 10 percent level in Column (4). Panel D of Table 2.7 presents the effect of MAP-21 on leadership workforce satisfaction partitioned by the funded status of pension plans among current employees in Column (3) independently of former employees in Column (4). We find that the coefficients on  $Underfunded \times Post$  are negative and significant at the 5 percent level for current employees but insignificant for former employees. Meanwhile, the coefficients on  $Fullyfunded \times Post$  are insignificant in Column (3) but negative and significant at the 10 percent level in Column (4).

Overall, our results indicates that both current and former employees drive our main results. It is probable that firms with fully funded plans maintained high standards of employee treatment when former employees worked for them.<sup>36</sup> Former

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<sup>35</sup> In an underfunded defined benefit plan, employees are "partially" secured long-term debtholders. Although PBGC insures against the loss of retirement income if firms go bankrupt, the amount of retirement income for which PBGC will be responsible is limited by law. In contrast, employees in a fully funded plan are "fully" secured long-term debtholders because such a plan has adequate dedicated assets to settle benefit obligations.

<sup>36</sup> According to stakeholder theory (see Cornell and Shapiro, 1987, for example), firms upholding high standards of workforce treatment tend to allocate cash flows for employee relations and benefits. In our case, firms allocated cash flows for pension funding.

employees may not expect that senior managers would divert pension funding relief to shareholders' payouts. They may know that the funded status is subject to changes in discount rates (and other actuarial assumptions), so fully funded plans today may turn underfunded in the future. Making investment that will generate cash flows for future pension funding is more fruitful to them than distributing payouts to shareholders. After knowing that managers use pension funding relief to pay dividends and buy back shares, they are therefore dissatisfied with managers' decisions. In contrast, current employees may be compensated in one way or another. Consequently, they are not dissatisfied with managers.

## 2.9 Validation Test of MAP-21

We validate the constraining effect of MAP-21 on pension contributions. We use paid pension contributions, including voluntary and mandatory portions, as our dependent variable. We use paid contributions rather than minimum required contributions because (1) matching between Compustat and the Form 5500 database is relatively problematic and leaves many unmatched observations as documented in Dambra (2018), Rauh (2006), and Kubick et al. (2021); and (2) minimum required contributions omit voluntary contributions and funding offsets (Kubick et al., 2021).<sup>37,38</sup> We obtain data on pension and on firm characteristics from Compustat. Our analysis contains only pension firms, which make pension contributions.

We use OLS regressions to test whether pension contributions falls following MAP-21 enactment.

$$Pension\ contributions_{it} = \beta_0 + \beta_1 Post_t + \sum \beta_k Controls_{it} + \gamma_i + \varepsilon_{it}, \quad (2)$$

where  $i$  indexes firm and  $t$  indexes year.  $Pension\ contributions_{it}$  is pension contributions a firm make during the fiscal year scaled by beginning total assets.  $Post_t$  is an indicator variable equal to one for the period after 2012.  $Controls_{it}$  is a vector of firm-specific control variables in accordance with Kubick et al. (2021)—including underfunding, expected pension contributions, pension obligation, high

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<sup>37</sup> We use EINs to match data from Compustat and that from the Form 5500 database. However, the identifiers in the Form 5500 database have changed over time (Kubick et al., 2021).

<sup>38</sup> Funding offset is using prefunding balances to offset minimum required contributions.

underfunded, rate of return, tax loss carryforward, total assets, employees, market-to-book ratios, and return on assets. Appendix A defines all the variables.  $\gamma_i$  is firm fixed effects. We cluster standard errors at the firm level. Our unit of analysis is at the firm-year level. We predict  $\beta_1$  to be negative and significant, consistent with pension contributions falling after MAP-21 enactment.

Next, we test whether pension firms make lower contributions when pension plans are more underfunded following MAP-21 enactment. We augment equation (2) by interacting  $Post_t$  with  $Underfunding_{it}$ .  $Underfunding_{it}$  is the excess of pension liabilities over plan assets of a firm's pension plan during the fiscal year scaled by beginning total assets.  $Pension\ contributions_{it}$ ,  $Post_t$ , and  $Controls_{it}$  are identical to those described above in equation (2). Appendix A defines all the variables. We also control for firm fixed effects and year fixed effects. We cluster standard errors at the firm level. Our unit of analysis is at the firm-year level. The Underfunding main effect is not subsumed by firm fixed effects as it is time-variant. The Post main effect is subsumed by year fixed effects. We predict the coefficient on  $Underfunding_{it} \times Post_t$  to be negative and significant, consistent with pension firms making lower contributions when pension plans are more underfunded following MAP-21 enactment.

Table 2.8 reports the constraining effect of MAP-21 on pension contributions. Panel A reports the descriptive statistics. Pension contributions has a mean value of 0.007, meaning that pension firms' pension contributions account for 0.70% of their beginning total assets. Post has a mean value of 0.506, meaning that 50.60% of our observations are in the post-MAP-21 period. Underfunding has a mean value of 0.037, meaning that pension firms' unfunded pension liabilities account for 3.70% of their beginning total assets. Panel B reports the results for the effect of MAP-21 on pension contributions. Columns (1) and (2) present the results of equation (2). In Column (1), we use the specification without control variables. In Column (2), we use the specification with firm-specific control variables. We find that the coefficient on Post are negative and significant at the 1 percent level in Columns (1) and (2). Our results indicate that pension firms reduce pension contributions after MAP-21 enactment.

[Insert Table 2.8]

Columns (3) and (4) present the results of augmented equation (2). In Column (3), we use the specification without control variables. In Column (4), we use the specification with firm-specific control variables. We find that the coefficients on  $\text{Underfunding} \times \text{Post}$  are negative and significant at 1 percent level in Columns (3) and (4). Our results show that pension firms reduce pension contributions when pension plans are more underfunded following the enactment of MAP-21. Using data from Form 5500 filings, Dambra (2018) and Kisser et al. (2017) document that pension firms reduce mandatory pension contributions after MAP-21 enactment. Given Dambra (2018) and Kisser et al. (2017), our evidence seemingly suggests that pension firms reduce not only mandatory but also voluntary pension contributions after MAP-21 enactment.

## **2.10 Robustness Tests**

### **2.10.1 Entropy Balancing**

To create our balanced sample, we utilize entropy balancing as a pre-analysis step. Entropy balancing is a matching approach designed to address differences in covariates between the treatment and control groups. In contrast to nearest-neighbor matching techniques, entropy balancing retains all observation units and allows unit weights to vary across units until a high degree of covariate balances is achieved (Hainmueller, 2012). Covariate balances will improve the efficiency of our regression analysis. We use this approach to reweight our observations so that the means and the variances of all the control variables, including industry and year dummies, in our control group are identical to those in our treatment group.

Table 2.9 reports the results of robustness tests. Panel A-1 reports the results of weighting balance when our dependent variable is overall ratings. Panel A-2 reports the results of weighting balance when our dependent variable is senior leadership ratings. After being balanced, treatment and control units have comparable control variables, industry dummies, and year dummies.

[Insert Table 2.9]

We then re-estimate equation (1) using our entropy balanced sample. Panel B of Table 2.9 reports the results of difference-in-differences regressions based on



entropy balancing. Our dependent variables are Overall ratings in Columns (1) and (2) and Senior leadership ratings in Columns (3) and (4). In Columns (1) and (3), we use specifications without control variables. In Columns (2) and (4), we use specifications with firm-specific control variables. We find that the coefficients on  $Treat \times Post$  are all negative and significant at the 1 percent level in Columns (1) and (2), at the 5 percent level in Column (3), and at 10 percent level in Column (4). These results are similar to our main results. To conclude, our main results are robust to using entropy balancing.

### **2.10.2 Single-Employer Plans**

In principle, MAP-21 was designed to apply exclusively to single-employer defined benefit plans. However, prior literature hardly considers this criterion possibly because matching data with the Form 5500 database is not objective. The identifier in the Form 5500 database is EIN, and EINs have changed over time (Kubick et al., 2021). We obtain data on single-employer plans from the Form 5500 database and merge it with our data using EINs and company names. Although our matched sample may not be complete, it would provide sufficiently reliable evidence for the robustness of our main results.

Panel C of Table 2.9 reports the results of difference-in-differences regressions whose treatment group contains only firms with single-employer pension plans. Our dependent variables are Overall ratings in Columns (1) and (2) and Senior leadership ratings in Columns (3) and (4). In Columns (1) and (3), we use specifications without control variables. In Columns (2) and (4), we use specifications with firm-specific control variables. We find that the coefficients on  $Treat \times Post$  are negative and significant at the 5 percent level in Column (1), at the 10 percent level in Column (2), and at the 1 percent level in Columns (3) and (4). These results are similar to our main results. To conclude, our main results are robust to using treatment firms with single-employer pension plans.

### **2.10.3 Non-Freeze Firms**

The past few decades have witnessed numerous pension freezes on which firms in the private sector depend to switch from defined benefit plans to defined contribution plans (Anantharaman et al., 2022; GAO, 2008; Rauh et al., 2020). This

phenomenon was probably noticeable after PPA shortened the pension funding period from thirty to seven years. In this analysis, we exclude firms reporting pension freezes in their Form 5500 filings during the sample period from our sample to prove that freeze firms do not determine our main results.

Panel D of Table 2.9 reports the results of difference-in-differences regressions whose treatment group contains only non-freeze firms. Our dependent variables are Overall ratings in Columns (1) and (2) and Senior leadership ratings in Columns (3) and (4). In Columns (1) and (3), we use specifications without control variables. In Columns (2) and (4), we use specifications with firm-specific control variables. We find that the coefficients on  $Treat \times Post$  are negative and significant at the 1 percent level in Column (1), at the 5 percent level in Column (2), and at the 1 percent level in Columns (3) and (4). These results are similar to our main results. To conclude, our main results are robust to using non-freeze treatment firms.

#### **2.10.4 Firms with Pension Liability Every Year**

In our main analysis, we include firms that just established their pension plans between 2008 and 2012. For this robustness check, we, however, restrict our treatment group to firms with pension liabilities every year throughout our sample period to include only firms with pension plans from the inception of our sample period. Our robustness check is to ensure that firms with newly created pension plans do not drive our main results.

Panel E of Table 2.9 reports the results of difference-in-differences regressions whose treatment group contains pension liabilities every year during our sample period. Our dependent variables are Overall ratings in Columns (1) and (2) and Senior leadership ratings in Columns (3) and (4). In Columns (1) and (3), we use specifications without control variables. In Columns (2) and (4), we use specifications with firm-specific control variables. We find that the coefficients on  $Treat \times Post$  are negative and significant at the 1 percent level in Column (1), at the 5 percent level in Column (2), and at the 1 percent level in Columns (3) and (4). These results are similar to our main results. To conclude, our main results are robust to using treatment firms with pension liabilities every year.

## 2.11 Conclusion

In this paper, we examine whether pension risk affects workforce satisfaction with firms and senior managers. We exploit a difference-in-differences design around the enactment of MAP-21 as a plausibly exogenous shock to pension funding requirements to provide causal evidence for the effect of pension uncertainty on workforce satisfaction and identify the shadow price of workforce satisfaction. MAP-21 increases discount rates for measuring pension liabilities, reducing mandatory pension contributions despite no change in nominal income at retirement and consequently escalating pension risk among employees. We use overall and senior leadership Glassdoor ratings to measure workforce satisfaction with firms and senior managers.

We predict and find that pension firms experience a decline in overall and leadership workforce satisfaction following MAP-21 enactment, relative to non-pension firms. Mechanisms underlying our predictions are that firms shift default risk in the firm from shareholders to employees through implicitly underfunding pension plans and that senior managers allocate pension funding relief to shareholders disbursement rather than investment. Our results suggest that pension firms must pay the shadow price of workforce satisfaction when they divert cash flows made available by MAP-21 away from making pension contributions. This shadow price implies a tradeoff between the financial and the ESG performance of the firm.

We also find that firms with underfunded and non-collectively bargained pension plans drive our main results. In addition, our cross-sectional evidence indicates that our main results are stronger when current employees participating in underfunded pension plans provide Glassdoor ratings. Next, we verify the parallel trends assumption, the mechanism underpinning our second hypothesis, and the constraining effect of MAP-21 on pension contributions. Finally, we conduct multiple tests to ensure the robustness of our main results.

Our study is probably the first to identify the shadow price of workforce satisfaction when pensions play a central role in the tradeoff between the corporate financial and ESG performance. Our study also contributes to the literature on pension funding and the growing literature on workforce satisfaction by providing causal evidence that reductions in minimum required pension contributions lead to a

fall in workforce satisfaction through the positive association between risk shifting and retirement insecurity.

## 2.12 Tables

**Table 2.1**

### Sample Selection

Table 2.1 reports our sample construction for our analysis with the overall and the senior leadership ratings as the dependent variable.

Dependent variables	Overall ratings	Senior leadership ratings
Compustat U.S. firms from 2008 to 2017	96,419	96,419
<u>Less</u> Observations without Glassdoor ratings	(72,116)	(72,439)
Firms in the railroad and road transportation industries	(306)	(303)
Observations with market to book ratios less than or equal to zero	(1,285)	(1,262)
Observations without sufficient data to calculate control and conditional variables	(7,535)	(7,403)
Firms without at least one observation in both the pre-period and the post-period	(2,060)	(1,985)
Sample	13,117	13,027

**Table 2.2**

### Sample Distribution

Table 2.2 presents two panels. Panel A reports the number of observations by year. Our unit of analysis is firm-year. For example, there were 847 firms in 2008 for both overall and senior leadership ratings. Panel B reports the number of observations by SIC (standard industrial classification) code. Transportation industries other than railroad and road industries remain in our sample. Our unit of analysis is firm-year. For example, there are 4,965 firm-year observations for overall ratings and 4,919 firm-year observations for senior leadership ratings.

#### Panel A: Sample by Year

Year	Overall ratings		Senior leadership ratings	
	Firm-years	Percent	Firm-years	Percent
2008	847	6.46	847	6.50
2009	914	6.97	914	7.02
2010	1,084	8.26	1,083	8.31
2011	1,246	9.50	1,246	9.56
2012	1,400	10.67	1,388	10.65
2013	1,497	11.41	1,485	11.40
2014	1,565	11.93	1,550	11.90
2015	1,582	12.06	1,566	12.02
2016	1,547	11.79	1,527	11.72
2017	1,435	10.94	1,421	10.91
<b>Total</b>	<b>13,117</b>	<b>100.00</b>	<b>13,027</b>	<b>100.00</b>

## Panel B: Sample by Industry

Industry	Overall ratings		Senior leadership ratings	
	Firm-years	Percent	Firm-years	Percent
Agriculture, Forestry and Fishing	22	0.17	21	0.16
Construction	205	1.56	196	1.50
Finance and Insurance	2,117	16.14	2,106	16.17
Manufacturing	4,965	37.85	4,919	37.76
Mining	471	3.59	469	3.60
Real Estate	506	3.86	502	3.85
Retail Trade	1,052	8.02	1,051	8.07
Services	2,366	18.04	2,359	18.11
Transportation and Public Utilities	977	7.45	970	7.45
Wholesale Trade	387	2.95	386	2.96
Other	49	0.37	48	0.37
<b>Total</b>	<b>13,117</b>	<b>100.00</b>	<b>13,027</b>	<b>100.00</b>

**Table 2.3**

### Sample Characteristics

Table 2.3 presents two panels. Panel A reports descriptive statistics. My sample period spans 10 years from 2008 to 2017. All continuous control variables are winsorized at 1st and 99th percentiles to mitigate the effect of outliers. Panel B reports correlations. In bold are all correlations that are statistically significant at the 0.10 level or better (two-tailed). Appendix A defines all the variables.

### Panel A: Descriptive Statistics

Variables	N	Mean	SD	25th	Median	75th
Overall ratings	13,117	3.124	0.751	2.714	3.128	3.588
Senior leadership ratings	13,027	2.816	0.794	2.357	2.812	3.250
Treat	13,117	0.490	0.500	0.000	0.000	1.000
Post	13,117	0.581	0.493	0.000	1.000	1.000
Total assets	13,117	8.038	2.067	6.629	7.994	9.393
Market to book ratios	13,117	3.259	3.831	1.327	2.135	3.590
Return on assets	13,117	0.034	0.099	0.008	0.038	0.080
Leverage	13,117	0.204	0.196	0.030	0.164	0.319
Buy-and-hold returns	13,117	0.140	0.438	-0.113	0.100	0.327
Defined contribution plans	13,117	0.650	0.477	0.000	1.000	1.000
Underfunded	13,117	0.445	0.497	0.000	0.000	1.000
Fully funded	13,117	0.045	0.207	0.000	0.000	0.000
Collective bargaining	13,117	0.017	0.131	0.000	0.000	0.000
Non-collective bargaining	13,117	0.472	0.499	0.000	0.000	1.000

**Panel B: Correlation Matrix**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) Overall ratings	1.00													
(2) Senior leadership ratings	<b>0.82</b>	1.00												
(3) Treat	<b>0.05</b>	<b>0.02</b>	1.00											
(4) Post	<b>0.10</b>	<b>-0.02</b>	<b>-0.03</b>	1.00										
(5) Total assets	<b>0.15</b>	<b>0.13</b>	<b>0.44</b>	-0.01	1.00									
(6) Market to book ratio	<b>0.07</b>	<b>0.05</b>	<b>-0.06</b>	<b>0.09</b>	<b>-0.08</b>	1.00								
(7) Return on assets	<b>0.06</b>	<b>0.07</b>	<b>0.09</b>	<b>-0.03</b>	<b>0.18</b>	<b>0.11</b>	1.00							
(8) Leverage	0.00	<b>-0.02</b>	<b>0.08</b>	<b>0.07</b>	<b>0.21</b>	<b>0.18</b>	0.00	1.00						
(9) Buy-and-hold returns	<b>0.02</b>	<b>0.04</b>	<b>-0.02</b>	<b>0.09</b>	<b>-0.02</b>	<b>0.13</b>	<b>0.21</b>	<b>0.02</b>	1.00					
(10) Defined contribution plans	<b>0.02</b>	0.00	<b>-0.04</b>	<b>0.11</b>	<b>-0.14</b>	<b>0.06</b>	<b>0.02</b>	<b>-0.04</b>	<b>0.03</b>	1.00				
(11) Underfunded	<b>0.05</b>	<b>0.02</b>	<b>0.91</b>	<b>-0.05</b>	<b>0.38</b>	<b>-0.05</b>	<b>0.09</b>	<b>0.10</b>	<b>-0.02</b>	<b>-0.03</b>	1.00			
(12) Fully funded	0.01	0.00	<b>0.22</b>	<b>0.05</b>	<b>0.16</b>	<b>-0.04</b>	<b>0.01</b>	<b>-0.05</b>	-0.01	0.00	<b>-0.19</b>	1.00		
(13) Collective bargaining	0.01	0.00	<b>0.14</b>	<b>0.02</b>	<b>0.03</b>	<b>0.03</b>	<b>0.02</b>	<b>0.01</b>	0.01	<b>0.08</b>	<b>0.13</b>	<b>0.02</b>	1.00	
(14) Non-collective bargaining	<b>0.05</b>	<b>0.02</b>	<b>0.97</b>	<b>-0.04</b>	<b>0.43</b>	<b>-0.07</b>	<b>0.09</b>	<b>0.07</b>	<b>-0.02</b>	<b>-0.06</b>	<b>0.88</b>	<b>0.22</b>	<b>-0.13</b>	1.00

**Table 2.4****Workforce Satisfaction and Enactment of MAP-21**

Table 2.4 reports estimates of difference-in-differences regressions on overall ratings (H1) and on senior leadership ratings (H2). In Columns (1) and (3) are specifications without control variables. In Columns (2) and (4) are specifications with firm-specific control variables. All continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the firm level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.

Dependent variables	(1) Overall ratings	(2) Overall ratings	(3) Senior leadership ratings	(4) Senior leadership ratings
TreatxPost	-0.070*** (-2.588)	-0.062** (-2.301)	-0.096*** (-3.300)	-0.084*** (-2.876)
Total assets		0.047* (1.685)		0.067** (2.270)
Market to book ratios		0.008*** (2.865)		0.009*** (3.160)
Leverage		-0.011 (-0.160)		-0.057 (-0.784)
Returns on assets		0.317*** (2.664)		0.322** (2.558)
Buy-and-hold returns		0.025 (1.444)		0.074*** (3.854)
Defined contribution plans		-0.064 (-1.474)		0.008 (0.172)
Constant	3.143*** (421.572)	2.771*** (12.524)	2.843*** (354.144)	2.256*** (9.505)
Observations	13,117	13,117	13,027	13,027
Adjusted R-squared	0.267	0.268	0.241	0.245
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm



**Table 2.5****Validation of Parallel Trends Assumption**

Table 2.5 reports the results for the effect of MAP-21 on workforce satisfaction by year. We set Year[-2] as our benchmark year. All Year variables are indicator variables, each of which equals one for the year described as follows. Year[-4] is 2008. Year[-3] is 2009. Year[-2] is 2010. Year[-1] is 2011. Year[0] is 2012, in which MAP-21 was enacted. Year[1] is 2013. Year[2] is 2014. Year[3] is 2015. Year[4] is 2016. Year[5] is 2017. Appendix A defines all other variables. In Columns (1) and (2) are specifications with firm-specific control variables. All continuous control variables are winsorized at the 1st and 99th percentiles. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity and clustered at the firm level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.

Dependent variables	(1) Overall ratings	(2) Senior leadership ratings
TreatxYear[-4]	-0.023 (-0.309)	0.040 (0.516)
TreatxYear[-3]	-0.096 (-1.401)	-0.039 (-0.528)
TreatxYear[-1]	-0.066 (-1.046)	-0.087 (-1.311)
TreatxYear[0]	-0.056 (-0.900)	-0.088 (-1.325)
TreatxYear[1]	-0.090 (-1.513)	-0.119* (-1.830)
TreatxYear[2]	-0.131** (-2.358)	-0.126** (-2.096)
TreatxYear[3]	-0.114** (-2.079)	-0.134** (-2.241)
TreatxYear[4]	-0.102* (-1.821)	-0.131** (-2.173)
TreatxYear[5]	-0.119** (-1.998)	-0.132** (-2.034)
Constant	2.800*** (12.532)	2.300*** (9.582)
Observations	13,117	13,027
Adjusted R-squared	0.268	0.244
Controls	Yes	Yes
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Firm	Firm

## Table 2.6

### Channel Analysis

Table 2.6 reports the results of estimating our specifications in subsamples based upon whether payouts or investments exceed the median of the whole sample. The results underpin the mechanism underscored in our second hypothesis (H2). Payouts are the sum of share repurchases (Almeida et al., 2016) and dividends scaled by beginning total assets. Investments are the sum of research and development (R&D) expense, capital expenditures, and acquisitions scaled by beginning total assets (Kubick et al., 2021). In Columns (1) and (3), we use firms with high payouts and with high investments respectively as our subsample. In Columns (2) and (4), we use firms with low payouts and with low investments respectively as our subsample. In Columns (1) - (4) are specifications with firm-specific control variables. All continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the firm level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.

Dependent variable	Payouts		Investments	
	High (1) Senior leadership ratings	Low (2) Senior leadership ratings	High (3) Senior leadership ratings	Low (4) Senior leadership ratings
TreatxPost	-0.133*** (-3.252)	-0.074 (-1.518)	-0.060 (-1.315)	-0.098** (-2.156)
Total assets	0.067 (1.397)	0.049 (1.156)	0.123*** (2.771)	0.022 (0.443)
Market to book ratios	0.007** (2.118)	0.009* (1.906)	0.009** (2.457)	0.009** (2.011)
Leverage	-0.183* (-1.746)	0.036 (0.329)	-0.040 (-0.402)	-0.122 (-0.898)
Returns on assets	0.666*** (3.570)	0.178 (1.062)	0.201 (1.157)	0.625*** (2.945)
Buy-and-hold returns	0.079*** (2.657)	0.076*** (2.990)	0.077*** (2.619)	0.084*** (2.993)
Defined contribution plans	0.035 (0.528)	-0.019 (-0.270)	-0.093 (-1.350)	0.133* (1.859)
Constant	2.278*** (5.690)	2.382*** (7.392)	1.912*** (5.651)	2.546*** (6.332)
Observations	6,765	6,217	6,044	5,999
Adjusted R-squared	0.283	0.237	0.255	0.263
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm
<u>Test: TreatxPost between High and Low</u>				
F-statistics	0.880		0.360	
p-value	0.348		0.550	

**Table 2.7****Cross-Sectional Analysis**

Table 2.7 presents four panels. Panel A reports the results for the effect of MAP-21 on workforce satisfaction partitioned by the funded status of defined benefit plans. Panel B reports the results for the effect of changes in pension funding requirements on workforce satisfaction partitioned by whether defined benefit plans are collectively bargained. Panel C reports the results of estimating our specifications in subsamples based upon whether reviewers are current or former employees. Panel D reports the results of estimating our specifications in Panel C partitioned by the funded status of defined benefit plans. In all columns are specifications with firm-specific control variables. All continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the firm level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.

**Panel A: Funded Status**

Dependent variables	(1) Overall ratings	(2) Senior leadership ratings
Underfunded	-0.021 (-0.298)	-0.047 (-0.555)
Underfunded×Post	-0.059** (-2.143)	-0.080*** (-2.690)
Fullyfunded×Post	-0.096 (-1.355)	-0.136 (-1.559)
Constant	2.779*** (12.447)	2.275*** (9.478)
Observations	13,117	13,027
Adjusted R-squared	0.268	0.244
Controls	Yes	Yes
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Firm	Firm
<u>Test: Underfunded×Post = Fully funded×Post</u>		
F-statistics	0.280	0.410
p-value	0.600	0.520

**Panel B: Collectively Bargained Plans**

Dependent variables	(1) Overall ratings	(2) Senior leadership ratings
Collective Bargaining	-0.065 (-0.916)	-0.077 (-1.085)
Collective Bargaining×Post	0.001 (0.014)	-0.005 (-0.066)
Non-Collective Bargaining×Post	-0.064** (-2.342)	-0.086*** (-2.925)
Constant	2.773*** (12.531)	2.258*** (9.514)
Observations	13,117	13,027
Adjusted R-squared	0.268	0.244
Controls	Yes	Yes
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Clustering	Firm	Firm
<u>Test: Collective Bargaining×Post = Non-Collective Bargaining×Post</u>		
F-statistics	0.940	1.310
p-value	0.332	0.253

### Panel C: Current or Former Employees

Dependent variables	(1) Overall ratings	(2) Overall ratings	(3) Senior leadership ratings	(4) Senior leadership ratings
Employee status	Current	Former	Current	Former
TreatxPost	-0.092*** (-2.942)	-0.019 (-0.580)	-0.086** (-2.508)	-0.059* (-1.703)
Total assets	0.039 (1.236)	-0.019 (-0.555)	0.054 (1.487)	0.004 (0.127)
Market to book ratios	0.003 (1.060)	0.006** (1.963)	0.005 (1.537)	0.006** (2.113)
Leverage	0.071 (0.908)	-0.004 (-0.053)	0.011 (0.127)	-0.032 (-0.380)
Returns on assets	0.414*** (2.887)	0.167 (1.187)	0.465*** (2.955)	0.274* (1.849)
Buy-and-hold returns	0.042** (2.060)	0.005 (0.221)	0.069*** (3.080)	0.045** (2.081)
Defined contribution plans	-0.021 (-0.452)	-0.040 (-0.820)	0.014 (0.284)	0.014 (0.264)
Constant	2.988*** (11.566)	3.066*** (11.296)	2.527*** (8.394)	2.521*** (8.910)
Observations	11,652	11,583	11,566	11,448
Adjusted R-squared	0.262	0.271	0.225	0.250
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm
<u>Test: TreatxPost between Current and Former</u>				
F-statistics	2.880*		0.350	
p-value	0.090*		0.555	

**Panel D: Current or Former Employees Partitioned by Funded Status**

	(1)	(2)	(3)	(4)
Dependent variables	Overall ratings	Overall ratings	Senior leadership ratings	Senior leadership ratings
Employee status	Current	Former	Current	Former
Underfunded	-0.015 (-0.181)	-0.063 (-0.759)	-0.035 (-0.366)	-0.075 (-0.916)
Underfunded×Post	-0.091*** (-2.840)	-0.013 (-0.380)	-0.086** (-2.460)	-0.049 (-1.408)
Fullyfunded×Post	-0.107 (-1.342)	-0.093 (-1.193)	-0.103 (-1.086)	-0.161* (-1.951)
Constant	2.994*** (11.460)	3.091*** (11.400)	2.543*** (8.347)	2.549*** (9.037)
Observations	11,652	11,583	11,566	11,448
Adjusted R-squared	0.262	0.271	0.225	0.250
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm
<u>Test: Underfunded×Post between Current and Former</u>				
F-statistics	3.130*		0.060	
p-value	0.077*		0.439	
<u>Test: Fullyfunded×Post between Current and Former</u>				
F-statistics			0.030	
p-value			0.587	

**Table 2.8****The Constraining Effect of MAP-21 on Pension Contributions**

Table 2.8 presents two panels. Panel A reports the descriptive statistics. My sample period spans 10 years from 2008 to 2017. All continuous control variables are winsorized at 1st and 99th percentiles to mitigate the effect of outliers. Panel B reports the results for the effect of MAP-21 on pension contributions. In Columns (1) and (3) are the specifications without control variables. In Columns (2) and (4) are the specifications with firm-specific control variables. All continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the firm level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.

**Panel A**

	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>25th</b>	<b>Median</b>	<b>75th</b>
Pension contributions	5,723	0.007	0.011	0.001	0.003	0.008
Post	5,723	0.506	0.500	0.000	1.000	1.000
Underfunding	5,723	0.037	0.047	0.006	0.020	0.049
Expected pension contributions	5,723	0.005	0.007	0.001	0.003	0.007
Pension obligation	5,723	0.176	0.201	0.040	0.104	0.239
High underfunded	5,723	0.235	0.424	0.000	0.000	0.000
Rate of return	5,723	0.069	0.016	0.063	0.074	0.080
Tax loss carryforward	5,723	0.125	0.260	0.004	0.036	0.129
Employees	5,723	2.032	1.749	0.952	2.065	3.281
Total assets	5,723	8.221	1.893	7.007	8.136	9.510
Market to book ratios	5,723	2.989	3.494	1.280	2.054	3.279
Returns on assets	5,723	0.044	0.071	0.013	0.043	0.078



**Panel B**

Dependent variable	(1) Pension contributions	(2) Pension contributions	(3) Pension contributions	(4) Pension contributions
Post	-0.003*** (-8.881)	-0.001*** (-5.768)		
Underfunding		0.026*** (3.053)	0.123*** (10.270)	0.043*** (3.803)
Underfunding×Post			-0.046*** (-4.054)	-0.030*** (-2.973)
Expected pension contributions		0.776*** (13.788)		0.776*** (13.574)
Pension obligation		0.021*** (5.220)		0.020*** (4.922)
High underfunded		0.001** (2.550)		0.001** (2.267)
Rate of return		-0.004 (-0.166)		0.010 (0.440)
Tax loss carryforward		-0.003*** (-2.707)		-0.003*** (-2.646)
Employees		-0.000 (-0.914)		-0.001 (-1.234)
Total assets		-0.000 (-0.141)		-0.000 (-0.242)
Market to book ratios		-0.000 (-0.314)		-0.000 (-0.500)
Return on assets		0.004* (1.912)		0.004** (2.195)
Constant	0.008*** (23.592)	0.001 (0.119)	0.003*** (7.840)	-0.000 (-0.054)
Observations	5,723	5,723	5,723	5,723
Adjusted R-squared	0.017	0.606	0.508	0.613
Year fixed effects	No	No	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm

## Table 2.9

### Robustness Tests

Table 2.9 presents five panels. Panel A reports the results of entropy balancing all control variables, year fixed effects, and industry fixed effects. Panel B reports estimates of difference-in-differences regressions on overall ratings (H1) and on senior leadership ratings (H2) using the entropy balancing method. Panel C reports estimates of difference-in-differences regressions on overall ratings (H1) and on senior leadership ratings (H2) by retaining only treatment firms with single-employer defined benefit plans. Panel D reports estimates of difference-in-differences regressions on overall ratings (H1) and on senior leadership ratings (H2) by retaining only treatment firms that do not freeze their defined benefit plans. Panel E reports estimates of difference-in-differences regressions on overall ratings (H1) and on senior leadership ratings (H2) by retaining only treatment firms that have pension liability (projected benefit obligation) every year throughout the sample period. In Columns (1) and (3) are specifications without control variables. In Columns (2) and (4) are specifications with firm-specific control variables. All continuous control variables are winsorized at the 1st and 99th percentiles. Appendix A defines all the variables. The t-statistics reported in parentheses are based on standard errors robust to heteroscedasticity. Standard errors are clustered at the firm level.

\*\*\*, \*\*, and \* denote statistical significance at the two-tailed 1 percent, 5 percent, and 10 percent levels, respectively.

**Panel A: Weighting Balance**

**Panel A-1: Overall Ratings as the Dependent Variable**

	Treatment (N=6,423)			Control (N=6,694)					
				Before balancing			After balancing		
	Mean	Variance	Skewness	Mean	Variance	Skewness	Mean	Variance	Skewness
Total assets	8.963	3.387	0.272	7.151	3.514	0.195	8.962	3.389	0.263
Market to book ratios	3.009	12.860	4.346	3.500	16.300	3.548	3.010	12.880	4.486
Leverage	0.220	0.029	1.037	0.189	0.047	1.169	0.220	0.029	0.683
Returns on assets	0.043	0.005	-0.669	0.025	0.015	-1.311	0.043	0.005	-0.260
Buy-and-hold returns	0.132	0.153	1.155	0.148	0.230	1.184	0.132	0.153	0.958
Defined contribution plan	0.633	0.232	-0.551	0.667	0.222	-0.710	0.633	0.232	-0.551

**Panel A-2: Senior Leadership Ratings as the Dependent Variable**

	Treatment (N=6,386)			Control (N=6,641)					
				Before balancing			After balancing		
	Mean	Variance	Skewness	Mean	Variance	Skewness	Mean	Variance	Skewness
Total assets	8.970	3.363	0.257	7.153	3.535	0.154	8.969	3.367	0.258
Market to book ratios	3.038	14.110	4.631	3.524	17.500	3.790	3.040	14.150	4.773
Leverage	0.220	0.030	1.094	0.190	0.048	1.196	0.220	0.030	0.686
Returns on assets	0.044	0.005	-0.678	0.024	0.016	-1.627	0.043	0.005	-0.219
Buy-and-hold returns	0.132	0.153	1.150	0.148	0.230	1.184	0.132	0.153	0.949
Defined contribution plan	0.632	0.233	-0.546	0.668	0.222	-0.711	0.632	0.233	-0.546

**Panel B: Difference-in-Differences Regressions Using Entropy Balancing**

Dependent variables	(1) Overall ratings	(2) Overall ratings	(3) Senior leadership ratings	(4) Senior leadership ratings
TreatxPost	-0.128*** (-3.192)	-0.128*** (-3.079)	-0.108** (-2.007)	-0.106* (-1.830)
Total assets		0.018 (0.454)		0.040 (0.764)
Market to book ratios		0.008** (2.429)		0.008** (1.964)
Leverage		-0.112 (-1.266)		-0.168* (-1.797)
Returns on assets		0.572*** (3.449)		0.729*** (4.338)
Buy-and-hold returns		0.016 (0.701)		0.054** (2.265)
Defined contribution plans		-0.065 (-0.931)		-0.045 (-0.595)
Constant	3.218*** (283.949)	3.069*** (8.377)	2.884*** (190.428)	2.530*** (5.142)
Observations	13,117	13,117	13,027	13,027
Adjusted R-squared	0.303	0.306	0.265	0.269
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm

**Panel C: Difference-in-Differences Regressions Retaining Single-Employer Plans**

Dependent variables	(1) Overall rating	(2) Overall rating	(3) Senior leadership rating	(4) Senior leadership rating
TreatxPost	-0.059** (-2.066)	-0.052* (-1.805)	-0.090*** (-2.879)	-0.081*** (-2.610)
Total assets		0.045 (1.482)		0.058* (1.786)
Market to book ratios		0.008*** (2.745)		0.009*** (3.288)
Leverage		0.016 (0.209)		-0.005 (-0.067)
Returns on assets		0.299** (2.383)		0.320** (2.404)
Buy-and-hold returns		0.031* (1.680)		0.074*** (3.666)
Defined contribution plans		-0.082* (-1.656)		-0.017 (-0.327)
Constant	3.128*** (518.721)	2.792*** (11.864)	2.832*** (434.828)	2.335*** (9.159)
Observations	10,880	10,880	10,778	10,778
Adjusted R-squared	0.271	0.273	0.245	0.249
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm

**Panel D: Difference-in-Differences Regressions Retaining Non-Freeze Firms**

Dependent variables	(1) Overall rating	(2) Overall rating	(3) Senior leadership rating	(4) Senior leadership rating
TreatxPost	-0.075*** (-2.591)	-0.068** (-2.344)	-0.111*** (-3.581)	-0.097*** (-3.112)
Total assets		0.037 (1.271)		0.068** (2.190)
Market to book ratios		0.008*** (2.700)		0.010*** (3.183)
Leverage		0.017 (0.228)		-0.035 (-0.455)
Returns on assets		0.315** (2.512)		0.264** (2.002)
Buy-and-hold returns		0.031 (1.622)		0.078*** (3.757)
Defined contribution plans		-0.055 (-1.223)		0.008 (0.172)
Constant	3.145*** (453.767)	2.836*** (12.266)	2.849*** (385.493)	2.253*** (9.122)
Observations	11,414	11,414	11,331	11,331
Adjusted R-squared	0.257	0.259	0.231	0.235
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm

**Panel E: Difference-in-Differences Regressions Retaining Firms with Pension Liability Every Year**

Dependent variables	(1) Overall ratings	(2) Overall ratings	(3) Senior leadership ratings	(4) Senior leadership ratings
TreatxPost	-0.073*** (-2.711)	-0.067** (-2.458)	-0.104*** (-3.550)	-0.093*** (-3.140)
Total assets		0.041 (1.441)		0.063** (2.068)
Market to book ratios		0.007*** (2.702)		0.008*** (2.906)
Leverage		0.005 (0.064)		-0.047 (-0.628)
Returns on assets		0.304** (2.516)		0.313** (2.445)
Buy-and-hold returns		0.025 (1.419)		0.075*** (3.865)
Defined contribution plans		-0.073* (-1.662)		0.006 (0.123)
Constant	3.147*** (428.671)	2.827*** (12.503)	2.847*** (359.643)	2.299*** (9.477)
Observations	12,763	12,763	12,680	12,680
Adjusted R-squared	0.266	0.268	0.240	0.244
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm

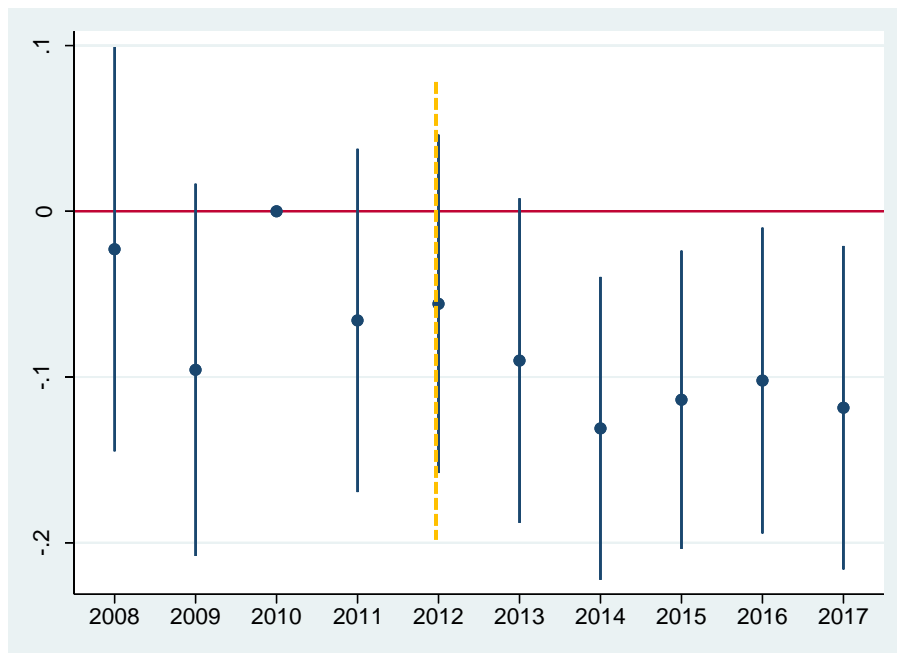
## 2.13 Figure

Figure 2.1

### Difference-in-Differences Estimates by Year

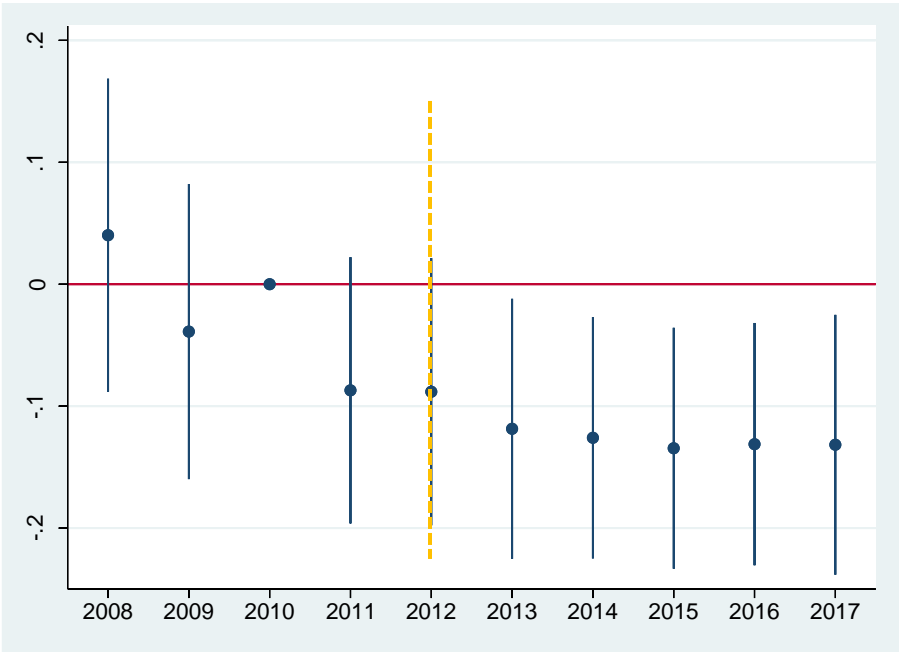
Figure 2.1 presents two panels. Panel A plots the estimated coefficients before, during, and after changes in pension funding requirements when the dependent variable is overall ratings. Panel B plots the estimated coefficients before, during, and after changes in pension funding requirements when the dependent variable is senior leadership ratings. We take the coefficients on all the interaction terms from Table 2.5. The vertical axis represents the coefficients. The horizontal axis represents the years of the coefficients, with 2010 as our benchmark year and 2012 as the year when MAP-21 was enacted. To evaluate statistical significance, we plot the two-tailed 90 percent confidence interval. The coefficients whose confidence intervals do not touch the zero line are significant.

#### Panel A: Overall Ratings as Dependent Variable





Panel B: Senior Leadership Ratings as Dependent Variable



## 2.14 Appendices

### Appendix A. Variable Definitions

<b>Variables</b>	<b>Definitions</b>	<b>Sources</b>
<u>Dependent variables</u>		
Overall workforce satisfaction	Average of employees' overall ratings of employer, ranging from one (minimum or worst) to five (maximum or best).	Glassdoor
Leadership workforce score	Average of employees' ratings of senior leadership, ranging from one (minimum or worst) to five (maximum or best).	Glassdoor
Pension contributions	Pension employer contribution (PBEC) made during the fiscal year scaled by beginning total assets.	Compustat
<u>Independent variables</u>		
Treat	Indicator variable equal to one for a firm with projected benefit obligation (PBPRO) in 2012 and zero otherwise.	Compustat
Post	Indicator variable equal to one for the period after 2012 and zero otherwise.	
Underfunded	Indicator variable equal to one for a firm with projected benefit obligation (PBPRO) greater than fair value of plan assets (PPLAO+PPLAU) during the fiscal year and zero otherwise.	Compustat
Fullyfunded	Indicator variable equal to one for a firm with projected benefit obligation (PBPRO) less than or equal to fair value of plan assets (PPLAO+PPLAU) during the fiscal year and zero otherwise.	Compustat
Underfunding	Excess of projected benefit obligation (PBPRO) over fair value of plan assets (PPLAO+PPLAU) scaled by beginning total assets.	Compustat
Collective bargaining	Indicator variable equal to one if a firm reports that its defined benefit plan is collectively bargained during the fiscal year and zero otherwise.	Form 5500
Non-collective bargaining	Indicator variable equal to one if a firm does not report that its defined benefit plan is collectively bargained during the fiscal year and zero otherwise.	Form 5500
<u>Control variables</u>		
Total assets	Natural logarithm of ending total assets.	Compustat
Market to book ratio	Market to book ratio of equity	Compustat
Return on assets	Income before extraordinary items scaled by beginning total assets.	Compustat
Buy-and-hold returns	Buy-and-hold returns over 12 months preceding the fiscal year.	Compustat-CRSP

<b>Variables</b>	<b>Definitions</b>	<b>Sources</b>
Defined contribution plans	Indicator variable equal to one if a firm reports that it has a defined contribution plan in Form 5500 during the fiscal year and zero otherwise.	Form 5500
Expected pension contributions	Expected pension employer contribution (PBECE) made during the prior fiscal year.	Compustat
Pension obligation	Beginning projected benefit obligation (PBPRO) scaled by beginning total assets.	Compustat
High underfunded	Indicator variable equal to one for a firm with an at-risk defined benefit plan ( $PBO \times 65\% > PPLAO + PPLAU$ ) during the prior fiscal year and zero otherwise. (Campbell et al., 2021)	Compustat
Rate of return	Assumed rate of return on plan assets (PPROR) for the prior fiscal year	Compustat
Tax loss carryforward	Beginning tax loss carry forward scaled by beginning total assets	Compustat
Employees	Natural logarithm of employees for the prior fiscal year	Compustat

## Appendix B. MAP-21 Segment Rates

Appendix B exhibits marked differences between unadjusted segment rates and segment rates adjusted in accordance with MAP-21. We survey Form 5500s for plan year 2012 and find that some pension firms still used unadjusted segment rates.

Adjusted segment rates for plan years beginning in 2012 (MAP-21 rates) were published in Notice 2012-55. As shown in the table below, all three segment rates for January 2012 are higher than the rates that would have otherwise been required prior to MAP-21:

Segment rate	January 2012 Unadjusted segment rates	MAP-21 rates for plan year beginning in 2012
First	1.98%	5.54%
Second	5.07%	6.85%
Third	6.19%	7.52%

Source: <https://www.irs.gov/retirement-plans/map-21-new-funding-rules-for-single-employer-defined-benefit-plans>

## Appendix C. Olin Corporation's Form 5500 and 10-K Filings and IRS Segment Rates

Appendix C compares Olin Corporation's pension information in 2012 and 2013 from the 10-K for the year ended December 31, 2013 and Form 5500 for plan year 2013. We use Form 5500 for plan year 2013 whose valuation date was January 1, 2013 for a comparison. After our investigation via EFAST2, Olin had one U.S. defined benefit plan named "Olin Corporation Employees Pension Plan" in 2012 and 2013. Therefore, we may be able to compare the funded status of its U.S. pension plan in the 10-K (U.S. GAAP) and Form 5500 (ERISA and MAP-21). In conclusion, the plan is underfunded under U.S. GAAP in the 10-K but overfunded under MAP-21 in Form 5500 as of the same point in time (December 31, 2012 for the 10-K or January 1, 2013 for the Form 5500).

<b>Qualified U.S. Pension Plan</b>	<b>10-K (million \$)</b>	<b>Form 5500 (million \$)</b>
Plan assets as of December 31, 2012 or January 1, 2013	1,912.5	1,912.5
Pension liabilities as of December 31, 2012 or January 1, 2013	(2,006.0)	(1,605.9)
Overfunded (Underfunded) as of December 31, 2012 or January 1, 2013	(93.5)	306.6
Discount rate for measuring pension liabilities	3.9%	6.22%

We then match the segment rates used to measure pension liabilities in Form 5500 to the MAP-21 segment rates released by the Internal Revenue Service (IRS).

<b>Segment rates</b>	<b>Form 5500</b>	<b>IRS website</b>
First	4.94%	4.94%
Second	6.15%	6.15%
Third	6.76%	6.76%

### 10-K (Partial)

Olin Corporation's disclosure on pension plans suggests that it had one qualified U.S. defined benefit plan in 2012. Non-qualified pension plans reportedly had no plan assets. To derive pension liabilities for the qualified U.S. plan, we start from reconciling the funded status of the qualified U.S. plan (-93.5) to fair value of U.S. plan assets at the end of the year (1,912.5). Pension liabilities of the qualified U.S. plan equal 2,006.0 (=1,912.5-(-93.5)). The discount rate for estimating pension liabilities for the U.S. plan is 3.9%.

## PENSION PLANS

Most of our employees participate in defined contribution pension plans. We provide a contribution to an individual retirement contribution account maintained with the CEO primarily equal to 5% of the employee's eligible compensation if such employee is less than age 45, and 7.5% of the employee's eligible compensation if such employee is age 45 or older. The defined contribution pension plans expense was \$15.4 million, \$15.1 million and \$14.6 million for 2013, 2012 and 2011, respectively.

A portion of our bargaining hourly employees continue to participate in our domestic defined benefit pension plans under a flat-benefit formula. Our funding policy for the defined benefit pension plans is consistent with the requirements of federal laws and regulations. Our foreign subsidiaries maintain pension and other benefit plans, which are consistent with statutory practices. Our defined benefit pension plan provides that if, within three years following a change of control of Olin, any corporate action is taken or filing made in contemplation of, among other things, a plan termination or merger or other transfer of assets or liabilities of the plan, and such termination, merger or transfer thereafter takes place, plan benefits would automatically be increased for affected participants (and retired participants) to absorb any plan surplus (subject to applicable collective bargaining requirements).

During the third quarter of 2012, the "Moving Ahead for Progress in the 21st Century Act" became law. The new law changes the mechanism for determining interest rates to be used for calculating minimum defined benefit pension plan funding requirements. Interest rates are determined using an average of rates for a 25-year period, which can have the effect of increasing the annual discount rate, reducing the defined benefit pension plan obligation, and potentially reducing or eliminating the minimum annual funding requirement. The new law also increased premiums paid to the PBGC. Based on our plan assumptions and estimates, we will not be required to make any cash contributions to the domestic qualified defined benefit pension plan at least through 2014 and under the new law may not be required to make any additional contributions for at least the next five years.

As part of the acquisition of KA Steel, as of December 31, 2013, we have recorded a contingent liability of \$10.0 million for the withdrawal from a multi-employer defined benefit pension plan.

As of December 31, 2013, we have a \$0.9 million liability associated with an agreement to withdraw our Henderson, NV chlor alkali hourly workforce from a multi-employer defined benefit pension plan.

### *Pension Obligations and Funded Status*

Changes in the benefit obligation and plan assets were as follows:

	December 31, 2013			December 31, 2012		
	(\$ in millions)			(\$ in millions)		
<i>Change in Benefit Obligation</i>	U.S.	Foreign	Total	U.S.	Foreign	Total
Benefit obligation at beginning of year	\$ 2,070.8	\$ 68.4	\$ 2,139.2	\$ 1,884.9	\$ 64.5	\$ 1,949.4
Service cost	2.8	0.6	3.4	2.8	0.7	3.5
Interest cost	78.4	2.7	81.1	89.2	2.8	92.0
Actuarial (gain) loss	(107.7)	(1.7)	(109.4)	220.8	2.3	223.1
Benefits paid	(127.8)	(3.5)	(131.3)	(126.9)	(3.3)	(130.2)
Currency translation adjustments	—	(4.3)	(4.3)	—	1.4	1.4
Benefit obligation at end of year	\$ 1,916.5	\$ 62.2	\$ 1,978.7	\$ 2,070.8	\$ 68.4	\$ 2,139.2

	December 31, 2013			December 31, 2012		
	(\$ in millions)			(\$ in millions)		
<i>Change in Plan Assets</i>	U.S.	Foreign	Total	U.S.	Foreign	Total
Fair value of plans' assets at beginning of year	\$ 1,912.5	\$ 68.5	\$ 1,981.0	\$ 1,842.6	\$ 64.3	\$ 1,906.9
Actual return on plans' assets	10.7	0.3	11.0	193.0	5.1	198.1
Employer contributions	3.2	1.2	4.4	3.8	1.0	4.8
Benefits paid	(127.8)	(3.5)	(131.3)	(126.9)	(3.3)	(130.2)
Currency translation adjustments	—	(4.4)	(4.4)	—	1.4	1.4
Fair value of plans' assets at end of year	\$ 1,798.6	\$ 62.1	\$ 1,860.7	\$ 1,912.5	\$ 68.5	\$ 1,981.0

	December 31, 2013			December 31, 2012		
	(\$ in millions)			(\$ in millions)		
<i>Funded Status</i>	U.S.	Foreign	Total	U.S.	Foreign	Total
Qualified plans	\$ (57.6)	\$ 1.7	\$ (55.9)	\$ (93.5)	\$ 2.1	\$ (91.4)
Non-qualified plans	(60.3)	(1.8)	(62.1)	(64.8)	(2.0)	(66.8)
Total funded status	\$ (117.9)	\$ (0.1)	\$ (118.0)	\$ (158.3)	\$ 0.1	\$ (158.2)

Under ASC 715 we recorded an \$8.9 million after-tax charge (\$14.4 million pretax) to shareholders' equity as of December 31, 2013 for our pension plans. This charge reflected unfavorable performance on plan assets during 2013, partially offset by a 60-basis point increase in the plans' discount rate. In 2012, we recorded a \$99.0 million after-tax charge (\$162.0 million pretax) to shareholders' equity as of December 31, 2012 for our pension plans. This charge reflected a 100-basis point decrease in the plans' discount rate and an unfavorable actuarial assumption change related to mortality tables, partially offset by the favorable performance on plan assets during 2012.

The \$109.4 million actuarial gain for 2013 was primarily due to a 60-basis point increase in the plans' discount rate. The \$223.1 million actuarial loss for 2012 was primarily due to a 100-basis point decrease in the plans' discount rate and an unfavorable actuarial assumption change related to mortality tables.

Amounts recognized in the consolidated balance sheets consisted of:

	<b>December 31, 2013</b>			<b>December 31, 2012</b>		
	<i>(\$ in millions)</i>			<i>(\$ in millions)</i>		
	<i>U.S.</i>	<i>Foreign</i>	<i>Total</i>	<i>U.S.</i>	<i>Foreign</i>	<i>Total</i>
Prepaid benefit cost	\$ —	\$ 1.7	\$ 1.7	\$ —	\$ 2.1	\$ 2.1
Accrued benefit in current liabilities	(14.2)	(0.1)	(14.3)	(6.0)	(0.1)	(6.1)
Accrued benefit in noncurrent liabilities	(103.7)	(1.7)	(105.4)	(152.3)	(1.9)	(154.2)
Accumulated other comprehensive loss	540.9	20.7	561.6	557.0	19.9	576.9
Net balance sheet impact	\$ 423.0	\$ 20.6	\$ 443.6	\$ 398.7	\$ 20.0	\$ 418.7

At December 31, 2013 and 2012, the benefit obligation of non-qualified pension plans was \$62.1 million and \$66.8 million, respectively, and was included in the above pension benefit obligation. There were no plan assets for these non-qualified pension plans. Benefit payments for the non-qualified pension plans are expected to be as follows: 2014—\$14.4 million; 2015—\$9.9 million; 2016—\$5.5 million; 2017—\$4.8 million; and 2018—\$3.0 million. Benefit payments for the qualified plans are projected to be as follows: 2014—\$123.3 million; 2015—\$118.2 million; 2016—\$113.8 million; 2017—\$109.8 million; and 2018—\$106.2 million.

### ***Pension Plan Assumptions***

Certain actuarial assumptions, such as discount rate and long-term rate of return on plan assets, have a significant effect on the amounts reported for net periodic benefit cost and accrued benefit obligation amounts. We use a measurement date of December 31 for our pension plans.

<b><i>Weighted Average Assumptions:</i></b>	<b><i>U.S. Pension Benefits</i></b>			<b><i>Foreign Pension Benefits</i></b>		
	<b><i>2013</i></b>	<b><i>2012</i></b>	<b><i>2011</i></b>	<b><i>2013</i></b>	<b><i>2012</i></b>	<b><i>2011</i></b>
Discount rate—periodic benefit cost	3.9%	4.9%	5.3%	4.2%	4.4%	5.5%
Expected return on assets	7.75%	8.0%	8.25%	7.75%	8.0%	8.0%
Rate of compensation increase	3.0%	3.0%	3.0%	3.5%	3.5%	3.5%
Discount rate—benefit obligation	4.5%	3.9%	4.9%	4.8%	4.2%	4.4%

The discount rate is based on a hypothetical yield curve represented by a series of annualized individual zero-coupon bond spot rates for maturities ranging from one-half to thirty years. The bonds used in the yield curve must have a rating of AA or better per Standard & Poor's, be non-callable, and have at least \$250 million par outstanding. The yield curve is then applied to the projected benefit payments from the plan. Based on these bonds and the projected benefit payment streams, the single rate that produces the same yield as the matching bond portfolio, rounded to the nearest quarter point, is used as the discount rate.

The long-term expected rate of return on plan assets represents an estimate of the long-term rate of returns on the investment portfolio consisting of equities, fixed income and alternative investments. We use long-term historical actual return information, the allocation mix of investments that comprise plan assets, and forecast estimates of long-term investment returns, including inflation rates, by reference to external sources. The historic rate of return on plan assets has been 9.9% for the last 5 years, 10.1% for the last 10 years and 8.6% for the last 15 years. The following rates of return by asset class were considered in setting the long-term rate of return assumption:

U.S. equities	9%	to	13%
Non-U.S. equities	10%	to	14%
Fixed income/cash	5%	to	9%
Alternative investments	5%	to	15%
Absolute return strategies	8%	to	12%

Form 5500

<b>SCHEDULE SB</b> <b>(Form 5500)</b>  <small>Department of the Treasury Internal Revenue Service</small>  <small>Department of Labor Employee Benefits Security Administration Pension Benefit Guaranty Corporation</small>	<b>Single-Employer Defined Benefit Plan</b> <b>Actuarial Information</b>  This schedule is required to be filed under section 104 of the Employee Retirement Income Security Act of 1974 (ERISA) and section 8059 of the Internal Revenue Code (the Code).  ▶ <b>File as an attachment to Form 5500 or 5500-SF.</b>	OMB No. 1210-0110  <b>2013</b>  This Form is Open to Public Inspection
For calendar plan year 2013 or fiscal plan year beginning <u>01/01/2013</u> and ending <u>12/31/2013</u>		
▶ <b>Round off amounts to nearest dollar.</b> ▶ <b>Caution:</b> A penalty of \$1,000 will be assessed for late filing of this report unless reasonable cause is established.		
<b>A</b> Name of plan OLIN CORPORATION EMPLOYEES PENSION PLAN	<b>B</b> Three-digit plan number (PN) ▶ <u>002</u>	
<b>C</b> Plan sponsor's name as shown on line 2a of Form 5500 or 5500-SF OLIN CORPORATION	<b>D</b> Employer Identification Number (EIN) 13-1872319	
<b>E</b> Type of plan: <input checked="" type="checkbox"/> Single <input type="checkbox"/> Multiple-A <input type="checkbox"/> Multiple-B	<b>F</b> Prior year plan size: <input type="checkbox"/> 100 or fewer <input type="checkbox"/> 101-500 <input checked="" type="checkbox"/> More than 500	
<b>Part I Basic Information</b>		
<b>1</b> Enter the valuation date: Month <u>01</u> Day <u>01</u> Year <u>2013</u>		
<b>2</b> Assets:		
<b>a</b> Market value .....	<b>2a</b>	1912500227
<b>b</b> Actuarial value .....	<b>2b</b>	1912500227
<b>3</b> Funding target/participant count breakdown:		
<b>a</b> For retired participants and beneficiaries receiving payment.....	<b>3a</b>	(1) Number of participants: 13220 (2) Funding Target: 1068043270
<b>b</b> For terminated vested participants.....	<b>3b</b>	8135 322918609
<b>C</b> For active participants:		
(1) Non-vested benefits .....	<b>3c(1)</b>	10423987
(2) Vested benefits .....	<b>3c(2)</b>	204556791
(3) Total active.....	<b>3c(3)</b>	1920 214980778
<b>d</b> Total.....	<b>3d</b>	23275 1805942857
<b>4</b> If the plan is in at-risk status, check the box and complete lines (a) and (b)..... <input type="checkbox"/>		
<b>a</b> Funding target disregarding prescribed at-risk assumptions .....	<b>4a</b>	
<b>b</b> Funding target reflecting at-risk assumptions, but disregarding transition rule for plans that have been in at-risk status for fewer than five consecutive years and disregarding loading factor.....	<b>4b</b>	
<b>5</b> Effective interest rate .....	<b>5</b>	6.22 %
<b>6</b> Target normal cost.....	<b>6</b>	5215763
<b>Statement by Enrolled Actuary</b> <small>To the best of my knowledge, the information supplied in this schedule and accompanying schedules, statements and attachments, if any, is complete and accurate. Each prescribed assumption was applied in accordance with applicable law and regulations. In my opinion, each other assumption is reasonable (taking into account the experience of the plan and reasonable expectations) and such other assumptions, in combination, offer my best estimate of anticipated experience under the plan.</small>		
<b>SIGN HERE</b>	Signature of actuary  DAVID PALMERINO, FSA, MAAA  Type or print name of actuary  SIBSON CONSULTING  Firm name  333 WEST 34TH STREET NEW YORK, NY 10001-2402  Address of the firm	Date 09/24/2014  Most recent enrollment number 14-06578  Telephone number (including area code) 212-251-5000
If the actuary has not fully reflected any regulation or ruling promulgated under the statute in completing this schedule, check the box and see instructions <input type="checkbox"/>		



<b>Part II Beginning of Year Carryover and Prefunding Balances</b>		(a) Carryover balance	(b) Prefunding balance			
<b>7</b>	Balance at beginning of prior year after applicable adjustments (line 13 from prior year) .....	553083515	0			
<b>8</b>	Portion elected for use to offset prior year's funding requirement (line 35 from prior year) .....	5816521	0			
<b>9</b>	Amount remaining (line 7 minus line 8) .....	547468994	0			
<b>10</b>	Interest on line 9 using prior year's actual return of <u>10.98%</u> .....	80111878	0			
<b>11</b>	Prior year's excess contributions to be added to prefunding balance:					
	<b>a</b> Present value of excess contributions (line 38a from prior year) .....		0			
	<b>b</b> Interest on (a) using prior year's effective interest rate of <u>5.19%</u> except as otherwise provided (see instructions) .....		0			
	<b>c</b> Total available at beginning of current plan year to add to prefunding balance .....		0			
	<b>d</b> Portion of (c) to be added to prefunding balance .....		0			
<b>12</b>	Other reductions in balances due to elections or deemed elections .....	0	0			
<b>13</b>	Balance at beginning of current year (line 9 + line 10 + line 11d - line 12) .....	607578870	0			
<b>Part III Funding Percentages</b>						
<b>14</b>	Funding target attainment percentage .....	<b>14</b>	81.25 %			
<b>15</b>	Adjusted funding target attainment percentage .....	<b>15</b>	119.08 %			
<b>16</b>	Prior year's funding percentage for purposes of determining whether carryover/prefunding balances may be used to reduce current year's funding requirement .....	<b>16</b>	102.89 %			
<b>17</b>	If the current value of the assets of the plan is less than 70 percent of the funding target, enter such percentage .....	<b>17</b>	%			
<b>Part IV Contributions and Liquidity Shortfalls</b>						
<b>18</b> Contributions made to the plan for the plan year by employer(s) and employees:						
(a) Date (MM-DD-YYYY)	(b) Amount paid by employer(s)	(c) Amount paid by employees	(a) Date (MM-DD-YYYY)	(b) Amount paid by employer(s)	(c) Amount paid by employees	
Totals ▶			<b>18(b)</b>	0	<b>18(c)</b>	0
<b>19</b> Discounted employer contributions – see instructions for small plan with a valuation date after the beginning of the year:						
<b>a</b> Contributions allocated toward unpaid minimum required contributions from prior years .....			<b>19a</b>	0		
<b>b</b> Contributions made to avoid restrictions adjusted to valuation date .....			<b>19b</b>	0		
<b>c</b> Contributions allocated toward minimum required contribution for current year adjusted to valuation date .....			<b>19c</b>	0		
<b>20</b> Quarterly contributions and liquidity shortfalls:						
<b>a</b> Did the plan have a "funding shortfall" for the prior year? .....						
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						
<b>b</b> If line 20a is "Yes," were required quarterly installments for the current year made in a timely manner? .....						
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						
<b>c</b> If line 20a is "Yes," see instructions and complete the following table as applicable:						
Liquidity shortfall as of end of quarter of this plan year						
(1) 1st	(2) 2nd	(3) 3rd	(4) 4th			
0	0	0	0			

<b>Part V Assumptions Used to Determine Funding Target and Target Normal Cost</b>			
<b>21</b> Discount rate:			
<b>a</b> Segment rates:	1st segment: 4.94%	2nd segment: 6.15%	3rd segment: 6.78 %
	<input type="checkbox"/> N/A, full yield curve used		
<b>b</b> Applicable month (enter code).....	<b>21b</b>	0	
<b>22</b> Weighted average retirement age .....	<b>22</b>	63	
<b>23</b> Mortality table(s) (see instructions)	<input type="checkbox"/> Prescribed - combined	<input checked="" type="checkbox"/> Prescribed - separate	<input type="checkbox"/> Substitute
<b>Part VI Miscellaneous Items</b>			
<b>24</b> Has a change been made in the non-prescribed actuarial assumptions for the current plan year? If "Yes," see instructions regarding required attachment.....	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
<b>25</b> Has a method change been made for the current plan year? If "Yes," see instructions regarding required attachment.....	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
<b>26</b> Is the plan required to provide a Schedule of Active Participants? If "Yes," see instructions regarding required attachment.....	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>27</b> If the plan is subject to alternative funding rules, enter applicable code and see instructions regarding attachment.....	<b>27</b>		
<b>Part VII Reconciliation of Unpaid Minimum Required Contributions For Prior Years</b>			
<b>28</b> Unpaid minimum required contributions for all prior years .....	<b>28</b>	0	
<b>29</b> Discounted employer contributions allocated toward unpaid minimum required contributions from prior years (line 19a).....	<b>29</b>	0	
<b>30</b> Remaining amount of unpaid minimum required contributions (line 28 minus line 29) .....	<b>30</b>	0	
<b>Part VIII Minimum Required Contribution For Current Year</b>			
<b>31</b> Target normal cost and excess assets (see instructions):			
<b>a</b> Target normal cost (line 8).....	<b>31a</b>	5215783	
<b>b</b> Excess assets, if applicable, but not greater than line 31a .....	<b>31b</b>	0	
<b>32</b> Amortization installments:	Outstanding Balance	Installment	
<b>a</b> Net shortfall amortization installment.....	0	0	
<b>b</b> Waiver amortization installment.....	0	0	
<b>33</b> If a waiver has been approved for this plan year, enter the date of the ruling letter granting the approval (Month _____ Day _____ Year _____) and the waived amount .....	<b>33</b>		
<b>34</b> Total funding requirement before reflecting carryover/prefunding balances (lines 31a - 31b + 32a + 32b - 33).....	<b>34</b>	5215783	
	Carryover balance	Prefunding balance	Total balance
<b>35</b> Balances elected for use to offset funding requirement.....	5215783	0	5215783
<b>36</b> Additional cash requirement (line 34 minus line 35).....	<b>36</b>	0	
<b>37</b> Contributions allocated toward minimum required contribution for current year adjusted to valuation date (line 19c).....	<b>37</b>	0	
<b>38</b> Present value of excess contributions for current year (see instructions)			
<b>a</b> Total (excess, if any, of line 37 over line 36) .....	<b>38a</b>	0	
<b>b</b> Portion included in line 38a attributable to use of prefunding and funding standard carryover balances .....	<b>38b</b>	0	
<b>39</b> Unpaid minimum required contribution for current year (excess, if any, of line 36 over line 37) .....	<b>39</b>	0	
<b>40</b> Unpaid minimum required contributions for all years .....	<b>40</b>	0	
<b>Part IX Pension Funding Relief Under Pension Relief Act of 2010 (See Instructions)</b>			
<b>41</b> If an election was made to use PRA 2010 funding relief for this plan:			
<b>a</b> Schedule elected .....	<input type="checkbox"/> 2 plus 7 years	<input type="checkbox"/> 15 years	
<b>b</b> Eligible plan year(s) for which the election in line 41a was made .....	<input type="checkbox"/> 2008	<input type="checkbox"/> 2009	<input type="checkbox"/> 2010 <input type="checkbox"/> 2011
<b>42</b> Amount of acceleration adjustment .....	<b>42</b>		
<b>43</b> Excess installment acceleration amount to be carried over to future plan years .....	<b>43</b>		

## IRS Segment Rates

### **Historical Funding Table 3 - MAP-21**

Historical Funding Table 3 - MAP-21 lists the 24-month average segment rates adjusted by MAP-21 applicable maximum and applicable minimum percentages of the 25-year average segment rates. These rates apply to a plan to the extent the plan sponsor has made an election pursuant to Section 2003(e)(2) of HATFA to defer the application of the HAFTA amendments until plan years beginning in 2014.

For Plan Years Beginning In	Applicable Month	Adjusted 24-Month Average Segment Rates, Based on MAP-21 Applicable Percentage of 25-Year Average Rates		
		First Segment	Second Segment	Third Segment
2013	Dec-13	4.94	6.15	6.76
2013	Nov-13	4.94	6.15	6.76
2013	Oct-13	4.94	6.15	6.76
2013	Sep-13	4.94	6.15	6.76
2013	Aug-13	4.94	6.15	6.76
2013	Jul-13	4.94	6.15	6.76
2013	Jun-13	4.94	6.15	6.76
2013	May-13	4.94	6.15	6.76
2013	Apr-13	4.94	6.15	6.76
2013	Mar-13	4.94	6.15	6.76
2013	Feb-13	4.94	6.15	6.76
2013	Jan-13	4.94	6.15	6.76

## CHAPTER 3

# WHEN WAGE INCREASES ARE UNDESIRABLE: THE EFFECT OF GOODWILL IMPAIRMENT ON UNION BARGAINING POWER

### 3.1 Introduction

“When a man wants to rob a bank, he hides behind a mask, but when a banker wants to rob a man, he hides behind a corporation.” — V.O. Diedlaff, *We Can Fix It: Reclaiming the American Dream*

Common in today’s society is income inequality whose consequences are detrimental to overall social welfare. In the labor market, unions are a main mechanism formed to fight the widening of income inequality by leveraging corporate disclosures to bargain collectively for a greater fraction of rent during renegotiations (e.g., Barlev and Haddad, 2003; Bova, 2013). Anticipating union behavior, firm managers increase information asymmetry or publicly release bad news to resist unions’ rent extraction (e.g., Chung et al., 2016; DeAngelo and DeAngelo, 1991).

Misalignment between managers’ and unions’ incentives is a salient form of social conflict. Managers aim to maximize shareholder wealth, whereas unions seek to extract above-market rents. Unions can threaten managers by staging a series of strikes. In response, managers exploit many means to weaken unions’ bargaining positions and counter unions’ demand for wage increases and benefit improvements. Central to this argument are accounting rules that consider labor costs a profit-reducing component, or an expense. Although labor costs may initially be part of an asset, they will eventually turn into an expense, which worsens financial performance and reduces economic rent. As managers are weakening union bargaining positions and cutting wages and benefits, they are cutting purchasing power, widening income inequality in society, and reducing the overall welfare of society.

I examine whether firms use goodwill impairment to reduce union bargaining power around the time of labor renegotiations. I exploit U.S. labor renegotiations, in which unions’ demand for better wages and benefits reached a peak. Without firm

intervention around the time of labor renegotiations, unions would manage to win major concessions and extract more rent from firms. I argue that firms that know unions' goal may announce goodwill impairment to reduce union bargaining power around the time of labor renegotiations. The accounting of goodwill impairment provides firms with flexibility to choose the timing of goodwill write-down (e.g., Li and Sloan, 2017; Ramanna, 2008). Therefore, goodwill impairment could be a means effective in limiting unions' strong demand around the time of labor renegotiations. However, my prediction is not a forgone conclusion because Kallousa et al. (2023) argue that goodwill impairment is an excessively costly method for firms. In this study, I extend prior literature by providing evidence for the opportunistic utilization of goodwill impairment in unionized industries.

I use wages and employee benefit expenses to measure union bargaining power. Exploiting variations in the timing of labor renegotiations and a staggered difference-in-differences model, I expect to find that around the time of labor renegotiations, unionized firms that announce goodwill impairment experience a decrease in union bargaining power. Goodwill impairment losses may affect union bargaining power through two channels. First, impairment losses decrease the value of assets and equity, increasing financial leverage. This capital structure change channel is compatible with Matsa (2010), who documents that unionized firms increase financial leverage to improve their bargaining positions against unions. Second, impairment losses are unexpected by nature (Li et al., 2011). Hence, they may trigger a temporary earnings shock to labor unions. Accordingly, labor unions tend to make a concession on relatively lower wage growth or market wages (e.g., Bova, 2013; Reynolds, 1978).

To substantiate my main results, I will perform cross-sectional analyses conditional on firm age, union strength, and employee ownership. I expect to find that my main results are stronger for unionized firms with low firm age, high union strength, and low employee ownership. García Osma et al. (2015) document that recurring renegotiations may involve increased cooperation and transparency, suggesting that earlier renegotiations create more serious labor conflict than later ones. I use firm age to proxy for the number of labor renegotiations. On the other hand, union strength presents

operational inflexibility to firm managers (Kallousa et al., 2023). High union strength leads to high operational flexibility that hinders post-acquisition synergy realization. Furthermore, Bova et al. (2015) propose that employee ownership alleviates misalignment between managers' and employees' incentives. Impairment losses reduce profits. Wage increases hurt firm profits even more. Shareholder wealth declines as a result. Knowing this information, unions with high employee ownership may concede in an early stage of renegotiations and be content with market wages to allow firms to make investments or distribute shareholder payouts. However, unions with low employee ownership may yield an opposite story. Facing high union strength and unions with low employee ownership, managers have strong incentives to suppress union power. Thus, managers could use goodwill impairment to shock unions around the time of renegotiations.

In terms of robustness checks, I plan to implement the entropy balancing technique to eliminate covariate imbalances and make the treatment and control groups comparable. I also plan to use an employee welfare rating as an alternate outcome variable to corroborate my main results. Further, I plan to conduct my analysis excluding firms headquartered in states with right-to-work legislation to test whether this legislation affects my results. The legislation allows employees to choose whether they will be union members and permits union members not to pay for union membership fees, undermining union strength. Finally, I plan to use an alternate measure for unexpected goodwill impairment (Li et al., 2001) to show that my selected measure does not drive my main results.

### **3.2 Contribution and Implications**

My contribution to the literature is at least fourfold. First, my study contributes to the burgeoning literature on the real effects of accounting information in response to Leuz and Wysocki's (2016) call. I provide direct evidence that goodwill impairment weakens union bargaining power in unionized industries.

Second, my study extends the literature on the consequences of SFAS 142 (e.g., Ramanna, 2008; Li and Sloan, 2017). I document an unintended consequence that managers strategically time goodwill impairment to influence labor unions during labor renegotiations. Nevertheless, I caution against interpreting my findings as managers accelerating the recognition of goodwill impairment losses. Alternatively, managers may have delayed impairing goodwill in order to strategically use it in a critical future moment, such as during labor renegotiations.

Third, my study contributes to the literature on fair value accounting. I demonstrate that goodwill impairment based on fair value estimates reduces union power. I highlight the role of fair value accounting in producing a real economic consequence for employees.

Last, my study contributes to the literature on accounting and social conflict (e.g., DeAngelo and DeAngelo, 1991; D'Souza and Jacob, 2001). I add to this branch of literature another piece of evidence suggesting that accounting standards that provide managers with generous discretion can deepen income inequality. In particular, managers can opportunistically use fair value accounting to exacerbate income inequality in society. Supporting this evidence, Chava et al. (2020) document that CEO compensation and dividends increase following a decrease in union bargaining power.

### **3.3 Literature Review and Institutional Setting**

#### **3.3.1 Accounting and Social Conflict**

Income and wealth inequality has been of central interest and extensively debated over the past century. While income refers to a flow that comprises labor income and capital income, wealth refers to a stock that is derived from the net value of assets and financial liabilities (Piketty and Saez, 2014). Ideally, one might expect that developed countries will not experience income and wealth inequality. However, the reality is a different story. Only in recent decades have Americans appallingly witnessed a dramatic rise in income inequality. According to Panel A of Figure 3.1, the upward trend indicates that income that accrued to top 10 percent income holders in the U.S.

grew considerably from just under 35 percent in 1970 to approximately 48 percent in 2010. On the other hand, wealth inequality, proxied by the fraction of total net wealth owned by top decile wealth holders, seemed to be constant from 1870 to 2010, as shown in Panel B of Figure 3.1. Overall, it stood at just over 70 percent in 2010.

[Insert Figure 3.1]

One proposed explanation for this income inequality is that top executives focus exclusively on pursuing corporate profits and maximizing shareholder surpluses by cutting employee wages and benefits. These numbers suggest how uneven the distribution of income and wealth in the United States could be, thereby leading scholars to explore what determines this extreme unevenness in such an advanced economy. Piketty and Saez (2014) posit that the drastic growth in income equality in recent decades is chiefly due to an increase in compensation of U.S. large corporations' top management concentrated at the top one percent.

“G.M. Strike: 50,000 Union Workers Walk Out Over Wages and Idled Plants” was the New York Times front-page headline on September 15, 2019 (Boudette, 2019). It features an exemplar of a conflicting relationship between two important parties in the postmodern world—namely managers and labor unions. Although scholars are reluctant to define “social conflict”, it literally means an interaction between at least two parties seeking to acquire control over scarce positions or resources (Mack and Snyder, 1957). Notably, social conflict has a profound impact on the welfare of the whole society.

Social conflict between corporate managers and employees potentially results in income and wealth inequality that appears to be common in today's economy that obviously prioritizes the interests of capital over those of labor (Sikka, 2015). This argument is substantiated by corporate demand for labor cost minimization, as seen in many news headlines worldwide. Prime examples include “Nike to Tackle Rising Asian Labour Costs” (Jopson, 2013) and “Productivity in U.S. Rises as Companies Try to Cut Labor Costs” (Chandra, 2013). Corporations that act on behalf of capital providers attempt to maximize productivity, profit, and shareholders' wealth at the expense of labor, because they tend to view labor as a major reduction in their shareholders' wealth. In other words, labor is perceived to extract rent from shareholders.



Exacerbating the problematic notion, accounting principles define corporate payment to employees as an income-decreasing component or a cost, which contains a negative connotation (Sikka, 2015). Therefore, companies neglect the welfare of employees and seek ways to minimize labor costs to enhance productivity and profitability. In fact, labor cost minimization and purchasing power loss are two sides of the same coin. While companies attempt to minimize labor costs with the aim of maximizing profits, they fail to foresee that employees who earn less immediately lose their purchasing power as a result. Inevitably, the loss of employees' purchasing power causes an overall decline in companies' sales and profits. The shrinkage of employee wages and benefits engenders income and wealth inequality (David and Cobb, 2010; Sikka, 2015), potentially eroding the welfare of society as a whole.

### **3.3.2 Labor Unions and Corporate Disclosure**

Prior literature documents that employees leverage corporate disclosure to gain an advantage over their employers during wage negotiations. To begin with, Tinker et al. (1982) suggest that accounting in the social context be highlighted, because accounting information that employers or companies disclose has a significant impact on employees' well-being. Echoing Tinker et al. (1982), Barlev and Haddad (2003) argue that employees evaluate competitiveness, profitability, survival of their companies largely through corporate disclosure. In particular, corporate disclosure provides information about earnings that employees use to derive an association between corporate earnings and their wages and benefits. If corporate earnings have reportedly risen, employees will not hesitate to exploit it to bargain for better remuneration (Reynolds, 1978). Once unionized, employees will possess an even more powerful capability of negotiation with their employers (Hirsch, 1991, 2008). Thus, it is not surprising that wages negotiated through collective bargaining agreements (CBAs) are positively linked to corporate profitability (Blanchflower et al. 1996; Bova, 2013; Christofides and Oswald 1992).

Realizing that unionized employees seek to extract a greater share of rents than employers want to give, employers withhold relevant information from corporate disclosure. Reynolds et al. (1998) claim that concealing or misstating companies' true information is essential to labor negotiations. Subsequent empirical evidence

corroborates this claim. By analyzing surveys responses from executive managers, Kleiner and Bouillon (1988) find that the more information the companies share with labor unions, the higher the level of wages and benefits and suggest that mitigated information asymmetry improves the bargaining position of labor unions. Scott (1994) reports that firms reduce the level of disclosure on pension plans when encountering a higher risk of strike. Hilary (2006) finds that the stronger the labor unions, the more likely the preservation of information asymmetry by managers. Chung et al. (2015) report that the frequency of disclosure declines in union strength, and this effect is more salient for firms with positive news. Likewise, Cheng (2017) documents that unionized firms prefer to finance their investment with bank loans rather than public debts, so that they can reduce the amount of information disclosed to the public, including labor unions.

While Dye's (1985) disclosure theory posits that managers will withhold bad information, managers in unionized companies are incentivized to provide negative signals about competitiveness, profitability or survival of the companies at the time of labor renegotiations. Although earlier work by Liberty and Zimmerman (1986) shows that there is no evidence that managers reduce corporate earnings during labor union contract negotiations, subsequent studies oppose their finding. DeAngelo and DeAngelo (1991) study the seven major domestic steel producers during requests for union concessions and conclude that these firms report larger losses during labor negotiations after cash flows are controlled for. Examining the determinants of SFAS 106 choices, D'Souza et al. (2001) report that unionized firms are positively associated with the use of immediate recognition as their incentive is to decrease labor renegotiation costs.

In addition, Matsa (2010) documents that managers strategically increase financial leverage to improve their bargaining position when negotiating with labor unions. Reinforcing the empirical finding by Matsa (2010), Michaels et al. (2019) propose a model demonstrating that a reduction in surpluses due to the higher probability of default suppresses employee wages. Bae et al. (2011) suggest that firms treating their employees less fairly are more likely to increase debt ratios. Bova (2013) also finds that unionized firms are more incentivized than their nonunionized counterparts to miss mean consensus analyst's earnings forecasts with the aim of enhancing the firms'

bargaining power during wage renegotiations. Arslan-Ayaydin et al. (2021) also find that the optimistic tone of earnings press releases is a decreasing function of the degree of labor unionization. To strategically release bad news or negative information about firm profitability and ability to generate future cash flows around a specific time, managers may time the recognition of discretionary expenses, including goodwill impairment loss.

### **3.3.3 Accounting for Goodwill Impairment**

In a business combination, goodwill is recognized when the amount of the consideration transferred by an acquirer exceeds the fair value of net assets acquired by the acquirer at the acquisition date under the purchase (or acquisition) method. Once goodwill has been recorded, its subsequent measurement is critical. While Statement of Financial Accounting Standards No. 142 (SFAS 142) Goodwill and Other Intangible Assets is my primary focus, it is imperative to understand accounting treatments for goodwill both before and after this SFAS came into effect in December 2001.

Effective in December 2001, SFAS 142 rescinded a significant part of APB Opinion No. 17 and SFAS 121 associated with the subsequent measurement of goodwill. To be more precise, it eliminated goodwill amortization and recoverability-based impairment. Rather, under SFAS 142, goodwill is subject to a yearly impairment test based on the fair value of the reporting unit to which goodwill is allocated. To elaborate more on SFAS 142, testing goodwill impairment involves two steps. First, consider whether there is a probable impairment event by comparing the carrying amount of a reporting unit to which goodwill is assigned and its fair value. If the former exceeds the latter, conduct the second step, i.e., estimate the amount of impairment loss. In doing so, the implied fair value of reporting unit goodwill shall be measured by computing the difference between the fair value of the reporting unit and the sum of the fair values of all identifiable assets and liabilities in that reporting unit. If the carrying amount of reporting unit goodwill is greater than the implied fair value of reporting unit goodwill, then the excess amount of the former over the latter shall be recognized as a goodwill impairment loss through income. Impairment reversal is not permitted.

Subsequently, SFAS 142 faced one addition in 2011 and one elimination in 2017 to reduce cost and complexity. Accounting Standards Update No. 2011-08, Intangibles—Goodwill and Other (Topic 350), introduced the optional preliminary step of qualitative assessment to enable firms to evaluate qualitatively the probability that the carrying amount of the reporting unit goodwill exceeds its fair value. The objective of step zero is to cut step one if the qualitative evaluation fails to indicate that goodwill impairment is “more likely than not”. Effective in December 2019, Accounting Standards Update No. 2017-04, Intangibles—Goodwill and Other (Topic 350), revoked the second quantitative step of estimating the implied fair value of reporting unit goodwill. Complying with this new rule, firms shall recognize the excess of the carrying amount of a reporting unit to which goodwill is assigned over its fair value—i.e., the outcome derived from step one—as goodwill impairment loss.

Fair value is defined as “the amount at which that asset (or liability) could be bought (or incurred) or sold (or settled) in a current transaction between willing parties, that is, other than in a forced or liquidation sale” (SFAS 142, pp. 13). Fair value has played a pivotal role in accounting standards over the past decades. Standard setters demand that financial statements reflect a high degree of relevance in order to make accounting information more useful to investors’ economic decision making. However, potential shortcomings of fair value accounting are not obscure. Thus, it is not surprising that several aspects of fair value accounting have been extensively studied.

### **3.3.4 Prior Research on SFAS 142**

In fact, accounting scholars investigate certain economic consequences of fair value-based goodwill impairment under SFAS 142. Researchers who study the impacts of SFAS 142 agree that the accounting standard provides managers with generous discretion to choose the timing of reporting goodwill impairment. Beatty and Weber (2006) examine whether managers are more likely to impair the carrying amount of goodwill during the transition period of SFAS 142 than to do it in the future. They find that riskier firms with high earnings response coefficient on income from continuing operations prefer the former choice that conforms to below-the-line accounting, whereas those with a higher probability of violating debt covenants prefer the latter that comply

with above-the-line accounting. Ramanna (2008) argues that fair value accounting under SFAS 142 is not verifiable and arbitrary, because it depends largely on managers' judgment. Managers can opportunistically exercise their discretion to determine reporting units to which goodwill is assigned, estimate fair values of reporting unit assets and liabilities, avoid the recognition of impairment loss for firms with high market-to-book ratios, and measure the amount of impairment loss (if any) for firms with assets and liabilities whose market values are unobservable. In the end, he concludes that firms with these characteristics lobby for goodwill impairment.

Likewise, Li et al. (2011) document three major impacts of goodwill impairment based on unverifiable fair value estimates. First, when an impairment loss is announced, investors and analysts react negatively by lowering their expectations. Second, the effect of an impairment loss is significant and negative. Third, goodwill impairment indicates a future decrease in profitability. They suggest that managers exercise their discretion to withhold the recognition of goodwill impairment loss. Li et al. (2011) suggest that the announcement of goodwill impairment is usually not expected by the market. Hence, goodwill impairment potentially conveys firms' (new) private information to outsiders.

Ramanna and Watts (2012) find that an intended consequence of SFAS 142 does not occur that standard setters want managers to signal their private information to outsiders. By contrast, an unintended consequence arises that managers delay goodwill write-offs when they have agency-based incentives. Li and Sloan (2017) study the effect of SFAS 142 on the accounting for and measurement of goodwill. They find that the recognition of goodwill impairment is less timely in the post-SFAS 142 period because managers use discretion to delay recording goodwill impairment, a finding consistent with Ramanna (2008) and Ramanna and Watts (2012). Moreover, they document that investors appear to overprice firm shares because of the transiently overstated carrying amount of goodwill.

While the prior studies focus principally on managerial discretion due to SFAS 142, subsequent studies advance the literature by investigating other issues. Exploiting SFAS 142 as an exogenous shock, Cheng et al. (2018) find that following the adoption

of SFAS 142, firms that record goodwill impairment improve the accuracy of their management forecasts. This finding suggests that changes in the accounting for goodwill improves managerial decisions via the internal information environment channel (i.e., managers obtain new information sets to estimate fair value). Ayres et al. (2019a) examines whether the presence of sell-side analysts improves the timeliness of goodwill impairment recognition. They find that analyst following accelerates the recognition of goodwill impairment through two monitoring channels. In the ex ante monitoring channel, analysts perform analysis of firm performance and, in turn, inevitably reduce information asymmetry, improving the information environment. In the ex post monitoring channel, analysts punish firms that do not announce goodwill impairment although goodwill impairment is probable by quitting following those firms. Using survival analysis, Chung and Hribar (2021) study whether CEO overconfidence impacts how likely and timely goodwill impairment is. They find that overconfident CEOs are less likely to recognize goodwill impairment and more likely to delay reporting goodwill impairment.

While SFAS 142 provides managers with ample discretion, auditors act as a detective mechanism that can curb the managerial discretion. Conflicting incentives between managers and auditors are clearly pronounced. On the one hand, managers prefer to exercise their discretion to decelerate, or even indefinitely avoid, impairment recognition. On the other hand, auditors attempt to make impairment recognition timely to assure users that financial statements faithfully represent firms' underlying economics. Ayres et al. (2019b) document that following the recognition of goodwill impairment, firms dismiss their auditors. This action suggests that auditors are conservative, in that they persuade, or even compel, managers to record an impairment loss when they identify probable impairment. It also suggests that auditor conservatism facilitates managers' decisions to write down goodwill.

### **3.3.5 Institutional Setting**

My major setting hinges on collective bargaining agreements (CBAs). The outcome of renegotiations between managers and unions is a CBA. The typical duration of CBAs is three to five years (e.g., Chava et al., 2020). Renegotiation on a CBA normally occurs around the expiry date of the previous CBA (Leap, 1991), which is 90

days before or after the effective date of the new CBA (Liberty and Zimmerman, 1986). Renegotiations are staggered over time, publicly known, and largely unaffected by managers (Aobdia and Cheng, 2018). In the United States, CBAs are typically characterized by single-employer bargaining, rather than multi-employer or sectoral bargaining (OECD, 2019). That is, CBAs are at the firm level in the U.S. According to OECD.Stat, collective bargaining coverage in the United States was 12.1% in 2020.

### **3.4 Hypothesis Development**

To develop my hypothesis, I link literature on labor unions and corporate disclosure with goodwill impairment. Around the time of labor renegotiations, the misalignment of incentives between managers and labor unions is most salient. Labor unions demand financial position and performance of firms and then evaluate and utilize the information to bargain collectively for better remuneration (Barlev and Haddad, 2003). Realizing this demand, managers of unionized firms withhold specific disclosures (e.g., Cheng, 2017), release negative news (e.g., Bova et al., 2013), or employ income-decreasing accounting methods to gain an information advantage over unions (Hilary, 2006).

The accounting for goodwill impairment provides managers with generous discretion to choose whether, when, and how much goodwill will be written down (e.g., Li and Sloan, 2017; Ramanna, 2008). Therefore, I argue that managers may opportunistically exercise their discretion to strategically impair goodwill (for SFAS 121, see Riedl, 2004; for SFAS 142, see Li and Sloan, 2017; Ramanna, 2008; Ramanna and Watts, 2012) around the time of labor renegotiations in order to weaken union bargaining power. Announcing goodwill impairment reduces corporate earnings through above-the-line accounting, as well as providing managers' adverse projection of future cash flows to firms.

The impacts of goodwill impairment losses are twofold. First, writing down goodwill reduces total assets and shareholders' equity, raising financial leverage. Firms with higher financial leverage have relatively bargaining positions against unions (Matsa,

2010; Michaels et al., 2019). Second, since goodwill impairment is unexpected by nature (Li et al., 2011), it may trigger a temporary earnings shock to labor unions. Then, this negative earnings shock may deprive labor unions of a powerful bargaining tool for gaining momentum against managers. In particular, when earnings are unexpectedly lower and business outlooks are unexpectedly unpromising, labor unions tend to bargain for relatively lower wage growth (e.g., Bova, 2013; Reynolds, 1978) on which managers are less hesitant to make concessions. Advocating these arguments, Lin et al. (2023) suggest that unions may not be able to undo the effects of goodwill impairment losses. As a consequence, I construct my first hypothesis (in alternative form).

**H1:** Unionized firms that report goodwill impairment losses around the time of labor renegotiations reduce union bargaining power.

Kallousa et al. (2023) argue that managers are less likely to use goodwill impairment losses to weaken union bargaining positions because doing so is too costly. However, SFAS 142 unintentionally allows delaying goodwill impairment (Li and Sloan, 2017; Ramanna, 2008), suggesting that unionized firms' managers know that goodwill have already been impaired but choose to report impairment around the time of renegotiations. This conflicting evidence creates a tension for my prediction.

## **3.5 Data and Research Design**

### **3.5.1 Data and Sample**

I will obtain the list of private CBAs from Bloomberg BNA (following Chava et al., 2020) from 2001 to 2016. I start my sample period in 2001 as it is the effective year of SFAS 142. Then, I will merge the CBA data with Compustat using company names. I plan to obtain firm-level wages from the Compustat-SSEL bridge and employee benefit expenses from Compustat. My sample period ends in 2016 because it is the last year of the Compustat-SSEL bridge. Subsequently, I will merge resulting data with relevant databases to obtain data on firm characteristics and financials. My unit of analysis is at the firm-year level.



Following Aobdia and Cheng (2018), I define my treatment group as firms operating in a unionized industry. My control group is firms that do not operate in a unionized industry. An industry is unionized when at least one firm in the industry renegotiates at least one CBA during the sample period.

### 3.5.2 Empirical Design

Exploiting staggered labor renegotiations that managers can anticipate well, I will perform Aobdia and Cheng's (2018) effectively staggered difference-in-differences model to test whether unionized firms that report goodwill impairment around the time of labor renegotiations experience a decrease in union bargaining power.

$$\begin{aligned}
 Union\_power_{it+1} &= \beta_0 + \beta_1 Union\_industry_i \times Renegotiation_{it} + \\
 &\quad \beta_2 Unexpected\_impairment_{it} + \\
 &\quad \beta_3 Union\_industry_i \times Unexpected\_impairment_{it} + \\
 &\quad \beta_4 Union\_industry_i \times Renegotiation_{it} \times Unexpected\_impairment_{it} \\
 &\quad + \sum \beta_k Controls_{it} + \gamma_i + \delta_t + \varepsilon_{it} \tag{1}
 \end{aligned}$$

My dependent variable,  $Union\_power_{it+1}$ , is firm-level wages or firm-level employee benefit expenses for the next fiscal year.  $Union\_industry_i$  is an indicator variable equal to one if a firm operates in a unionized industry and zero otherwise. An industry is statically defined by the four-digit SIC code and unionized when at least one firm in the industry renegotiates a CBA during the sample period.  $Renegotiation_{it}$  is an indicator variable equal to one if a firm renegotiate a CBA during the fiscal year.  $Unexpected\_impairment_{it}$  is an indicator variable equal to one if goodwill impairment losses for the fiscal year exceed the excess of the firm's tangible net worth over its market value of equity at the fiscal year-end and zero otherwise (Beatty and Weber, 2006).

Following prior literature (e.g., Currie and McConnell, 1992),  $Controls_{it}$  is a vector of firm-specific control variables—including the natural logarithm of total assets, market-to-book ratios, sales scaled by lagged total assets, net income scaled by lagged total assets, inventories scaled by lagged total assets, liquid assets scaled by lagged total

assets, the capital-labor ratio, employees, and leverage.  $\gamma_i$  is firm fixed effects, which control for time-invariant firm-specific characteristics that could affect my dependent variable.  $\delta_t$  is year fixed effects, which control for specific-time events that could affect my dependent variable. The *Union\_industry<sub>i</sub>* main effect is subsumed by firm fixed effects as in Aobdia and Cheng (2018). Standard errors are clustered at the industry level. My unit of analysis is at the firm-year level. I predict  $\beta_4$  to be negative and significant, consistent with union bargaining power falling after unionized firms announce goodwill impairment around the time of labor renegotiations.

### **3.6 Cross-Sectional Analyses**

I will assess whether my main results are more pronounced for firms with low firm age, high union strength, and high employee ownership. I will partition my sample into high and low subsamples using the median value of the whole sample. García Osma et al. (2015) document that renegotiations are repeated games, suggesting that cooperation and transparency in renegotiations may rise over time. I use firm age to proxy for the number of labor renegotiations.

Kallousa et al. (2023) document that unions create operational inflexibility that hinders the realization of post-acquisition synergy. Therefore, when union strength is high, managers are more likely to report unexpected goodwill impairment to reduce union bargaining power.

Further, Bova et al. (2015) argue that employee ownership mitigates conflict between managers and employees in renegotiations. Knowing firm announcement of goodwill impairment, unions with high employee ownership tend to concede early in the renegotiation process. Goodwill impairment already reduces profit. Wage increase will reduce profit even more. Therefore, unions may be happy to receive market wages and expect firms to pay dividends or repurchase shares. By contrast, unions with low employee ownership may extract rent resistantly.

### **3.7 Robustness Tests**

I will first use entropy balancing to generate a balanced sample. This technique will reweight the distribution, so that the mean, variance, and skewness values are identical between the treatment and control groups. I expect to find that my main results are robust to using entropy balancing. Second, I will use an employee welfare rating (such as the Refinitiv workforce score) as an alternate dependent variable. I expect to find similar results. Third, I plan to exclude firms headquartered in right-to-work (RTW) states. RTW laws debilitate unionization, so I expect to find results of higher magnitude or of a better significance level.

To ensure that my selected measure of unexpected goodwill impairment losses does not drive my main results, I will also rerun equation (1) using an alternate proxy: regression residual. Li et al. (2001) build an alternative proxy for unexpected goodwill impairment losses fundamentally on Beatty and Weber's (2006) impairment indicators. In estimating expected goodwill impairment, they regress goodwill impairment losses on managers' incentives to write down goodwill and prior economic indicators of goodwill impairment (e.g., prior returns and earnings news). The residual of such a regression serves as the unexpected constituent of goodwill impairment loss. I predict that the signs and significance of all the parameters remain intact in this robustness test.

### **3.8 Limitations**

This paper is not without limitations. First, the dependent variable, union bargaining power, is empirically understudied; therefore, it may not be perfectly constructed. However, it represents the outcome that I aim to study. I urge future researchers to develop the measure for union bargaining power further and replicate my paper using that measure to find out whether my results still hold. Additionally, while this paper may not suffer from reverse causality, it is not completely free of omitted variable bias. However, I gain reasonable assurance that my control variables drawn from prior literature and fixed effect structures mitigate the bias substantially.

### 3.9 Figure

Figure 3.1

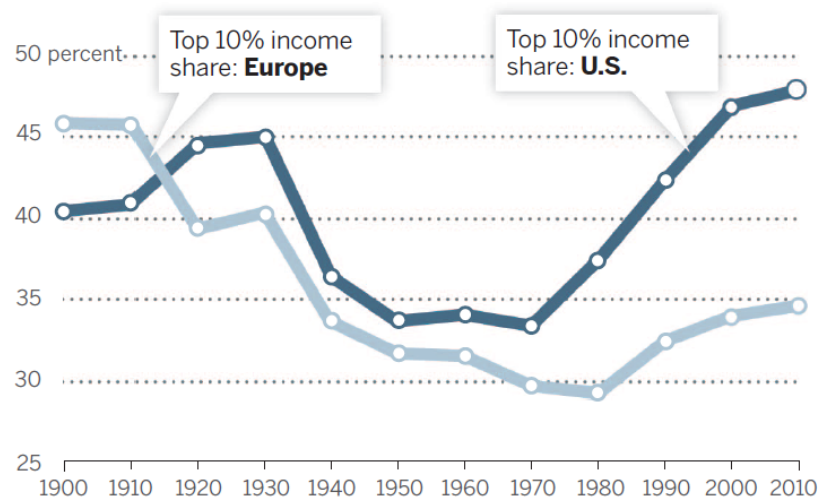
#### Income and Wealth Inequality in Europe and the United States

Figure 3.1 presents two panels. Panel A reports income inequality in Europe and the United States from 1900 to 2010 (Piketty and Saez, 2014). U.S. income inequality is the focus. Overall, the share of total income accruing to top decile income holders for the U.S. was a U shape—a downward trend from 1900 to 1950, a plateau from 1950 to 1970, and a sharp increase from 1970 to 2010. Piketty and Saez (2014) plot the graph using income tax returns and national accounts. Panel B reports wealth inequality in Europe and in the United States between 1870 and 2010 (Piketty and Saez, 2014). U.S. wealth inequality is the focus. Overall, the trend of net wealth belonging to the top decile wealth holders for the U.S. was stable between 1870 and 2010. A peak was reached in 1910 while a trough was seen in 1970. Piketty and Saez (2014) plot the graph using inheritance tax returns and national accounts.

#### Panel A: Income Inequality in Europe and the United States

##### Income inequality in Europe and the United States, 1900–2010

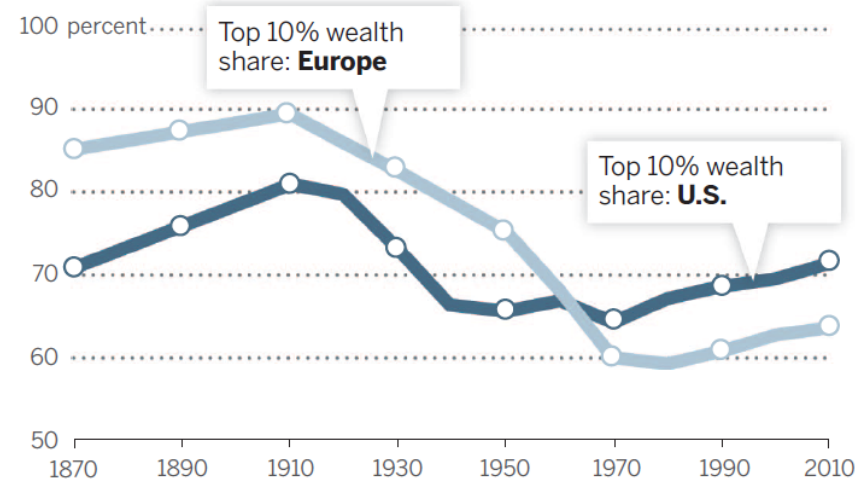
Share of top income decile in total pretax income



**Panel B: Income Inequality in Europe and the United States**

**Wealth inequality in Europe and the United States, 1870–2010**

Share of top wealth decile in total net wealth



## BIBLIOGRAPHY

- Allen, D.G., Bryant, P.C., Vardaman, J.M., 2010. Retaining talent: replacing misconceptions with evidence-based strategies. *The Academy of Management Perspectives*, 24, 48–64.
- Anantharaman, D., Gao, F., Manchiraju, H., 2022. Does social responsibility begin at home? The relation between firms' pension policies and corporate social responsibility (CSR) activities. *Review of Accounting Studies* 27, 76–121.
- Anantharaman, D., Lee, Y.G., 2014. Managerial risk-taking incentives and corporate pension policy. *Journal of Financial Economics* 111, 328–351.
- Aobdia, D., Cheng, L., 2018. Unionization, product market competition, and strategic disclosure. *Journal of Accounting and Economics* 65, 331–357.
- Arslan-Ayaydin, Ö., Thewissen, J., Torsin, W., 2021. Disclosure tone management and labor unions. *Journal of Business Finance & Accounting* 48, 102–147.
- Ayres, D.R., Campbell, J.L., Chyz, J.A., Shipman, J.E., 2019a. Do financial analysts compel firms to make accounting decisions? Evidence from goodwill impairments. *Review of Accounting Studies* 24, 1214–1251.
- Ayres, D.R., Neal, T.L., Reid, L.C., Shipman, J.E., 2019b. Auditing goodwill in the post-amortization era: Challenges for auditors. *Contemporary Accounting Research* 36, 82–107.
- Austin, P. S., 2013. Pension funding relief is tempting but the price may be too high in the long run. Available at <https://www.pionline.com/article/20130918/ONLINE/130919877/pension-funding-relief-is-tempting-but-the-price-may-be-too-high-in-the-long-run>
- Badertscher, B., Shroff, N., White, H.D., 2013. Externalities of firm presence: evidence from private firms' investment decisions. *Journal of Financial Economics*. 109 (3), 682–706.
- Bae, K.H., Kang, J.K., Wang, J., 2011. Employee treatment and firm leverage: a test of the stakeholder theory of capital structure. *Journal of Financial Economics* 100, 130–153.
- Bakke, T., Whited, T.M., 2012. Threshold events and identification: a study of cash shortfalls. *The Journal of Finance* 67, 1083–1111.
- Barlev, B., Haddad, J.R., 2003. Fair value accounting and the management of the firm. *Critical Perspectives on Accounting* 14, 383–415.
- Baron, R.M., Kenny, D.A., 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* 51 (6), 1173–1182.
- Bartram, S.M., 2018. In good times and in bad: Defined-benefit pensions and corporate financial policy. *Journal of Corporate Finance* 48, 331–351.

- Bartram, S.M., 2017. Corporate postretirement benefit plans and real investment. *Management Science* 63, 355–383.
- Beatty, A., Liao, S., Yu, J.J., 2013. The spillover effect of fraudulent financial reporting on peer. *Journal of Accounting and Economics* 55, 183–205.
- Berg, F., Fabisik, K., Sautner, Z., 2021. Is history repeating itself? The (un)predictable past of ESG ratings. European Corporate Governance Institute – Finance Working Paper 708/2020
- Berkowitz, B., 2013. Rate Pressures On Pensions Wipe Out Billions In Profits. Available at: <https://www.reuters.com/article/us-corporate-pensions-idUSBRE90U1HW20130131/>
- Bhattacharya, S., 1980. Nondissipative signaling structures and dividend policy. *The Quarterly Journal of Economics* 95, 1.
- Birhanu, A. G., Gambardella, A., Valentini, G., 2016. Bribery and investment: Firm-level evidence from Africa and Latin America. *Strategic Management Journal* 37(9), 1865–1877.
- Blanchflower, D., Oswald, G.A., Sanfey, P., 1996. Wages, profits, and rent-sharing. *The Quarterly Journal of Economics* 111, 227–51.
- Bode, C., Singh, J., Rogan, M., 2015. Corporate social initiatives and employee retention. *Organization Science* 26 (6), 1702–1720.
- Boudette, N.E., 2019. G.M. Strike: 50,000 union workers walk out over wages and idled plants. Available at: <https://www.nytimes.com/2019/09/15/business/autoworkers-union-general-motors.html>
- Bova, F., 2013. Labor unions and management's incentive to signal a negative outlook. *Contemporary Accounting Research* 30, 14–41.
- Bova, F., Dou, Y., Hope, O.K., 2015. Employee ownership and firm disclosure. *Contemporary Accounting Research* 32, 639–673.
- Bradford, H., 2012. Corporate pension plans ready to seek more relief. Available at: <https://www.pionline.com/article/20120222/ONLINE/120229979/corporate-pension-plans-ready-to-seek-more-relief>
- Campbell, J.L., Dhaliwal, D.S., Schwartz Jr., W.C., 2010. Equity valuation effects of the Pension Protection Act of 2006. *Contemporary Accounting Research* 27, 469–536.
- Campbell, J.L., Dhaliwal, D.S., Schwartz, W.C., 2012. Financing constraints and the cost of capital: Evidence from the funding of corporate pension plans. *Review of Financial Studies* 25, 868–912.
- Campbell, B.A., Ganco, M., Franco, A.M., Agarwal, R., 2012. Who leaves, where to, and why worry? Employee mobility, entrepreneurship and effects on source firm performance. *Strategic Management Journal* 33, 65–87.
- Campbell, J.L., Goldman, N.C., Li, B., 2021. Do financing constraints lead to incremental tax planning? Evidence from the Pension Protection Act of 2006. *Contemporary Accounting Research* 38, 1961–1999.

- Cao, J., Liang, H., Zhan, X., 2019. Peer effects of corporate social responsibility, *Management Science* 65, 5487–5503.
- Chandra, S., 2013. Productivity in U.S. Rises as Companies Try to Cut Labor Costs. Available at: <https://www.bloomberg.com/news/articles/2013-05-02/productivity-in-u-s-rises-as-companies-try-to-cut-labor-costs>
- Chava, S., Danis, A., Hsu, A., 2020. The economic impact of right-to-work laws: evidence from collective bargaining agreements and corporate policies. *Journal of Financial Economics* 137, 451–469.
- Chen, H.J., Kacperczyk, M., Ortiz-Molina, H., 2010. Labor unions, operating flexibility, and the cost of equity. *Journal of Financial and Quantitative Analysis* 46, 25-58.
- Cheng, L., 2017. Organized labor and debt contracting: Firm-level evidence from collective bargaining. *Accounting Review* 92, 57–85.
- Cheng, Q., Cho, Y.J., Yang, H., 2018. Financial reporting changes and the internal information environment: Evidence from SFAS 142. *Review of Accounting Studies* 23, 347–383.
- Christofides, L., Oswald, A., 1992. Real wage determination and rent-sharing in collective bargaining agreements. *The Quarterly Journal of Economics* 107, 985–1002.
- Chung, R., Byung-Hee L. B., Woo-Jong, L., Charlie S.B., 2016. Do managers withhold good news from labor unions? *Management Science* 62, 46–68.
- Chung, B.H., Hribar, P., 2021. CEO overconfidence and the timeliness of goodwill impairments. *Accounting Review* 96, 221–259.
- Coff, R. W., 1997. Human assets and management dilemmas: coping with hazards on the road to resource-based theory. *Academy of Management Review* 22 (2), 374–402.
- Comrix, J., Muller, K.A., 2011. Pension plan accounting estimates and the freezing of defined benefit pension plans. *Journal of Accounting and Economics* 51, 115–133.
- Cornell, B., Shapiro, A.C., 1987. Corporate stakeholders and corporate finance. *Financial Management* 16, 5.
- Cramton, P.C., Tracy, J.S., 1992. Strikes and holdouts in wage bargaining: theory and data. *American Economic Review* 82 (1), 100–121.
- Cullen, P., 2012. MAP-21: Good news & bad news for pension plans. Available at: <https://viaactuarial.com/2012/07/12/map-21-good-news-bad-news-for-pension-plans/>
- Currie, J., McConnell, S., 1992. Firm-specific determinants of the real wage. *The Review of Economics and Statistics* 74, 297–304.
- Dambra, M.J., 2018. Stakeholder conflicts and cash flow shocks: Evidence from changes in ERISA pension funding rules. *Accounting Review* 93, 131–159.
- David, G.F., Cobb, J.A., 2010. Corporations and economic inequality around the world: The paradox of hierarchy. *Research in Organizational Behavior* 30, 35–53.



- DeAngelo, H., DeAngelo, L., 1991. Union negotiations and corporate policy: a study of labor concessions in the domestic steel industry during the 1980s. *Journal of Financial Economics* 30, 3–43.
- D'Souza, J., Jacob, J., 2001. The use of accounting flexibility to reduce labor renegotiation costs and manage earnings. *Journal of Accounting and Economics* 30, 187–208.
- Dye, R.A., 1985. Disclosure of nonproprietary information. *Journal of Accounting Research* 23, 123–145.
- Durnev, A., Mangen, C., 2009. Corporate investments: learning from restatements. *Journal of Accounting Research* 47 (3), 679–720.
- Eckardt, R., Skaggs, B.C., Youndt, M., 2014. Turnover and knowledge loss: an examination of the differential impact of production manager and worker turnover in service and manufacturing firms. *Journal of Management Studies* 51, 1025–1057.
- Edmans, A., 2011. Does the stock market fully value intangibles? Employee satisfaction and equity prices. *Journal of Financial Economics* 101, 621–640.
- Edmans, A., 2012. The link between job satisfaction and firm value, with implications for corporate social responsibility. *Academy of Management Perspectives* 26, 1–19.
- Eggers, A.C., Tuñón, G., Dafoe, A., 2023. Placebo tests for causal inference. *American Journal of Political Science* 00, 1–16.
- Ellemers, N., Kingma, L., van de Burgt, J., Barreto, M., 2011. Corporate social responsibility as a source of organizational morality, employee commitment and satisfaction. *Journal of Organizational Moral Psychology* 1, 97–124.
- Financial Accounting Standards Board (FASB), 2001. *Statement of Financial Accounting Standards No. 142: Goodwill and Other Intangible Assets*. Norwalk, CT: FASB.
- Financial Accounting Standards Board (FASB), 2011. *Update No. 2011-08—Intangibles—Goodwill and Other (Topic 350): Testing Goodwill for Impairment*. Norwalk, CT: FASB.
- Financial Accounting Standards Board (FASB), 2017. *Accounting Standards Update 2017-04—Intangibles—Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment*. Norwalk, CT: FASB.
- Fisher, B., 1917. Determining cost of turnover of labor. *The Annals of the American Academy of Political and Social Science* 71, 44–50.
- Flammer, C., Luo, J., 2017. Corporate social responsibility as an employee governance tool: evidence from a quasi-experiment. *Strategic Management Journal* 38, 163–183.
- Franzoni, F., 2009. Underinvestment vs. overinvestment: Evidence from price reactions to pension contributions. *Journal of Financial Economics* 92, 491–518.
- Ganco, M., Ziedonis, R.H., Agarwal, R., 2015. More stars stay, but the brightest ones still leave: Job hopping in the shadow of patent enforcement. *Strategic Management Journal* 36(5), 659–685.

- García Osma, B., Mora, A., Sabater, A.M., 2015. Strategic Accounting Choice Around Firm-Level Labor Negotiations. *Journal of Accounting, Auditing & Finance* 30, 246–277.
- Gatchev, V.A., Pulvino, T., Tarhan, V., 2010. The interdependent and intertemporal nature of financial decisions: An application to cash flow sensitivities. *The Journal of Finance* 65, 725–763.
- Glaeser, S., 2018. The effects of proprietary information on corporate disclosure and transparency: evidence from trade secrets. *Journal of Accounting and Economics* 66, 163–193.
- Goto, S., Yanase, N., 2021. Pension return assumptions and shareholder-employee risk-shifting. *Journal of Corporate Finance* 70, 102047.
- Government Accountability Office (GAO), 2008. Survey of sponsors of large defined benefit pension plans (GAO-08-818SP). Available at: <https://www.gao.gov/products/GAO-08-818SP>
- Green, T.C., Huang, R., Wen, Q., Zhou, D., 2019. Crowdsourced employer reviews and stock returns. *Journal of Financial Economics* 134, 236–251.
- Gustman, A.L., Mitchell, O.S., Steinmeier, T.L., 1994. The role of pensions in the labor market: A survey of the literature. *Industrial and Labor Relations Review* 47, 417–438.
- Hainmueller, J., 2012. Entropy balancing for causal effects: a multivariate reweighting method to produce balanced samples in observational studies. *Political Analysis* 20 (1), 25–46.
- Hall, R., 1993. A framework linking intangible resources and capabilities to sustainable competitive advantage. *Strategic Management Journal* 14 (8), 607–618.
- Hamm, S.J.W., Jung, B., Lee, W.-J., Yang, D.G., 2021. Organized labor and inventory stockpiling. *The Accounting Review*: In press.
- Hausknecht, J. P., Trevor, C. O., Howard, M. J., 2009. Unit-level voluntary turnover rates and customer service quality: implications of group cohesiveness, newcomer concentration, and size. *Journal of Applied Psychology* 94, 1068–1075.
- Heavey, A. L., Holwerda, J. A., Hausknecht, J. P., 2013. Causes and consequences of collective turnover: a meta-analytic review. *Journal of Applied Psychology* 98, 412–453.
- Hilary, G., 2006. Organized labor and information asymmetry. *Review of Accounting Studies* 11, 525–548.
- Hirsch, B.T., 1991. Union coverage and profitability among U.S. firms. *Review of Economics and Statistics* 73 (1), 69–77.
- Hirsch, B.T., 2008. Sluggish institutions in a dynamic world: can unions and industrial competition coexist?. *The Journal of Economic Perspectives* 22, 153–176.

- Hom, P. W., Roberson, L., Ellis, A. D., 2008. Challenging conventional wisdom about who quits: Revelations from corporate America. *Journal of Applied Psychology* 93, 1–34.
- Huang, M., Li, P., Meschke, F., Guthrie, J.P., 2015. Family firms, employee satisfaction, and corporate performance. *Journal of Corporate Finance* 34, 108–127.
- Huang, K., Li, M., Markov, S., 2020. What do employees know? Evidence from a social media platform. *The Accounting Review* 95, 199–226.
- Ippolito, R.A., 1985. The labor contract and true economic pension liabilities. *The American Economic Review* 75, 1031–1043.
- Ippolito, R.A., 2002. Replicating default risk in a defined-benefit plan. *Financial Analysts Journal* 58, 31–40.
- Jia, Y., Gao, X., Julian, S., 2019. Do firms use corporate social responsibility to insure against stock price risk? Evidence from a natural experiment. *Strategic Management Journal* 41 (2), 290-307.
- Jopson, B., 2013. Nike to tackle rising Asian labour costs. Available at: <https://www.ft.com/content/277197a6-df6a-11e2-881f-00144feab7de>
- Klasa, S., Ortiz-Molina, H., Serfling, M., Srinivasan., S., 2018. Protection of trade secrets and capital structure decisions. *Journal of Financial Economics* 128 (2), 266–286.
- Kleiner, M. M., Bouillon, M. L., 1988. Providing business information to production workers: correlates of compensation and profitability. *Industrial and Labor Relations Review* 41, 605–617.
- Kallousa, N., Jang, Y., Jung, B., Warsame, H., 2023. Labor unions and post-acquisition integration capability: Evidence from goodwill impairment. *Journal of Business Finance & Accounting* 50, 764–794.
- Kisser, M., Kiff, J., Soto, M., 2017. Do managers of U.S. Defined benefit pension plan sponsors use regulatory freedom strategically?. *Journal of Accounting Research* 55, 1213–1255.
- Koba, M., 2013. New rule signals kiss of death for pensions. Available at: <https://www.cnbc.com/id/100694955>
- Koh, P., Reeb, D., 2015. Missing R&D. *Journal of Accounting and Economics* 60 (1), 73–94.
- Kubick, T.R., Lockhart, G.B., Robinson, J.R., 2021. Internal capital and investment: Evidence from 2012 pension relief. *Contemporary Accounting Research* 38, 2034–2070.
- Leap, T., 1991. *Collective bargaining and labor relations*, second ed. Prentice Hall, Englewood Cliffs, New Jersey.
- Lee, Y., Ng, S., Shevlin, T., Venkat, A., 2021. The effects of tax avoidance news on employee perceptions of managers and firms: Evidence from glassdoor.com ratings. *The Accounting Review* 96, 343–372.

- Leuz, C., Wysocki, P. D., 2016. The economics of disclosure and financial reporting regulation: Evidence and suggestions for future research. *Journal of Accounting Research* 54, 525–622.
- Li, X., 2010. The impacts of product market competition on the quantity and quality of voluntary disclosures. *Review of Accounting Studies* 15, 663–711.
- Li, Z., Shroff, P.K., Venkataraman, R., Zhang, I.X., 2011. Causes and consequences of goodwill impairment losses. *Review of Accounting Studies* 16, 745–778.
- Li, K.K., Sloan, R. G., 2017. Has goodwill accounting gone bad?. *Review of Accounting Studies* 22, 964–1003.
- Liberty, S.E., Zimmerman, J.L., 1986. Labor union contract negotiations and accounting choices. *The Accounting Review* 61, 692–712.
- Lin, G., Brown, A.B., Wu, W., 2023. The effect of unionization on firms' earnings management and employee compensation: Evidence from a regression discontinuity design. *Journal of Business Finance & Accounting* 50, 1715–1742.
- Mack, R.W., Snyder, R.C., 1975. The analysis of social conflict—toward an overview and synthesis. *Journal of Conflict Resolution* 1, 212–248.
- Marinescu, I., N. Klein, A. Chamberlain, and Smart, M., 2018. Incentives can reduce bias in online reviews. Working paper, National Bureau of Economics.
- Matsa, D.A., 2010. Capital structure as a strategic variable: Evidence from collective bargaining. *The Journal of Finance* 65, 1197–1232.
- Michaels, R., Page, T.B., Whited, T.M., 2019. Labor and capital dynamics under financing frictions. *Review of Finance* 23, 279–323.
- Mobley, W.H., 1977. Intermediate linkages in the relationship between job satisfaction and employee turnover. *Journal of Applied Psychology* 62, 237–240.
- Mobley, W.H., Griffeth, R.W., Hand, H.H., Meglino, B.M., 1979. Review and conceptual analysis of the employee turnover process. *Psychological Bulletin* 86, 493–522.
- Modigliani, F., Miller, M. H., 1958. The cost of capital, corporation finance, and the theory of investment. *American Economic Review* 48, 261–297.
- Norris, F., 2012. Private pension plans, even at big companies, may be underfunded. Available at: <https://www.nytimes.com/2012/07/21/business/pension-plans-increasingly-underfunded-at-largest-companies.html>
- Novick, B., Hunt, A., Ransenberg, D., 2012. Corporate pension funding update. Available at: <https://www.blackrock.com/corporate/literature/whitepaper/corporate-pension-funding-update.pdf>
- Organisation for Economic Co-operation and Development (OECD), 2017. Collective bargaining in a changing world of work, in: *OECD Employment Outlook 2017*, OECD Employment Outlook. OECD, 125–186.
- Organisation for Economic Co-operation and Development (OECD), 2019. *Negotiating our way up: Collective bargaining in a changing world of work*, OECD Publishing, Paris.

- Park, T. Y., Shaw, J. D., 2013. Turnover rates and organizational performance: A Meta-Analysis. *Journal of Applied Psychology* 98, 268–309.
- Piketty, T., Saez, E., 2014. Inequality in the long run. *Science* 344, 838–843.
- Price, J. L., 1977. *The study of turnover*. Ames, IA: Iowa State Press.
- Price, J. L., 2001. Reflections on the determinants of voluntary turnover. *International Journal of Manpower* 22, 600–624.
- Price, J. L., Mueller, C. W., 1981. A causal model for turnover for nurses. *Academy of Management Journal* 24, 543–565.
- Price, J. L., Mueller, C. W., 1986. *Absenteeism and turnover of hospital employees*. Greenwich, CT: JAI Press.
- Ramanna, K., 2008. The implications of unverifiable fair-value accounting: Evidence from the political economy of goodwill accounting. *Journal of Accounting and Economics* 45, 253–281.
- Ramanna, K., Watts, R.L., 2012. Evidence on the use of unverifiable estimates in required goodwill impairment. *Review of Accounting Studies* 17, 749–780.
- Rauh, J.D., 2006. Investment and financing constraints: Evidence from the funding of corporate pension plans. *The Journal of Finance* 61, 33–71.
- Rauh, J.D., Stefanescu, I., Zeldes, S.P., 2020. Cost saving and the freezing of corporate pension plans. *Journal of Public Economics* 188, 104211.
- Refinitiv, 2022, Environmental, social and governance scores from Refinitiv. Available at: [https://www.lseg.com/content/dam/marketing/en\\_us/documents/methodology/refinitiv-esg-scores-methodology.pdf](https://www.lseg.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf)
- Reynolds, L. G., 1978. *Labor economics and labor relations*, 7th Edition: Prentice-Hall, Inc.
- Reynolds, L. G., Masters, S. H., Moser, C. H., 1998. *Labor economics and labor relations* (11th ed.). New Jersey: Prentice Hall.
- Rich, R., Tracy, J., 2004. Uncertainty and labor contract durations. *Review of Economics and Statistics* 86 (1), 270–287.
- Rich, R., Tracy, J., 2013. Early contract renegotiations: An analysis of U.S. labor contracts, 1970–1995. *Journal of Labor Economics* 31 (4), 825–842.
- Riedl, E.I., 2004. An examination of long-lived asset impairments. *Accounting Review* 79, 823–852.
- Serafeim, G., Yoon, A., 2023. Stock price reactions to ESG news: The role of ESG ratings and disagreement. *Review of Accounting Studies* 28, 1500–1530.
- Shaver, J.M., 2011. The benefits of geographic sales diversification: How exporting facilitates capital investment. *Strategic Management Journal* 32(10), 1046–1060.
- Sikka, P., 2015. The hand of accounting and accountancy firms in deepening income and wealth inequalities and the economic crisis: Some evidence. *Critical Perspectives on Accounting* 30, 46–62.

- Scott, T. W., 1994. Incentives and disincentives for financial disclosure: Voluntary disclosure of defined benefit pension plan information by Canadian firms. *The Accounting Review* 69, 26–43.
- Shaw, J. D., Duffy, M. K., Johnson, J. L., Lockhart, D. E., 2005. Turnover, social capital losses, and performance. *Academy of Management Journal* 48, 594–606.
- Shiu, Y., Yang, S., 2017. Does engagement in corporate social responsibility provide strategic insurance-like effects?. *Strategic Management Journal* 38 (2), 455–470.
- Shroff, N., Verdi, R., Yost, B.P., 2017. When does the peer information environment matter?. *Journal Of Accounting And Economics* 64, 183–214.
- Society of Actuaries, 2012. Proposed pension funding stabilization: how does it affect the single-employer defined benefit system?. Available at: <http://www.soa.org/Files/Research/Projects/Proposed-Pension-Funding-Stabilization-How-Does-It-Affect-theSingle-Employer-Defined-Benefit-System-Report.pdf>
- Teoh, S. H., Zhou, Y., Makridis, C., 2023. Understanding reputation damage to firm culture: insights from employee perceptions post financial misconduct. Working paper.
- Tesser, A., Millar, M., Moore, J., 1988. Some affective consequences of social comparison and reflection processes: the pain and pleasure of being close. *Journal of Personality and Social Psychology* 54(1), 49–61.
- Tinker, A.M., Merino, B.D., Neimark, M.D., 1982. The normative origins of positive theories: Ideology and accounting thought. *Accounting, Organizations and Society* 7, 167–200.