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Resilience in Collective Bargaining

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A central finding of the theoretical literature on bargaining is that parties' attitudes towards delay influence bargaining outcomes. However, the ability to endure delays, resilience, is often private information and hard to measure in most real-world contexts. In the context of collective bargaining, we show firms actively attempt to become *financially* resilient in anticipation of labor negotiations. Firms adjust their financial resilience to respond to the passage of right-to-work laws (RWLs), unionization, and labor negotiation events. Unions' financial structure also responds to RWLs. Our findings suggest resilience is key to understanding the process through which collective bargaining determines wages.

Keywords: labor unions, right-to-work laws, bargaining, debt structure.

JEL classification: G32, J51, C78.

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"The length of the walkout may hinge on the answers to two crucial questions: How long can the United Auto Workers afford to stay out? And how long can General Motors endure a strike?"

'In GM strike, both sides see defining moment,' *The New York Times*, September 2007

1 Introduction

A central finding of the theoretical literature on bargaining is that parties' attitudes towards delay influence bargaining outcomes: parties for whom haggling is less costly (i.e., more resilient) are able to refuse unfavorable offers and, therefore, are better able to extract more favorable concessions during negotiations (Rubinstein 1982; Rubinstein and Wolinsky 1985; Abreu and Gul 2000). Resilience in negotiations, however, is often private information and consequently hard to measure in most real-world contexts. It is thus unsurprising that there is little empirical evidence on the connection between resilience and negotiations and, specifically, evidence on whether, in practice, parties do actively try to strengthen their resilience to negotiations.

To make progress on this question, we revisit collective bargaining, a classic bargaining setting by antonomasia. Labor union support is at its highest point since the 1960s[1] while strike activity has been near its 30-year high.[2] And labor costs are meaningful for firms and the economy: the labor share of GDP is around 50%; for publicly-traded firms, labor costs represent around 60% of expenses (Donangelo, Gourio, Kehrig, and Palacios 2019). Prior work has documented that unionization is associated with higher wages (e.g., Blanchflower and Bryson 2003; Card, Lemieux, and Riddell 2003) and lower wage inequality (Fortin and Lemieux 1997; Card, Lemieux, and Riddell 2004). Yet, the effect on wages may understate the total effects of collective bargaining as firms and unions attempt to increase resilience to help them improve their position during negotiations. Firms' anticipatory measures in particular can then affect workers indirectly, for example, through changes in unemployment risk.[3] Echoing the famous quote from Freeman and Medoff, it seems

[1] Gallup (2022). Available at https://news.gallup.com/poll/398303/approval-labor-unions-highest-point-1965.aspx

[2] 'A Summer of Strikes,' *New York Times*, September 2023. See also, 'Auto Strike Looms, Threatening to Shut Detroit's Big 3,' *New York Times*, September 2023.

[3] Giroud and Mueller (2017) document that local consumer demand shocks during the financial crisis led to sharper

that assessing the collective bargaining process itself is critical for our understanding of "under what conditions" and "with what effects to the economy" firms and unions determine the wages workers receive.[4]

In this article, we theoretically and empirically evaluate firms' attempts to gain resilience and unions' financial response in the context of collective bargaining. We identify financial resilience as the key lever firms target in anticipation of labor negotiations, and union fee increases as the unions' main channel of response. Financial resilience is key to firms because financial obligations make firms more financially vulnerable during strikes (DiNardo and Hallock 2002; Becker and Olson 1986; Figure 1). Firm financial resilience can take on many forms, including changes in the debt structure, and accumulation of inventory or cash. A key finding of this paper is that financial resilience operates mostly, though not entirely, through extending the term to maturity. For unions, we identify changes in total fees and fees per member as the key margin of adjustment to changes in the collective bargaining environment, with total fees decreasing for unions in the bottom half of size distribution but significantly increasing for the largest ones.

To illustrate the relationship between resilience and bargaining, we incorporate financial default into a traditional model of bargaining (Rubinstein 1982; Binmore 1987).[5] We show that the possibility of default can act as a double-edged sword in negotiations: on the one hand, committing resources to prevent default (e.g., repayment of debt (Bronars and Deere 1991)) helps firms push surplus off the bargaining table; on the other hand, being vulnerable to default during a strike

declines in employment for firms that were highly levered. Benmelech, Frydman, and Papanikolaou (2019) showed that, during the Great Depression, greater need to refinance maturing bonds was linked to larger reductions in a firm's workforce.

[4]"Everyone "knows" that unions raise wages. The questions are how much, under what conditions, and with what effects on the overall performance of the economy" (Freeman and Medoff 1984).

[5]The role of resilience is often observed anecdotally in collective bargaining events. For instance, during General Motors (GM) 2019 workers' strike, financial analysts and rating companies worried about the impact of a prolonged strike on the firm's ability to fulfill its obligations, as GM entered the talks with a large outstanding debt (i.e., high leverage) with a significant portion due just months later (i.e., short debt maturity). Moody's, for example, stated that GM's rating could topple into junk bond status if the strike lasted more than a week or two. Shortly thereafter, the strike ended with the company urging the union to "engage in 'around-the-clock' bargaining to reach a deal." (See 'GM strike, Day 2: Nearly 50,000 workers off the job in 19 states,' *CNN Business*, September 2019; 'GM urges UAW to engage in 'around-the-clock' bargaining to reach a deal, potentially end strike,' *CNBC*, October 2019.) Other salient collective bargaining events have shown similar narratives (e.g., 'GM 2007 strike,' *New York Times*, 2007).

reduces their ability to hold back workers' demands over the surplus left on the bargaining table. We then show this relationship empirically by showing firms aim to improve resilience following key events in the collective bargaining process: passage of right-to-work laws (RWLs), union elections, and the materialization of labor negotiations. Our findings showcase financial resilience as an important margin of response to changes in labor regulation, which has important implications for understanding the collective bargaining process as well as exposure to unemployment risk (Giroud and Mueller 2017; Benmelech et al. 2019).

Our theoretical model features workers and shareholders bargaining over the partition of a firm's surplus. Workers halt production until they secure an agreement; thus, delays in finalizing a deal reduce surplus. A debt obligation poses a limit to the length of negotiations: if production is delayed for too long, the firm cannot meet its debt obligation and goes bankrupt. We refer to this limit as the firm's *resilience to strikes*. Workers discount future payments more than shareholders, so that they are (all else being equal) relatively more eager to reach an agreement. Shareholders can then use the threat of long negotiations to hold back workers' wage demands in equilibrium. Since this threat is credible only if long negotiations are feasible, shareholders extract more surplus when the firm is more resilient to strikes.

We model two dimensions of the firm's debt structure: debt maturity and leverage. Resilience decreases with leverage (a more levered firm can afford fewer losses from strikes), and it increases with debt maturity (the firm has more time to pay its debt as maturity increases).[6] By increasing resilience, longer maturity unambiguously improves shareholders' position in negotiations. Leverage, instead, has two contrasting effects on the shareholders' payoff: on the one hand, it reduces the surplus available for negotiations (say x), shielding their wealth from wage concessions.[7] This first effect captures the idea of strategic leverage, which arises also in static bargaining

[6]Longer debt maturity also reduces the frequency of refinancing (similar to He and Xiong 2012), since the firm has to roll over on its debt less frequently when maturity is longer. This reduces the likelihood of having to raise capital in the middle or the aftermath of negotiations.

[7]That wage bargaining does take place within firms, and that financial distress plays a role in negotiations is supported by previous work. Hall and Krueger (2012) found evidence supporting bargaining for wages inside firms. Using a detailed dataset on wages in the airline industry, Benmelech, Bergman, and Enriquez (2012) show that firms in financial distress obtain more wage concessions.

models (Bronars and Deere 1991). On the other hand, shareholders receive a smaller fraction of x as leverage increases, because the firm becomes less resilient to strikes. This second effect uncovers a strategic cost in using leverage as a bargaining tool, which derives from its impact on the negotiation dynamics. While building resilience to strikes, firms also gain resilience to other potential cash flow shocks. Thus, bargaining with strong labor can make firms *safer* in our model, with implications for our understanding of unemployment risk.

Following the insights of our theoretical model, our strategy is to empirically measure the relationship between worker bargaining power and financial resilience. We do so in three steps. First, we evaluate the firm's financial resilience response to the adoption of RWLs – which we interpret as their response *in anticipation* of future labor negotiation events. Second, we evaluate unions' financial response to the adoption of RWLs. Lastly, we evaluate potential narrower mechanisms that connect RWLs and financial resilience, and we find empirical support for a connection between financial resilience and labor negotiation events.

First, we evaluate firms' financial resilience responses in anticipation of future labor negotiation events. We follow the common approach in the literature (Matsa 2010; Fortin, Lemieux, and Lloyd 2023) and examine the effects of an exogenous decrease in workers' bargaining power (α) using the introduction of state RWLs. Firms unambiguously reduce their debt maturity after the passage of RWLs (decrease in α). We show that a decrease in workers' bargaining power leads firms to reduce their debt maturity by reducing long-term debt and, to a lesser extent, by increasing short-term debt. Importantly, we show that reductions in debt maturity persist after conditioning for total leverage, profitability, or size. We also show that this effect is stronger for firms that have few other sources of cashflow risk besides labor.

Second, we evaluate unions' financial resilience response following hostile legislation. Using data on union financials from the Office of Labor-Management Standards (OLMS) of the U.S. Department of Labor, we evaluate unions' margins of response following the passage of RWLs. We find that unions keep cash constant despite, on average, experiencing a drop in membership and total fees. Instead, large unions increase their fees per member, which leads them to raise higher total fees than prior to the passage of RWLs; meanwhile, smaller unions increase leverage. This suggests that larger unions are better able to retain support following the passage of RWLs and thus mitigate the legislation's impact. Consistent with this, higher fees are associated with higher wage increases during labor negotiations; this last relationship is not causal, however, and can be interpreted as both fees making unions more effective, or more effective unions being able to capture and retain more support.

Third, we evaluate mechanisms that more precisely connect RWLs to financial resilience. To influence the outcome of negotiations with labor, shareholders in our model adjust debt's term to maturity and total outstanding debt, which jointly determine financial resilience. Therefore, we empirically address this by evaluating a firm's *direct* financial resilience response to labor negotiation events. Using data on negotiation events from the Settlement Summaries database of Bloomberg BNA, we show that firms *decrease* leverage in negotiation years compared to non-negotiation years, while increasing debt's average term to maturity. This decrease in debt is mostly concentrated in debt with shorter maturities, and it is more pronounced in firms for which strikes are likely to be more costly (e.g., in more unionized industries). We also show longer debt maturity is negatively correlated with wage concessions, which suggests that increasing financial resilience is effective during negotiations with workers. We do not find empirical support for changes in credit conditions; among other tests, we show that there is no significant change in debt pricing around negotiations or the passage of RWLs, which supports the view that changes in debt structure are directly taken in response to the negotiations rather than being indirectly mediated by credit markets' response to negotiations. We also fail to find supporting evidence for operating flexibility or politics materializing as mechanisms.

Contributions. We make three main contributions to the literature, in no particular order of importance. First, we provide, to the best of our knowledge, the first study of financial resilience of firms and unions during collective bargaining and provide a theoretical framework that incorporates financial resilience into the wage-setting process. While the relationship between unions and wages has been long-studied (e.g., Freeman and Medoff 1984, 1985; Card et al. 2003; Fortin and Lemieux 1997; Card et al. 2004), the conditions under which collective bargaining leads to higher wages is less understood.[8] Because financial resilience is specific to each firm and union, understanding its role in bargaining also offers an alternative mechanism through which firm-specific heterogeneity spills over to wages (Abowd, Kramarz, and Margolis 1999; Card, Cardoso, Heining, and Kline 2018; Bonhomme, Holzheu, Lamadon, Manresa, Mogstad, and Setzler 2023).

Second, we contribute to the literature on bargaining games. By showing that firms (and unions) actively attempt to become resilient in anticipation of collective bargaining, we provide evidence that parties' ability to delay the resolution of negotiations influences their outcomes (Rubinstein 1982; Rubinstein and Wolinsky 1985; Abreu and Gul 2000). Our theoretical model is also of interest in itself. A number of papers show that players may make costly commitments to refuse certain offers to improve their bargaining position in negotiations (Schelling 1956; Crawford 1982). More recent work argues that the pressure to reach an agreement may force players to accept bad deals, so they may choose to pay a cost to maintain the flexibility to reject unfavorable offers (Spier 1992; Ma and Manove 1993). In the context of financial obligations, we show that there is an inherent tension between these two objectives (commitment and flexibility) and characterize how this tension shapes firms' financing decisions in anticipation of collective bargaining.

Last, our paper contributes to a growing literature on the effects of nonfinancial stakeholders on firms' decision-making – see Matsa (2018) and Pagano (2020) for a review. Important early work in the labor and finance literature (Bronars and Deere 1991; Perotti and Spier 1993; Matsa 2010) argues that debt can be increased strategically to obtain concessions during negotiations. By contrast, we focus on the ability of firms to be resilient during the course of negotiations as a key determinant in understanding to what extent collective bargaining can affect wages. As such, we show that the relationship between capital structure and wages is a more nuanced one that is affected by multiple channels. This nuance arises in large part because of the dynamic nature of negotiations. Most of the theoretical work in this area considers static settings, showing that leverage improves shareholders' bargaining positions in negotiations (e.g., Bronars and Deere, 1991; Perotti and

[8] "Everyone "knows" that unions raise wages. The questions are how much, under what conditions, and with what effects on the overall performance of the economy" (Freeman and Medoff 1984).

Spier, 1993). Meanwhile, we analyze a dynamic bargaining model in which strikes are costly, and workers and shareholders have different costs of negotiating. Combining these features, we obtain novel insights into the use of capital structure in negotiations by highlighting the role of financial resilience. We are also able to explore the role of debt maturity in negotiations, which had not been studied before.

2 Bargaining with Financial Resilience

This section illustrates the role of financial resilience in collective bargaining. To simplify the exposition, the model described here focuses on the firm's (or shareholder's) choice of resilience and abstracts from the union's (or workers') response. In Appendix B.1, we allow both parties to choose their resilience to negotiations; we show that our main insights continue to hold.

The model features two types of risk-neutral agents: the shareholders (s) and workers (w) of a firm. Time is discrete, indexed by $t = 0, 1, ..$, and the horizon is infinite. The firm has access to an investment project that generates a revenue 1 and requires both a capital investment k, where $1 > k > 0$, and w's labor input. Shareholders use both equity e and debt to fund the project. They raise an amount $d \in [0, k]$ in debt at $t = 0$, against a promise to pay back to debtholders an amount $D \geq 0$ at some time $T \leq \overline{T}$, where T is a nonnegative integer that captures debt maturity. Shareholders set the firm's debt structure (D, T) at the beginning of time $t = 0$, before negotiations with w start. Given this debt structure, a credit market pins down the amount d raised by the firm.

Our objective is to explore how s chooses (D, T) strategically to influence the outcome of the wage negotiations with workers. For simplicity, here we capture the *nonstrategic* costs of leverage and maturity – due, for example, to bankruptcy costs or information frictions – in a reduced-form way, through Assumption 1 below. Appendix B.2 considers a simple extension of the model where these nonstrategic costs arise endogenously and shows that our results carry through.

Assumption 1. *The amount raised in debt d is a continuous, increasing, and concave function of D, and a decreasing function of T, and it satisfies $d \leq D$ and $d(D = 0) = 0$ for any value of T.*

Assumption 1 implies that debtholders require a premium $D - d$ that increases in the amount of borrowing d and in the debt maturity T. The firm's leverage is $\frac{d}{k}$. Since d increases with D, we will use the terms leverage, debt level, and D interchangeably in the remainder of this section. We allow for the possibility that s incurs nonstrategic costs also when raising equity – due, for example, to transaction costs and information frictions. The overall cost to shareholders of raising an amount e in equity is κe, where $\kappa \in [1, \infty)$ and $\kappa - 1$ represents the transaction cost.

The bargaining between s and w unfolds according to a dynamic version of the random-proposer model of Binmore (1987). At time $t = 0$, with probability α, w makes an offer to s, where an offer is a proposed partition of the firm's profits. If s accepts the offer, then an agreement is struck: w engages in production and a revenue of 1 is realized; D is paid back to creditors, and $1 - D$ is distributed among s and w according to the accepted offer. With probability $1 - \alpha$, s makes the offer at time $t = 0$, and w decides whether to accept. If the party receiving the offer at time $t = 0$ declines it, another round of negotiations takes place at time $t = 1$, with w and s having again probabilities α and $1 - \alpha$ of making an offer, respectively. If the offer made at time $t = 1$ is accepted, an agreement is struck then: w engages in production and the revenue δ is realized, where $\delta \in (0, 1)$; D is paid back to creditors, and $\delta - D$ is distributed among s and w according to the accepted offer. The delay in reaching an agreement reduces the firm's revenue: w halts production until an agreement is reached, resulting in foregone revenues $1 - \delta$.

This process of making offers and counteroffers continues until an offer is accepted. An agreement reached at time t consists of a sharing rule y_t of the residual surplus $\delta^t - D$. We adopt the convention that y_t is the share of surplus that goes to s. The share of surplus that goes to w is $\delta^t - D - y_t$. As is typical in bargaining models, making offers grants relatively greater bargaining power than responding to offers. The probability with which each player makes offers at each period thus captures its relative (exogenous) bargaining power in the negotiations.

A key feature of the model is that the firm's ability to meet its debt obligations depends on the unfolding of negotiations. If an agreement between s and w is yet to be reached at time T, the firm cannot repay D to debtholders and goes bankrupt, in which case both s and w receive a payoff of 0. If an agreement is yet to be reached at time $\bar{t}$ such that $\delta^{\bar{t}} \geq D$ but $\delta^{\bar{t}+1} < D$, the firm cannot repay its future obligations and goes bankrupt as well, even if $\bar{t} < T$. If $D = 0$, there is no debt obligation, so the firm never goes bankrupt. The maximal length of negotiations is thus $t^* = \min\{\bar{t}, T\}$ if $D > 0$, and $t^* = \infty$ if $D = 0$. We refer to t^* as the firm's resilience to negotiations.

Shareholders and workers are impatient, as they discount future payoffs. The delay in reaching an agreement has, thus, private costs for both parties, on top of the destruction of revenues due to walkouts. Let $(\delta_s, \delta_w) \in [0,1]^2$ denote s's and w's discount factors, respectively.

Assumption 2. *Shareholders are more patient than workers, that is, $\delta_s > \delta_w$.*

The assumption that workers are more impatient than shareholders is common in the literature on contracting (e.g., DeMarzo and Sannikov 2006; Opp and Zhu 2015) and reflects a lower degree of diversification for workers.[9] In Appendix B.1, we consider an extension of the model where workers' ability to endure a strike depends on the strategic choice of resilience of their union. In the extension, our main insights hold also when $\delta_s = \delta_w$. If an agreement y_t is reached at time $t \leq t^*$, s's payoff is $u_s = \delta_s^t y_t - \kappa e$, where e is the equity s has invested into the project, and w's payoff is $u_w = \delta_w^t \left(\delta^t - D - y_t\right)$. Otherwise, the firm goes bankrupt, and s's and w's payoffs are equal to 0. The equilibrium concept is Subgame Perfect Equilibrium (SPE).

In the baseline model described above, we make a number of simplifying assumptions to streamline the exposition. Appendix B shows that our main insights are robust to relaxing many of these assumptions. Appendix B.1 studies the choice of resilience of a union that represents w in the negotiation with s. Appendix B.2 adds credit market frictions to endogenize the interest rate on debt. Appendix B.3 studies the role of outside options. Finally, Appendix B.4 and Appendix B.5 allow for the possibility of debt rollover and debt renegotiation, respectively.

2.1 Equilibrium Analysis

Proceeding by backward induction, we first characterize the equilibrium of the bargaining game for given values of the debt structure D and T. We then use this characterization to describe how

[9] In practice, a firm's management negotiates on behalf of its shareholders, so δ_s may represent a weighted average of the shareholders' and management's discount factors. Such an average, however, is still likely to be larger than δ_w: Workers rely more heavily on labor income for their livelihood, so they are (all else equal) arguably more eager to end a strike than both shareholders and management.

the debt structure that maximizes s's total payoffs changes with w's bargaining power.

Proposition 1. *Fix (D, T) and let t^* denote the firm's resilience to negotiations – the last period before the firm goes bankrupt. An equilibrium always exists, is unique, and has the following features:*

1. *An agreement y_0^* is reached immediately, that is, at time $t = 0$.*
2. *For any time $t \leq t^*$, the equilibrium offers are such that the player receiving the offer is indifferent between accepting and refusing. If $t^* = \infty$, each player makes the same offer at each time.*

To build intuition, first consider the case where t^* is finite, so that there is a limit to the length of negotiations. At each period $t < t^*$, the player receiving an offer chooses between: (i) accepting the offer; (ii) refusing the offer, and having a chance to make its own offer in the next round. The offer made at t^* is always accepted, since the alternative is to decline the offer and drive the firm to bankruptcy. The equilibrium is then obtained moving *backward*, as a sequence of offers that make players indifferent between accepting and refusing the offer at each period.

The equilibrium outcome is Pareto efficient: the two parties avoid the costs of delay and reach an agreement immediately in equilibrium. The equilibrium allocation of surplus, however, depends on the sequence of offers players would make if a deal was not struck until the last possible period t^*. The agreed-upon allocation then reflects the relative costs that a prolonged negotiation would impose on each party, even though the first offer is always accepted in equilibrium.

Since making an offer confers relative bargaining power, the exact value of y_0^* depends on which of the two players is selected to make the offer at $t = 0$. Let $\mathbb{E}[y_0^*]$ denote the expected share of surplus s receives in equilibrium; we have:

$$\mathbb{E}[y_0^*] = (1-\alpha)\left\{1 - D + \alpha\left(\delta_s - \delta_w\right)\sum_{j=1}^{t^*}\left(\delta^j - D\right)\left[(1-\alpha)\,\delta_w + \alpha\delta_s\right]^{j-1}\right\}, \tag{1}$$

for $t^* > 0$, and $\mathbb{E}[y_0^*] = (1-\alpha)(1-D)$ for $t^* = 0$. For any $t^* \geq 0$, the expected amount of surplus that goes to w is then $1 - D - \mathbb{E}[y_0^*]$.

For the sake of exposition, first treat t^* as a parameter that does not depend on (D, T). Since $\delta_s > \delta_w$ and $\delta^t - D \geq 0$ for any $t \leq t^*$, the expected surplus s receives from negotiations $\mathbb{E}[y_0^*]$

increases with t^*. Being more patient than w gives s a relative advantage: refusing an offer and waiting for the next round of negotiations is relatively less costly for s. This is reflected in the equilibrium allocation, with s receiving, all else being equal, a relatively larger share of surplus for any $t^* > 0$. The more rounds of negotiations are potentially feasible (i.e., the larger t^*), the more surplus s receives in equilibrium: the threat of prolonged negotiations helps shareholders to hold back workers' wage demands. So s receives more surplus when the firm is more resilient.

In equilibrium, t^* is a function of the firm's debt structure, so it varies when D or T change. Debt maturity only affects $\mathbb{E}[y_0^*]$ through its effect on t^* (t^* increases with T). Leverage instead also directly affects the firm's equilibrium profits $1 - D$. $\mathbb{E}[y_0^*]$ thus decreases when D goes up both because (a) there is less surplus on the bargaining table and (b) the firm is less resilient to strikes (t^* decreases with D), so s extracts less of the surplus available in the negotiations with w.

If $t^* = \infty$, there is no limit to the length of negotiations. Players' equilibrium strategies are stationary in this case, with each player making the same offer whenever it's its turn to make one. Similar to before, an agreement is reached immediately, but the equilibrium allocation reflects the relative costs that continuing the negotiation indefinitely would impose on each party.

It is worth noticing that, when $t^* = 0$, $\mathbb{E}[y_0^*]$ corresponds to the expected surplus s would receive in a traditional *static* bargaining game (e.g., one where the protocol is Nash Bargaining or players make take-it-or-leave-it offers). The firm approaches an infinitely resilient debt structure ($t^* \rightarrow \infty$) in the limit as D tends to 0 and T tends to infinity. In this case, $\mathbb{E}[y_0^*]$ converges to the expected surplus s receives when the firm is fully equity funded and there is no limit to the length of negotiations. So our model collapses to a static bargaining model when only a single round of negotiations is feasible, and it converges to the model with infinite horizon as t^* tends to infinity.

In equilibrium, s's total expected payoff $\mathbb{E}[u_s^*]$ equals the sum of its expected share of surplus net of the equity s has invested in the firm. That is, $\mathbb{E}[u_s^*] = \mathbb{E}[y_0^*] - \kappa e$, where $e = k - d$. Next, we describe how the firm's debt structure impacts $\mathbb{E}[u_s^*]$ through its effect on negotiation outcomes.

Proposition 2. *Suppose $d = D$ for any (D, T) and $\kappa = 1$; shareholders' expected equilibrium payoff $\mathbb{E}[u_s^*]$ always increases with the debt maturity T, while it may increase or decrease with the debt level D.*

To focus on the strategic effects, Proposition 2 assumes that $d = D$ and $\kappa = 1$ for any value of (D, T). This corresponds to the case where there are no direct costs of raising debt or equity, so the firm's financing choices affect s's payoff only through their effect on negotiations. Longer debt maturity increases the firm's resilience to negotiations, as it delays the date D is due to debtholders. Since s extracts more surplus when t^* is larger, $\mathbb{E}[u_s^*]$ always increases with T.

Higher leverage has instead two contrasting effects on $\mathbb{E}[u_s^*]$. On the one hand, due to the negotiation with w, s earns only a fraction of the return on the equity invested in the project. Holding the firm's resilience fixed, a debt-for-equity swap (i.e., increasing D) thus increases s's payoff. This first effect captures the traditional idea of strategic leverage, which also arises in static models of bargaining (see, e.g., Bronars and Deere 1991; Perotti and Spier 1993). On the other hand, a higher D reduces the firm's resilience, as it lowers the revenue losses the firm can withstand before going bankrupt ($\bar{t}$ and, thus, t^* decrease with D). Since s captures a smaller share of the surplus available for negotiations when t^* is smaller, this second effect is negative. Put differently, when leverage increases: less of the firm's revenue is exposed to wage negotiations, but shareholders capture a smaller share of the revenue on the negotiation table. We show that either of these two effects can be stronger, so that $\mathbb{E}[u_s^*]$ may increase or decrease with D.

Notice that maturity and leverage work as (imperfect) substitutes as strategic tools in our model. If $D > \delta^{T+1}$, we have $t^* = \bar{t}$, which does not depend on T. In this case, if negotiations go on for too long, the firm goes bankrupt before its debt expires – due to the loss in revenues. Longer debt maturity then improves s's bargaining position only if the firm is not too levered and can withstand a relatively long negotiation (at least longer than T). Similarly, if $T < \bar{t}$, an increase in leverage does not shorten negotiations, as the firm's debt is due before $\bar{t}$. Hence, when the firm's debt expires very close to negotiations, increasing leverage does not hurt s's bargaining position.

Having characterized how shareholders' payoff depends on the firm's debt structure, we can now describe how their choice of D and T changes with the workers' bargaining power (α).

Proposition 3. *Consider $\alpha \in [0, \frac{1}{2})$; the following comparative statics results hold in equilibrium:*

1. *Holding the debt level D fixed, the debt maturity T that maximizes shareholders' expected payoff $\mathbb{E}[u_s^*]$*

increases with the workers' bargaining power α.

2. *Holding T fixed, the value of D that maximizes $\mathbb{E}[u_s^*]$ may increase or decrease with α.*

Proposition 3 studies how s's choice of debt structure changes with α for a generic function d satisfying Assumption 1 and any value of $\kappa \geq 1$. That is, when the firm's borrowing cost $D - d$ depends on the choices of D and T, and there are transaction costs associated with raising equity.[10] The proposition focuses on the conditional responses, that is, holding fixed D, how the optimal choice of T changes with α, and vice-versa. Debt maturity increases the firm's resilience and, thus, s's expected share of surplus in the negotiations. Holding fixed D, s can then increase T to curb the effects of an increase in w's bargaining power. As discussed before, leverage has an ambiguous effect on shareholders' expected equilibrium payoff. It follows that s's best response to an increase in α may be instead to increase *or* decrease D, depending on the parameters of the model.[11,12]

The joint responses of D and T to changes in α are more nuanced. Suppose debtholders require a larger premium for longer maturity when the firm is more levered (for example, because shorter maturity facilitates monitoring by lenders (Flannery 1986; Diamond 1991)). Suppose also that s finds it optimal to increase D when α goes up. s may then also choose to *decrease* T, since long maturity may be too costly at the new choice of D. It is worth emphasizing, however, that a decrease in maturity is never a *direct* strategic response to the wage negotiations, since shorter maturity always hurts shareholders' bargaining position (at least weakly) for any value of D.

By a similar logic, the leverage reaction to changes in α may be an indirect effect of the strategic response in debt maturity. Suppose the interest rate $D - d$ increases less with leverage when T is larger (for example, because the firm is less exposed to rollover risk when its debt has longer maturity (e.g., He and Xiong 2012)). When α goes up, all else equal, s wants to increase T to

[10] As α approaches 1, shareholders' share of surplus vanishes in equilibrium, so that s has lower incentives to take costly actions to affect the negotiations. Therefore, we restrict our attention to values of α between 0 and $\frac{1}{2}$.

[11] In Appendix B.1, we model an alternative measure of workers' bargaining power: their ability to organize and sustain a walkout (t_w). Our qualitative results about the response of D and T to an increase in α also apply to an exogenous increase in t_w.

[12] In Appendix B.2, we introduce a stochastic component to the firm's revenue, which allows for the possibility of bankruptcy on the equilibrium path. When α increases and s responds by choosing a more resilient debt structure, the firm becomes *safer* in that version of the model, as bankruptcy occurs with a smaller probability.

gain bargaining power with w. Since increasing leverage is cheaper when T is larger, s may then also increase D as an indirect effect of the strategic response in T. We prove the results discussed above, about the joint responses of D and T to changes in α, in Appendix A.4. Of course, D and T may also both increase with α for strategic considerations: s may prefer to increase D to reduce surplus on the negotiation table, while at the same time increasing T to gain resilience to strikes.

Altogether, our results suggest that the conditional responses of D and T to changes in α (i.e., the response in T holding fixed D, and vice-versa) are generally more informative about the firm's strategic motive, as it is otherwise hard to disentangle whether one moves for strategic reasons and the other follows mechanically through the interest rate channel.

2.2 From Theory to Empirics

Our model links the firm's debt structure to the frequency α with which workers make offers in the negotiation, where α captures the bargaining power of workers. The model has two main empirical implications:

P1. In response to an increase in α, firms increase their debt maturity.

P2. In response to an increase in α, firms either increase leverage (consistent with the strategic leverage argument) or reduce leverage (consistent with the resilience argument).

To test these implications, we use changes in α stemming from changes in the collective bargaining environment. As we discuss in Section 4, RWLs reduce the bargaining power of unions. Thus, we interpret the passage of RWLs as a decrease in the value of α in future negotiations with management. By the same logic, we interpret unionization events (which we use as a robustness exercise in Appendix E) as an increase in the value of α in future negotiations. Finally, in the negotiation of collective agreements, workers go from an existing contract (which, in terms of our model, is equivalent to having $\alpha = 0$ and an exogenous partition of surplus) to negotiating a new contract ($\alpha > 0$). Hence, we interpret actual negotiation events as increases in α.

A central assumption of the model is that firms with higher leverage and shorter debt maturity are more vulnerable to financial distress when hit by a negative shock to their cash flows, like the revenue loss caused by labor walkouts (see Figure 1).

P3. Firms with higher leverage and shorter debt maturity are more vulnerable to financial distress after a negative shock to their cash flows.

We test the empirical validity of this assumption in Appendix F, using the negative shock to firms' cash flows caused by the financial crisis of 2007–2009. Financially distressed firms resort to restructuring to avoid being forced into bankruptcy by creditors (Jensen 1989), and restructuring efforts often include worker layoffs (Ofek 1993; Kang and Shivdasani 1997). Therefore, we evaluate how a firm's debt structure at the onset of the financial crisis affected its changes in employment in response to the crisis. This approach also allows us to quantify the cost to workers, in terms of increased unemployment risk, of policies that induce firms to reduce their financial resilience.

3 Data Description and Empirical Methodology

The adverse effect of RWLs on union power has been documented in the literature (Ellwood and Fine, 1987; Abraham and Voos, 2000; Chava, Danis, and Hsu, 2020). RWLs forbid union security agreements between unions and employers, which compel employees to join the union or pay union fees as a condition in the employment contract. In states with RWLs, unions then cannot force new employees to join a union or pay union fees. Employees have little private incentives to join a union, since they can enjoy the potential benefits of collective bargaining without having to contribute to the funding of the union. Therefore, unions have fewer members and less funding when employees are not forced to join a union (Moore and Newman, 1985; Fortin et al., 2023). Both these effects limit the bargaining power of unions, since they can convince fewer workers to join a strike and have less funding to sustain operations and those that participate in strikes.[13]

Our analysis follows Fortin et al. (2023), who use the adoption of RWLs in five U.S. states since 2011 to estimate the effect of these laws on wages and unionization rates. Their findings indicate that RWLs lower both wages and unionization rates. We use the same sample period and methodologies but focus on different outcome variables: firms' debt structures and union financials. Our

[13]Unions typically distribute funds (strike funds) to striking workers to partially substitute their regular paychecks.

estimation strategy exploits the staggered adoption of RWLs to estimate a difference-in-differences model. The model compares the debt structures of firms headquartered in states introducing RWLs with those of firms headquartered in states that did not adopt these laws. Specifically, we estimate the following fixed effects model:

$$y_{ijst} = a_i + a_{jt} + \beta_1 RWL_{st} + \gamma X_{ijst} + \nu_{ijst}, \tag{2}$$

where the variable RWL is a state-level indicator that takes value one since the year a state s introduces these laws, and zero otherwise. We saturate the model by including firm controls X, firm fixed-effects a_i to absorb unobservable time-invariant firm heterogeneity, and industry-by-year fixed effects a_{jt} to capture time-varying unobservable industry characteristics. The error term ν contains the unexplained variation of the dependent variable y (i.e., leverage or debt maturity). The coefficient β_1 has a causal interpretation if the residual variation in ν is uncorrelated with states' decisions to introduce RWLs.

We estimate the model using all the firms in Compustat, and use the information about their headquarter locations to match companies and US states.[14] Currently, 27 US states have RWLs in place.[15] A total of 14 states adopted RWLs between 1950 and 2019, with 8 of these adoptions occurring after 1974 (the data about firms' debt maturity is available starting in 1974). We focus our estimation on a recent wave of RWLs adoptions: Indiana, Michigan, Kentucky, West Virginia, and Wisconsin (see details in Table IA6). We restrict our sample period to 2007–2019 and exclude states that introduced RWLs before 2007. Column 2 in Table 1 reports averages and standard deviations for firm characteristics using our estimation sample. Table IA1 contains additional detailed statistics.

The internal validity of our DID model relies on the assumption that, absent the adoption of RWLs, the differences in the outcome variables are likely to remain constant (*parallel trends* assumption). To investigate the validity of this assumption in our setting, we estimate a dynamic

[14] A similar matching strategy can be found in Matsa (2010), Agrawal and Matsa (2013), Heider and Ljungqvist (2015), and Klasa, Ortiz-Molina, Serfling, and Srinivasan (2018), among others.

[15] Table IA6 reports the list of states and the year of adoption of RWLs. Missouri passed a right-to-work bill in 2017, but the bill never became effective as it was blocked by a popular referendum in 2018.

version of the model in Equation (2) by introducing state-specific relative time indicator variables up to four years before and after the RWLs adoptions. A recent literature argues that two-way fixed effects models in frameworks with staggered treatments can be biased in the presence of treatment effect heterogeneity (e.g., Callaway and Sant'Anna, 2021; Sun and Abraham, 2021; Goodman-Bacon, 2021; Borusyak, Jaravel, and Spiess, 2022; Baker, Larcker, and Wang, 2022; Cengiz, Dube, Lindner, and Zipperer, 2019). This bias undermines the testing of pretrends using lead and lag coefficients.[16] To alleviate these concerns, and given the unbalanced nature of our panel dataset, we estimate the dynamic DID model based on Sun and Abraham (2021).[17]

Figures 2 plots the point estimates for every indicator variable in our dynamic DID model, and the 95% confidence interval using alternative measures of debt maturity as the dependent variable. None of the specifications display pretrends. There is no statistical difference between the debt maturity structure of treated and controls firms before the RWLs' adoptions.

In Appendix section D.5, following Fortin et al. (2023), we employ a second identification strategy that exploits the heterogeneous impact of RWLs across industries (in states with and without RWLs) to estimate the effect of unionization on firms' debt structure decisions.

4 Empirical Analysis: Financial Responses to the Passage of RWLs

In this section, we empirically test the implications of the model. Section 4.1 shows that firms adjust their financial resilience when the bargaining power of workers decreases: following the passage of RWLs, firms decrease the maturity length of their debt obligations. We also show that the main lever for changing financial resilience is adjusting debt, rather than hoarding cash or building inventory. Altogether, the evidence presented in this section is consistent with firms increasing financial resilience in response to, or in anticipation of, labor negotiations. Finally, Section 4.2 evaluates the unions' financial response to the passage of RWLs.

[16]It is worth noting that bias is unlikely to be large in our setting since most control observations are in "never-treated states", which provides a large number of controls throughout the 2007–19 period.

[17]In additional robustness tests, we also implement the estimators proposed by Borusyak et al. (2022) and Cengiz et al. (2019). Figures IA4 and IA5 plot results using these two approaches.

4.1 Firms' Financial Response

In this section, we exploit the adoptions of RWLs across US states to capture a decrease in the negotiation power (α) of unions. Consistent with our theory, we show that firms adjust their debt maturity when workers' bargaining power changes.

4.1.1 DID Results: Direct Response

According to our model, in response to an increase in unions' bargaining power, firms should increase debt maturity to become more resilient. Conversely, in response to a decrease in unions' bargaining power, firms would decrease maturity. A reduction in debt maturity can be achieved by either reducing long-term debt or by increasing short-term debt. In contrast, responses through leverage are indeterminate because the firm can choose to increase leverage strategically to push surplus off the bargaining table or decrease leverage to become more resilient.

In Table 3, we evaluate this direct response. Because leverage and maturity are jointly determined, Proposition 3 shows that the conditional response of maturity holding leverage fixed, and leverage holding maturity fixed are the objects of interest. However, while a conditional specification would be most informative, these controls can be considered "bad controls" because they themselves are outcomes of the bargaining process. Because of this, we present unconditional and conditional estimates and show that both sets of results paint a very similar story.

Panel A presents unconditional estimates of the debt structure response of firms to the passage of RWLs, which we interpret as a decrease in the bargaining power of workers. A decrease in workers' bargaining power implies that firms will reduce their debt maturity. Columns (1) and (2) show that firms reduce their long-term debt ratio (LT debt ratio (>5Y) dependent variable) by between 1.7 and 1.9 percentage points, which corresponds to approximately 27% of the sample mean (6.2%). Unconditionally, that reduction in long-term debt is achieved through an overall reduction in leverage of about 1.8–2.0 percentage points (columns 3 and 4), while the increase in short-term maturity debt is muted (columns 5 and 6). The change in debt maturity does not reflect changes in the composition of debt caused by a substitution of public debt with private debt (Appendix D.3.4). As we discussed in Section 2.1 of our theoretical framework, the joint response of leverage and maturity is confounded by the fact that the strategic use of leverage must accommodate changes in maturity and, conversely, increased resilience must accommodate changes in leverage. The more theoretically precise object to look at is the responses of maturity and leverage conditioning on each other (Proposition 3). Still, Panel A serves an important function as it shows that firms' interest in increasing resilience is indeed accommodating changes in leverage, and it is thus a first-order channel of response within our framework.

Alternatively, to directly test Proposition 3, we present in Panel B conditional estimates of the debt structure response of firms to the passage of RWLs. In columns (1) and (2), we show that, conditioning on leverage, firms reduce their long-term debt ratio (LT debt ratio (>5Y) dependent variable) by a statistically significant 1.1 percentage points. In addition, this reduction in long-term debt goes hand in hand with an increase in short-term debt of about 0.7–0.9 percentage points, pointing towards direct substitution of long-term debt with short-term debt. Leverage, on the other hand, does not sufficiently respond once we condition on long-term debt, again consistent with firms' interest in increasing resilience accommodating changes in leverage.

4.1.2 Heterogeneous Response to RWLs Conditional on Profit Variability

Another way to evaluate the importance of resilience for firms' capital structure decisions is to investigate the response of firms subject to more risky cash flows. Firms with higher levels of profit variability are more exposed to risk beyond labor negotiations, which implies that labor-induced risks are a lower proportion of their overall risk exposure. The adoption of RWLs will thus induce a smaller risk reduction in high-profit variability firms and, hence, the incentives to decrease maturity following the passage of RWLs should be more muted in these firms. We test for this by looking at firms with higher levels of pre-RWL profit variability.

Table IA16 presents estimates of RWLs on maturity and leverage conditional on profit variability. While columns (1)–(2) show that the long-term maturity response is muted for firms with high levels of pre-RWL profit variability, this effect is neither large nor statistically significant. However, firms with higher levels of pre-RWL profit variability are significantly less likely to increase short-term maturity (columns 5–6) and total leverage (columns 3–4); these latter results on leverage mirror the findings in Matsa (2010) for an earlier wave of RWLs.[18] These heterogeneous responses again lend support to the importance of resilience when making capital structure decisions and as a margin of response to the threat of collective bargaining.

4.1.3 Heterogeneous Response to RWLs Conditional on Pretreatment Size and Profitability

Table IA17 presents estimates of RWLs on maturity and leverage conditional on firms' pretreatment size and profitability. Conditioning on size or profitability does not change the core estimates of RWLs on maturity (columns 1–4). Moreover, the estimates for both second-order terms are around zero. When we focus on leverage (columns 5–8), however, the story is different. Conditioning on size and profitability does not qualitatively change the core estimates that leverage goes down following RWLs, but the interactions yield economically and statistically significant results when firm controls are included (columns 6 and 8). The interpretation of these interactions is that conditional on standard firm-level controls (size, profitability, collateral, and market-to-book ratio), larger and more profitable firms are more likely to increase, rather than decrease, leverage, following the passage of RWLs. This is consistent with larger and more profitable firms placing more weight on resilience rather than on the strategic use of leverage. It is also consistent with our theoretical prediction that maturity effects are unambiguous. If larger and more profitable firms are less able, precisely because of their profitability, to convince workers of potential financial distress, the value of strategically using leverage should go down.

4.2 Unions' Financial Response

All our analysis so far, as well as the literature on RWLs at large, assumes that, consistent with intent, RWLs decrease the bargaining power of unions.[19] Nevertheless, it is worth evaluating the process and degree through which unions' financials are affected, as it is possible that unions could adjust their financials to mitigate the impact of RWLs, just as firms do adjust their financials differently in the presence or absence of RWLs. Using data on union financials from the Office of

[18] See Table 8, p. 1224 in Matsa (2010).

[19] See, for example, Ellwood and Fine (1987), Farber, Herbst, Kuziemko, and Naidu (2021), and Fortin et al. (2023).

Labor-Management Standards (OLMS) of the U.S. Department of Labor, we evaluate changes in membership and changes in the fee structure of unions. We find significant and sharp declines in overall membership. We also find that unions' fee structure is significantly changed after the passage of RWLs, with an expected average drop in total fees driven by the bottom half of unions in terms of total fees but with statistically significant increases in fees for the largest unions. Union dues are used to finance the operations of the union, including bargaining on behalf of workers, providing member benefits, organizing efforts, legal representation, and other union activities.

First, we confirm that union membership does indeed decline following the passage of RWLs, which lends support to a decline in α in our theoretical framework. Results are presented in Figure 3. Panel A presents declines in membership for unions that survive for at least four years following the passage of RWLs. Panel B accounts for declines in membership due to union exits by assigning zero membership to a union that ceased to exist after the passage of RWLs. Panel A shows that surviving unions become progressively weaker, with drops in membership reaching approximately 5% after year four. Panel B shows that this effect is significantly larger if we account for declines in membership due to some unions disappearing entirely. Total decline in membership including union exits is around 10%.

Next, we show correlational evidence that negotiations with stronger unions are associated with better outcomes for workers. We model the percent increase in wages as a linear function of several key union financials, including fees and total membership. Just as more financially resilient firms are associated with lower wage increases (Table 7), more financially resilient unions are associated with higher wage increases. Table 8 reports the estimation results. Every observation represents a collective agreement between a firm and a union, with the union negotiating on behalf of the employees. The cross-sectional estimates in columns (1)–(2) and (5)–(6) show a positive and statistically significant correlation at the 5 and 10% level between wage increases and total fees. A 1% increase in total fees is associated with between 57 and 60 basis points in first-year wage increases and 1.86 and 2.07% cumulative wage increases. Total membership is also associated with higher wage increases, although that association is statistically weaker.

Lastly, we proceed to evaluate whether RWLs affect other key direct measures of union health (total fees and fees per member) as well as potential variables they could have adjusted to mitigate the impact of RWLs. Results are shown on Table 4. Panel A presents the relationship between RWLs and union financials. As expected, the total number of members and the total fees collected decreases significantly. This decrease is to the tune of 3.5 and 3.7%, respectively (columns 1 and 2). While statistically insignificant, there seems to also be a slightly smaller, but of similar order, drop in the average assets and average cash of unions (columns 3 and 4). In contrast to our results for firms, there does not appear to be a change in unions' financial leverage (column 5).

4.2.1 Heterogeneous Union Response by Size

Looking at unions of different sizes, however, paints a slightly more nuanced picture. Panel B in Table 4 presents heterogeneity by union size as measured by total fees just prior to the passage of RWLs. As before, effects on assets (column 3), cash (column 4), total cash per member (column 6), fees relative to receipts (column 8), and funds used to support strikers (column 9) are all statistically insignificant. However, the drop in membership and fees that we document in Panel A is stronger for smaller unions, although that relationship is statistically significant only for fees. In fact, for the top 10% largest unions, total fees actually exhibit a statistically significant increase (Figure 4), both in terms of total fees and fees per member. In terms of total fees, each log point increase in pre-RWLs total fees is linked to an increase of 2 basis points in total fees. This effect is not just mechanically linked to changes in membership: in contrast to Panel A, fees per member exhibit statistically significant effects, there is a drop of 212 dollars for the average union, but each log point increase in pre-RWLs total fees is associated with an increase in fees per member of about 19 dollars. These increases are monotonically increasing in the pre-RWLs size of the union, as measured by total fees (Figure 4). In contrast, smaller unions exhibit large declines in membership, total fees, and fees per member. These differences in response are also seen in leverage, as expected, in an opposite direction: smaller unions significantly increase leverage but this increase is significantly mitigated the larger the union is.

4.2.2 Other Margins of Adjustment for Unions

It is worth highlighting that unions' cash per member (column 6), fees relative to receipts (column 8), and funds used to support strikers (column 9) do not respond to RWLs and do not present heterogeneous responses by size. This is in contrast to what we observe for fees per member (column 7) and leverage (column 5). These results would suggest that the main margins of response for unions are their dues and membership, and that unions jointly adjust their fee and debt structure to keep short-term funds relatively stable. Fees relative to total receipts (column 8) is particularly informative of this – when we consider receipts (all cash inflows and outflows, including fees but also other revenues and paying off liabilities), the fee to receipt structure stays constant, indicating a matching of inflows and outflows, regardless of union size. Overall, larger unions appear to be better able to retain support following the passage of RWLs, mitigate some of the legislation's impact and, for a nonnegligible number of unions improve their financial position.

5 Mechanisms Connecting RWLs and Financial Responses

5.1 Direct Financial Response to the Collective Bargaining Process

Incentives to change a firm's financial structure should be more pressing when the threat of negotiations is immediate. In this section, we estimate a fixed effects regression model to investigate firms' debt structure strategy in labor negotiation years compared to non-negotiation years.

5.1.1 Response to Labor Negotiations

Data Description and Empirical Methodology. We retrieve information about collective bargaining agreements from the Settlement Summaries database of Bloomberg BNA (henceforth, BNA). Data contains the employer name, the union name, the effective date of the agreement, contract duration, the employer's industry (i.e., Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS)), and a summary of the agreed-upon deal.[20]

[20] The Settlement Summaries database is collected by Bloomberg using union publications and other press. Klasa, Maxwell, and Ortiz-Molina (2009) and Chava et al. (2020) use the same database to collect information about contract expiration dates and negotiation outcomes, respectively. Other studies (see, e.g., Myers and Saretto 2016) use instead the Contract Listing agreements retrieved from F-7 form filings to the Federal Mediation and Conciliation Service.

The sample period spans from 1986 to 2020. We use the employer name to match the BNA data and Compustat, obtaining 470 unique firms and 1,288 labor negotiations. We drop observations for which the size of the bargaining unit is zero. Column 1 in Table 1 reports averages and standard deviations for firm characteristics of our negotiations-Compustat matched dataset. Table IA2 contains more detailed statistics on firm- and negotiation-specific variables.

Similar to Matsusaka, Ozbas, and Yi (2019), we employ the following fixed effects specification to model firms' decisions:

$$y_{ijt} = \alpha_0 + \alpha_1 Negotiation_{ijt} + \gamma X_{ijt} + a_i + a_{jt} + \epsilon_{ijt}, \tag{3}$$

where i indicates a given firm in industry j, at time t.

We estimate this model using leverage and debt as outcome variables y. In the main specification, the variable *Negotiation* is an indicator variable equal to one if a firm i has stipulated a collective bargaining agreement with a union in year t, and zero otherwise. Our coefficient of interest, α_1, estimates the within-firm effect of labor negotiations on the outcome variable, y, compared to the same variable in non-negotiation years. The model also accounts for time-invariant heterogeneity by including firm fixed effects, a_i, and time-varying unobservable industry variation by including industry-by-year fixed effects, a_{jt}. Furthermore, we include a set of time-varying controls, X, to absorb firm- and negotiation-specific characteristics. Specifically, we include the variables size, profitability, and cash holding as firm characteristics, and the bargaining unit size scaled by the firm's number of employees to capture the relevance of the negotiation for the firm.

We can use Equation (3) to identify firms' strategic use of debt structure under the assumption that leverage hurts firms' bargaining position more in years of negotiations with labor compared to years without negotiations, while the general (non-strategic) value of leverage is the same in negotiation and non-negotiation years. Contract negotiation dates are plausibly exogenous. A contract typically lasts three to five years, the expiration date is established in the contract, and we observe almost no early renegotiation in our sample. In 44% of the cases, the length of the new contract is the same as the old contract, and in 75% of them it differs by one year or less.

Results. Columns (1) and (2) in Table 5 report the estimation results using firm book leverage as the outcome variable. Point estimates in Columns (1) and (2) show that firms reduce leverage in labor negotiation years.[21] The coefficient in Column (2) indicates that, on average, firm leverage is 1.2 percentage points lower in years of labor negotiations, which is equivalent to a 4% reduction in its sample mean. We interpret these results as evidence that firms adjust their debt structure to become more resilient to strikes when negotiating collective agreements with unions.[22]

To further explore the mechanism behind our findings, we separate firms in two groups, *low* and *high*, based on the median value of their cash holding and inventory. We hypothesize that firms with *low* cash holding and inventory levels are those with a stronger interest in becoming resilient to strikes, since they are relatively more vulnerable to the costs of labor walkouts. If that is the case, we should observe that the effect estimated and reported in Table 5 is more pronounced in firms in the *low* group. Results in the table support this hypothesis. Furthermore, findings in Table 6 indicate that the leverage reduction in years of negotiations is mostly concentrated in debt with shorter maturities. This is consistent with the theoretical result that debt with a shorter maturity weakens firms' bargaining position relatively more than debt with a longer maturity.

Rather than build resilience against strikes, firms may want to pay off their debt to reduce their cash holdings and push surplus off the bargaining table (Klasa et al. 2009). If that is the case, we expect the reduction in leverage in years of negotiations to be more pronounced in firms with more cash in hand, who have more surplus to push off the table. However, Columns (3) to (6) in Table 5 show that the leverage changes concentrate in firms with *low* cash holdings. This result is instead consistent with the resilience argument: firms with large cash reserves can use these to weather the costs of strikes, so they have fewer incentives to build resilience by decreasing leverage.

The reshaping of firms' debt structure during negotiation years raises two additional questions.

[21] The reduction in leverage is mostly financed through a decrease in dividend payouts and acquisitions (see Appendix D.4.4).

[22] An alternative explanation for this result is that unions target firms with less debt. Crucially, this would depend on (a) unions' awareness of a firm's debt structure, including its levels of debt maturity, and (b) their ability to initiate early renegotiations of labor contracts. Regarding (b), Rich and Tracy (2013) show that such early renegotiations are generally very rare and mostly triggered by large unanticipated changes in inflation. In Appendix D.4.1, we show that firm characteristics are not predictive of labor negotiations, which weighs against this alternative explanation.

The first question is whether this strategy of reducing credit market pressure leads to better negotiation outcomes for shareholders. We provide descriptive cross-sectional evidence that longer debt maturity is associated with lower wage concessions. We use the wage outcome from negotiations contained in the BNA data. Similar to Chava et al. (2020), we use the first-year wage increase (Panel A) and the cumulative three-year wage increase (Panel B) as proxies for the total wage increases, with the objective of capturing the extent of firms' concessions to employees.

We model the percent increase in wages as a linear function of leverage, debt maturity, and other firms' characteristics. Table 7 reports the estimation results. Every observation represents a collective agreement between a firm and a union. The cross-sectional estimates show a negative (positive) correlation between long-term debt ratio (short-term debt ratio) and wage increases. This correlation is statistically significant for the relationship between long-term debt and negative wage increases absent controls for leverage or firm-level controls, and it is statistically significant for the relationship between short-term debt and positive wage increases when we control for leverage or add firm-level controls. All relationships are consistent with the firm benefiting from having longer debt maturities during negotiations with labor. In our preferred specification, a one-percentage-point increase in the long-term debt ratio (i.e., LT debt ratio (>5Y) variable) is associated with a 0.035 percentage points lower wage increase. For the average deal (sample mean is 5.570%), this is equivalent to a smaller first-year wage increase of around 63 basis points.

The second question is whether the observed changes in debt structure are driven by the credit market response to labor negotiations rather than by the firms' attempt to influence the negotiations. Debtholders may be uneasy with the uncertainty surrounding the negotiation outcomes or with the realizations of these outcomes. This may lead to higher interest rates on the firms' debt and, as a consequence, less debt issuance by firms. We examine firm cumulative abnormal bond returns around negotiation years and find no evidence supporting this hypothesis. Following Bessembinder, Kahle, Maxwell, and Xu (2008) and Campello, Gao, Qiu, and Zhang (2018), we compute bonds' cumulative abnormal returns (CARs) and study their behavior in a five-month window around negotiation dates. Figure 6 plots cross-sectional averages and standard deviations of CARs. We do not observe statistically or economically significant changes in CARs in a five-month window around the negotiation dates.

5.1.2 Response to Unionization

In between the ability to organize under the law and labor negotiations actively taking place, one can consider the role unionization plays in changing the balance of power between firms and workers. In Appendix E, we use establishment-level unionization events to capture these intermediate changes in workers' bargaining power. We again show that firms adjust their debt structure in response to such events consistently with our theoretical results in Section 2.

5.2 Mechanisms with No Response and Potential Confounders

In this subsection, we briefly examine potential mechanisms for which we find no empirical support and additional confounders to our analysis. We reserve a more detailed discussion of these results to the Appendices (see Appendix D).

Credit Markets. One major concern in our setting is the possibility that RWLs might produce changes in how creditors perceive the creditworthiness of firms. To the extent that these laws reduce labor rigidities within the firm, creditors might perceive the firm to be less risky, lowering the cost of debt and potentially leading to more and riskier borrowing by the firm. We provide several pieces of evidence, however, that weigh against credit markets mediating our results.

We first explore the relevance of this channel by directly looking at the response of credit ratings, bond prices, and CDS spreads following the passage of RWLs. Changes in the perceived riskiness of a firm's debt are likely to be reflected in its credit ratings, bond prices, or CDS spreads. In Table IA12, we show that credit ratings remain unchanged following the passage of RWLs, which suggests that these laws did not change rating agencies' assessment of firm risk. Still, it is possible that markets differ from rating agencies in their perception of firms' creditworthiness. To evaluate this possibility, we explore the response of bond prices following the passage of RWLs. In Figure 5, we present results showing that bond prices do not change either post RWLs.[23]

[23]We must note that bonds might be less liquid than other instruments. However, that would also mitigate their

RWLs may have affected the price differential for similar quality bonds at different maturities (by changing the relative riskiness of debt with longer maturity compared to debt with shorter maturity), even though they did not affect average bond prices or ratings. The post-RWLs adjustments in firms' debt maturity could be then driven by changes in the cost of maturity rather than firms' attempt to improve their bargaining position in negotiations with labor. To inquire this possibility, we use the spread differentials across CDS contracts with different maturities as proxies for the perceived differences in the credit risk of the underlying debt contracts. Table IA13 shows that these spread differentials do not meaningfully change post RWLs, which suggests that the passage of these laws did not have a significant effect on firms' cost of maturity either.[24]

A more subtle version of credit markets as a potential confounder is that firms might optimize differently across *sources* of debt, regardless of the effect that RWLs may have on the cost of credit for each of these sources. The argument runs as follows: firms facing more powerful employees may substitute bank loans with public debt, since the latter is harder to renegotiate with creditors and is thus more effective in pushing surplus off the negotiation table with workers (Qiu 2016). Given that public debt tends to have longer maturity, our results may be driven by this substitution rather than the firms' interest in financial resilience. To test for this alternative mechanism, we use data on firms' debt structure to separate different sources of financing. Results in Table IA11 show that firms do not adjust the relative weights of their sources of debt (including the fractions of bank and public debt), which suggests that this alternative mechanism is not at play either.

Operating Flexibility. A different potential concern is that the connection between financial leverage/debt maturity and labor negotiations might be driven to some degree by substitution between operational and financial leverage (Simintzi, Vig, and Volpin, 2015; Serfling, 2016). Simintzi et al. (2015) argue for this trade-off using cross-country variation in employment protection.

effects on the firm.

[24]The lack of credit market response is consistent with the documented lack of short-term equity response and subsequent long-term slow equity market response following unionization events (Lee and Mas 2012), response that takes over a year to materialize. We show that this lack of short-term equity market response extends to passage of RWLs (Appendix Table IA14). Slow diffusion of information to investors or slow resolution of uncertainty are consistent with the empirical patterns documented here and in Lee and Mas (2012).

In Appendix D.3.7, we test for this by evaluating whether there exists a heterogeneous response to the passage of RWLs in firms that have high fixed costs and thus higher operational leverage. Following the literature standard (e.g., Gorodnichenko and Weber, 2016), we measure fixed costs by using Compustat variables: selling, general and administrative expenditures (Compustat item XSGA), advertising (Compustat item XAD), and research and development expenses (Compustat item XRD). We then normalize these by sales. We report results in Table IA15. We find that firms with high fixed costs do not respond differently to the passage of RWLs than other firms.

Concurrent Changes in the Political Environment. The passage of RWLs might coincide with a shift in the political environment at the state level. Governments supportive of RWLs may be more business-friendly with regard to other economic policies, which may then cause shifts in firms' debt structure. We can design a falsification test that addresses this concern by focusing on whether the election of Republican governors explains our outcomes of interest. We implement this test in three different ways: a standard DiD analysis, a stacked DiD analysis centered around each election keeping four years before and four years after each election, and an RDD analysis.

Results of these analyses are presented in Tables IA23, IA24, and IA25, respectively. Using the standard DiD analysis, Table IA23 shows the election of a Republican governor does not have an effect on either maturity or leverage, regardless of controls. When we zoom into specific elections using the stacked DiD analysis, in Table IA24, we find no effects on debt maturity, regardless of specification. For leverage, we find no results in five out of our six specifications (columns 7–10 and 12). Only the inclusion of all fixed effects but no firm controls yields a marginally statistically significant effect (column 11). Finally, we further validate our results by focusing on close elections.[25] Estimates are shown in Table IA25. As before, political status does not seem to play a role in determining either firm's debt maturity or leverage.

[25]Figure IA7 plots the density of the share of votes in favor of Republican candidates and shows that there is no discontinuity in votes around the 50% threshold. Optimal bandwidths for estimation follow Calonico, Cattaneo, and Titiunik (2014).

6 Conclusion

This paper investigates the use of financial resilience as a strategic tool in labor negotiations. We develop a dynamic model of employer-employee negotiations and derive two main results. Longer debt maturity improves financial resilience and, thus, shareholders' bargaining position. Contrary to the standard intuition of strategic leverage, increasing debt reduces financial resilience; as a consequence of the interplay of these two factors, leverage has an ambiguous effect on shareholders' bargaining position.

We empirically show that changes in the bargaining power of workers lead to changes in the financial resilience of the firm. During labor negotiations, firms lengthen the maturity of their debt. In contrast, following the passage of RWLs, firms decrease their debt maturity. This is a negative externality produced by RWLs that is borne by workers: In the context of the Great Recession we show that the labor force of firms with short-maturity debt is more exposed to unemployment risk. These results demonstrate that firms respond to more powerful employees by increasing their financial resilience to negotiations and strikes and, hence, that regulation that decreases the bargaining power of workers, such as RWLs, has the pernicious effect of increasing unemployment risk, especially during periods of economic slowdown.

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Figures

Figure 1. (Firm operating profitability around strikes) The figure displays the average profitability of firms five quarters before and after a labor strike. Strikes are centered at date zero, and the average profitability is computed for firms that have experienced such an event. The data on strikes is sourced from the Work Stoppages database available on the US Bureau of Labor Statistics website. We use the detailed monthly listing for work stoppages involving 1,000 or more workers spanning from 1993 to 2019. The Compustat quarterly database is used to compute the operating profitability variable, defined as the ratio between Operating Income Before Depreciation and Amortization (oibda variable in Compustat) and total asset value. The figure is based on 57 strikes, with an average duration of 20 days.

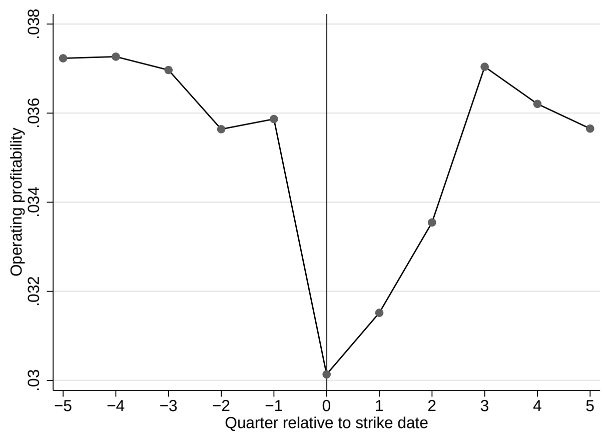
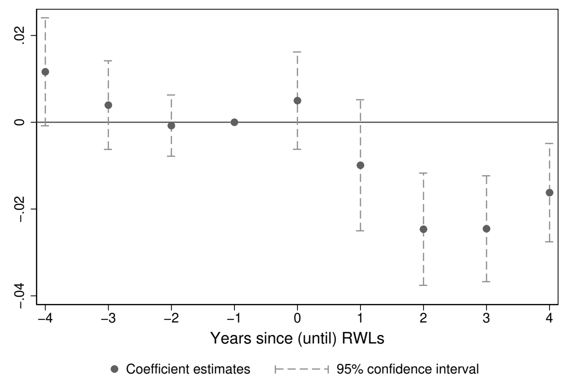
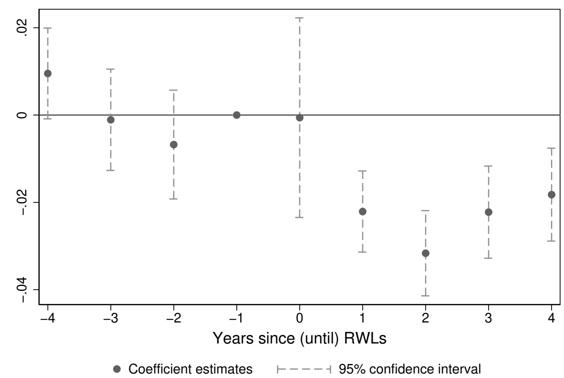


Figure 2. (Maturity – Parallel trends in diff-in-diffs framework) The figure depicts the dynamic effect of RWLs on the debt maturity variables, using the estimation procedure outlined in Sun and Abraham (2021). We centered the Right-to-Work law in the year before its adoption and estimated a model with indicators for each year relative to that reference date. Consistent with Fortin et al. (2023), the sample excludes states that adopted RWLs before 2007. The regressions include industry-by-year and firm fixed effects, with standard errors clustered at the state level.

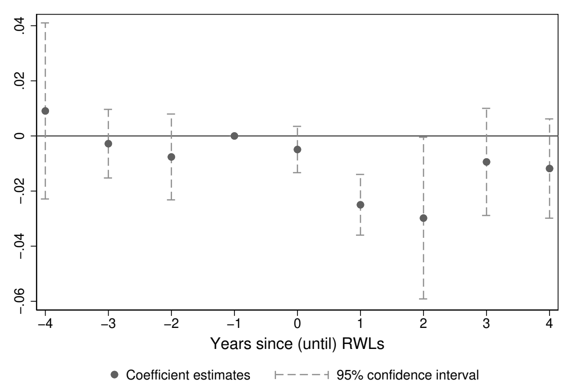
(a) Debt maturity: more than 2 year



(b) Debt maturity: more than 3 year



(c) Debt maturity: more than 4 year



(d) Debt maturity: more than 5 year

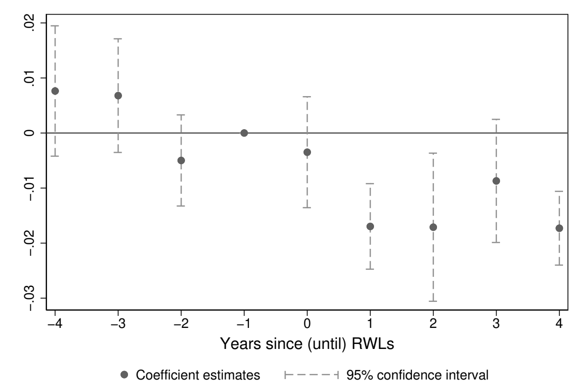
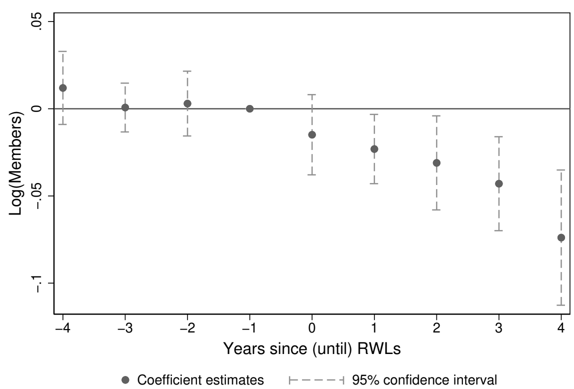


Figure 3. (Parallel trends in diff-in-diffs framework – Union memberships) The figure shows the dynamic effect of RWLs on union membership (computed as the natural logarithm of the number of union members) using the estimation procedure described in Sun and Abraham (2021). We centered the adoption of the Right-to-Work law in the year prior to its implementation and estimated a model with indicators for each year relative to that reference date. In panel (a), the model is estimated using unions with non-missing observations within the estimation window. In panel (b), the model is estimated by replacing zero members for unions that exited the sample anytime from the RWLs adoption date onward (e.g., if a union is in the sample until time $t = +1$, then from $t = +2$ onward, union membership is recorded as zero). Consistent with Fortin et al. (2023), the sample excludes states that adopted RWLs before 2007. The regressions include year and union fixed effects, with standard errors clustered at the state level.

(a) Non-missing observations within estimation window



(b) Zero members for exiting unions

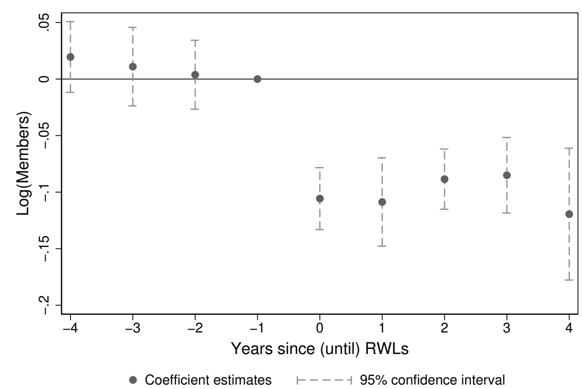
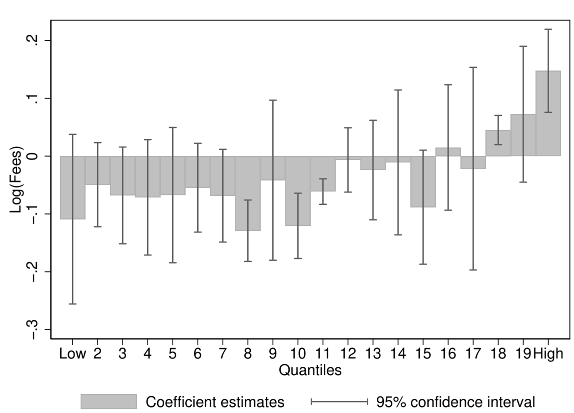


Figure 4. (Heterogeneous response in union fees after RWLs adoptions) The figure displays the coefficient estimates of the DiD model in Equation (2), where we interact the explanatory variable with dummies capturing heterogeneity in union fees. Unions are divided into 20 groups based on their fee levels one year before the adoption of RWLs. The Low group consists of unions with the lowest fees, while the High group includes those with the highest fees. We estimate the model using the logarithm of union fees (Figure a) and the ratio between fees and the number of union members (Figure b) as outcome variables. Each coefficient represents the sum of the baseline effect and the interaction term. Vertical lines indicate a 95% confidence interval. The sample selection and estimation procedure follow Fortin et al. (2023). Specifically, we exclude states that introduced RWLs before 2007 and use the specified sample period. The regressions include year and union fixed effects, with standard errors clustered at the state level.

(a) Log(Fees)



(b) Fees-to-members

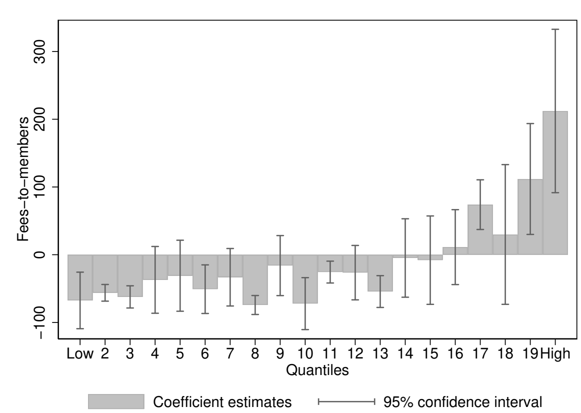


Figure 5. (Bond pricing around RWLs' adoptions) The figure plots averages and standard deviations of firms' cumulative abnormal bond returns for a five-month window around the RWLs' adoptions. We use the recent wave of RWLs' introductions involving the following US states: Indiana, Kentucky, Michigan, West Virginia, and Wisconsin. Corporate bond data is from TRACE. Refer to the Variable List and Description table for details about variables' definition and computation.

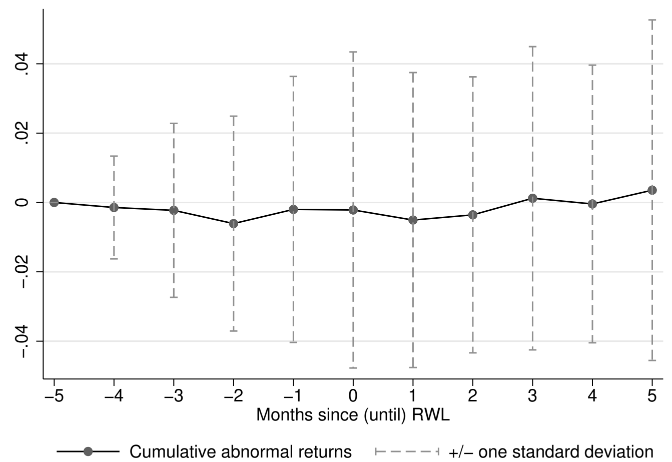
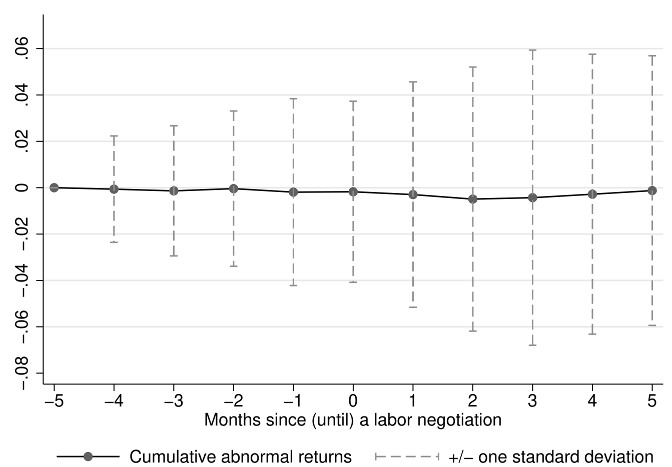


Figure 6. (Bond pricing around labor negotiations) The figure plots averages and standard deviations of firms' cumulative abnormal bond returns for a five-month window around the negotiation of collective bargaining agreements with workers represented by a labor union. Labor negotiation data is sourced from the Settlement Summaries database provided by Bloomberg BNA. Corporate bond data is from TRACE. Refer to the Variable List and Description table for details about variables' definition and computation.



Main Results – Tables

Table 1. (Summary statistics across samples) The table presents the averages and standard deviations of the dependent and independent variables for the three samples used in the empirical analysis (refer to Section 4). Each sample is merged with the Compustat dataset to obtain firm financial information. The data on collective bargaining agreements (column 1) is sourced from the Bloomberg BNA Settlement Summaries database, covering the period from 1986 to 2020. Information about RWLs across US states (column 2) is obtained from the National Conference of State Legislatures website. Consistent with Fortin et al. (2023), we exclude states that introduced RWLs before 2007 and focus on the sample period from 2007 to 2019. Union election data (column 3) is sourced from Holmes (2006) for the period 1977-1999 and from hand-collected data from the National Labor Relations Board website for the years 2000 to 2014. More detailed statistics for the three samples can be found in Tables IA2, IA1, and IA3 in the Internet Appendix. Financial variables are winsorized at the 1% tails. Refer to the Variable List and Description table for more details about variables' definition and computation.

	(1)		(2)		(3)	
	Labor negotiations		**Right-to-work laws**		**Union elections**	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Book leverage	0.305	0.175	0.164	0.217	0.286	0.180
Market leverage	0.306	0.217	0.149	0.219	0.330	0.220
LT debt ratio (>3Y)	0.210	0.155	0.095	0.162	0.181	0.155
LT debt ratio (>5Y)	0.149	0.130	0.062	0.122	0.137	0.133
ST debt ratio (≤1Y)	0.021	0.043	0.021	0.074	0.020	0.041
ST debt ratio (≤3Y)	0.052	0.063	0.024	0.058	0.026	0.045
Debt mat.(>3Y)	0.666	0.247	0.482	0.374	0.611	0.260
Debt mat.(>5Y)	0.480	0.262	0.329	0.325	0.460	0.258
Total asset ($M)	8288.659	10899.769	3104.059	7643.268	3534.703	7222.587
Total Debt ($M)	2360.112	3105.975	874.113	2204.546	974.012	2035.448
Cash	0.073	0.092	0.321	0.299	0.070	0.084
Investment	0.058	0.047	0.040	0.060	0.078	0.062
Market-to-book	1.608	0.820	3.122	4.339	1.078	0.923
Collateral	0.497	0.224	0.256	0.244	0.577	0.189
Firm size	7.991	1.617	5.168	3.015	6.741	1.981
Profitability (ROA)	0.146	0.091	-0.028	0.369	0.150	0.094
Z-score	3.135	2.248	4.488	15.971	3.641	2.828

Table 2. (Summary statistics – Labor organizations membership and financials) This table reports summary statistics for labor organization variables. Data is collected from the U.S. Department of Labor website: https://www.dol.gov/agencies/olms/Regs/Compliance/formspage. Labor organizations are required to file the forms LM-2 and LM-3 according to their total annual receipts. The term "*total annual receipts*" refers to all financial receipts of the labor organization during its fiscal year, regardless of the source. The form LM-2 is required for labor organizations with $250,000 or more in total annual receipts, the form LM-3 is required for labor organizations with total annual receipts of $10,000 or more, but less than $250,000 and the form LM-4 is required for labor organizations which have total annual receipts of less than $10,000. Our sample includes all labor organizations filing forms LM-2 and LM-3. Sample selection and period follow Fortin et al. (2023). Specifically, we exclude all labor organizations in US states that have adopted RWLs before 2007 and stop our sample in 2019 to avoid confounding effects due to the Covid-19 pandemic. The sample comprises 717 unique labor organizations, 13,447 union-filing pairs, and 132,088 union-filing-year observations with no missing total assets. Financial variables are winsorized at 1% tails. Refer to the Variable List and Description table for more details about variables' definition and computation.

	Mean	Std. Dev.	Min	Median	Max
Assets ($MM)	1.058	3.060	0.000	0.092	19.152
Cash ($K)	423.122	1069.662	0.000	69.596	6496.515
Members	1709.454	5274.532	0.000	254.000	36083.000
Fees ($K)	541.121	1406.982	0.000	66.731	8529.291
Leverage	0.060	0.178	0.000	0.000	1.122
Cash-to-assets	0.780	0.304	0.029	0.963	1.000
Cash-to-members	591.360	998.322	0.406	262.198	6350.002
Fees-to-members	528.541	597.682	0.000	359.555	3475.877
Assets-to-members	1014.446	1820.205	1.198	384.038	11130.178
Strike funds	0.043	0.204	0.000	0.000	1.000
Fees-to-receipts	0.803	0.291	0.000	0.937	1.000

Table 3. (Debt structure response to RWLs) The table presents results from a difference-in-differences estimation, specifically Equation (2), which exploits staggered adoptions of RWLs at the state level. The table includes results for two measures of debt maturity. In columns (1) and (2), the results are displayed for debt with maturity longer than five years, labeled as LT debt ratio(>5Y). Columns (3) and (4) show the findings for book leverage, while columns (5) and (6) present the results for debt with maturity equal to or shorter than five years, labeled as ST debt ratio(≤5Y). Panel A reports baseline estimates, while Panel B regression specifications are conditional on leverage or maturity, depending on the outcome variable. The sample selection and estimation procedure follow Fortin et al. (2023). Specifically, we exclude states that implemented RWLs before 2007 and focus on the sample period from 2007 to 2019. Some specifications include financial controls such as Size, Profitability (ROA), Collateral, and Market-to-book ratio. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the state level. $***$, $**$, and $*$ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	LT debt ratio(>5Y)		Book leverage		ST debt ratio(≤5Y)	
A. Baseline						
RWL	-0.017***	-0.019***	-0.018**	-0.020*	0.003	0.004
	(0.005)	(0.007)	(0.008)	(0.012)	(0.004)	(0.005)
Adj. R2	0.6526	0.6709	0.7622	0.8060	0.6632	0.6765
Obs.	17,633	14,213	17,633	14,213	17,633	14,213
Cluster	28	28	28	28	28	28
B. Conditional specification						
RWL	-0.011***	-0.011***	-0.008	-0.009	0.007**	0.009***
	(0.004)	(0.003)	(0.006)	(0.008)	(0.003)	(0.003)
Book leverage	0.315***	0.472***			0.205***	0.241***
	(0.022)	(0.029)			(0.023)	(0.025)
LT debt ratio(>5Y)			0.621***	0.613***		
			(0.048)	(0.060)		
Adj. R2	0.7206	0.7488	0.8087	0.8508	0.6987	0.7151
Obs.	17,633	14,213	17,633	14,213	17,633	14,213
Cluster	28	28	28	28	28	28
Firm controls	No	Yes	No	Yes	No	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 4. (DiD: Effects of RWLs on labor organizations memberships and financials) The table presents the results of the difference-in-differences estimation, Equation (2), using labor organization characteristics as outcome variables. The main explanatory variable, RWL, is an indicator at the state level that takes a value of one from the year a state introduces RWLs onward, and zero otherwise. To ensure consistency across samples and analyses, we adopt the sample selection and estimation procedure outlined in Fortin et al. (2023). Specifically, we exclude states that introduced RWLs before 2007 and focus on the sample period from 2007 to 2019. Panel A displays the results of the baseline specification for each outcome variable. Panel B presents the results of the cross-sectional analysis, where the RWL indicator interacts with the natural logarithm of union fees in the year before the law is adopted. Labor organizations' data is sourced from Form LM-2 and LM-3 filed with the Office of Labor-Management Standards (OLMS) and maintained by the U.S. Department of Labor. Panel F of the Variable List and Description table provides definitions for all outcome variables. Standard errors, shown in parentheses, are robust and clustered at the state level. $***$, $**$, and $*$ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Log(Members)	Log(Fees)	Log(Assets)	Log(Cash)	Leverage	Cash-to-members	Fees-to-members	Fees-to-receipts	Strike funds
	Panel A: RWL Baseline Specification								
RWL	-0.035**	-0.037*	-0.023	-0.024	0.001	5.397	-11.125	-0.000	-0.005
	(0.013)	(0.021)	(0.016)	(0.032)	(0.002)	(15.702)	(7.009)	(0.004)	(0.004)
Adj. R2	0.9623	0.9592	0.9494	0.8984	0.6221	0.8055	0.8359	0.8032	0.4749
Obs.	127,467	122,709	128,167	127,827	127,850	127,282	127,288	129,848	45,110
Cluster	28	28	28	28	28	28	28	28	28
	Panel B: Cross-sectional using Pre-RWL Log(Fees)								
RWL	-0.088*	-0.253***	-0.102	-0.118	0.022***	-99.645	-211.731***	-0.012	-0.014
	(0.043)	(0.056)	(0.080)	(0.075)	(0.007)	(73.584)	(35.298)	(0.007)	(0.031)
RWL × Pre-RWL fees	0.005	0.020***	0.008	0.009	-0.002**	9.737	18.564***	0.001	0.001
	(0.003)	(0.004)	(0.006)	(0.007)	(0.001)	(7.965)	(3.263)	(0.001)	(0.002)
Adj. R2	0.9628	0.9595	0.9497	0.8984	0.6229	0.8076	0.8389	0.7998	0.4703
Obs.	124,599	120,516	125,191	124,871	124,884	124,418	124,447	126,786	44,476
Cluster	28	28	28	28	28	28	28	28	28
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Union FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5. (Labor negotiations – Leverage) The table presents estimates from a linear regression model using firm book leverage as the dependent variable. Columns (1) and (2) display results for the full sample, while the remaining columns show results from a subsample analysis that examines firms' leverage decisions during negotiation years using cash and inventory (finished goods) as indicators. The subsample is divided into "Low" and "High" groups based on the median values of these two variables, lagged by one period. The data on labor negotiations is sourced from the Settlement Summaries database of Bloomberg BNA, covering the period from 1986 to 2020. The variable of interest, *Negotiation*, is an indicator variable that takes a value of one in the year a firm negotiates a collective agreement with a union, and zero in non-negotiation years. Where indicated, the specification includes firm controls such as size, profitability, and cash, along with a negotiation characteristic (share of employees variable). Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the firm level. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Dependent var.: Book leverage									
	Full sample		Low cash		High cash		Low inventory		High inventory	
Negotiation	-0.011**	-0.012**	-0.018***	-0.011	-0.003	-0.004	-0.016*	-0.026*	-0.009	-0.010
	(0.005)	(0.006)	(0.006)	(0.007)	(0.006)	(0.009)	(0.009)	(0.013)	(0.008)	(0.009)
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.5435	0.5793	0.6014	0.6116	0.6072	0.6304	0.6478	0.6692	0.6075	0.6248
Obs.	10,948	10,503	5,055	4,951	5,097	4,974	2,714	2,681	2,712	2,683
Cluster	459	454	387	381	383	379	198	196	172	172

Table 6. (Labor negotiations – Debt maturity) The table presents estimates from a linear regression model using different measures of debt maturity as the dependent variables. The data on labor negotiations is sourced from the Settlement Summaries database of Bloomberg BNA, covering the period from 1986 to 2020. The variable of interest, *Negotiation*, is an indicator variable that takes a value of one in the year a firm negotiates a collective agreement with a union, and zero in non-negotiation years. The specification includes firm controls such as size, profitability, and cash holding, along with a negotiation characteristic (share of employees). Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the firm level. * * *, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
	LT debt ratio(>1Y)	LT debt ratio(>2Y)	LT debt ratio(>3Y)	LT debt ratio(>4Y)	LT debt ratio(>5Y)
Negotiation	-0.013***	-0.011**	-0.010**	-0.007	-0.005
	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
Firm controls	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.5777	0.5712	0.5357	0.4828	0.4426
Obs.	8,068	8,068	8,068	8,068	8,068
Cluster	447	447	447	447	447

Table 7. (Cross-sectional correlation: wage concessions in labor negotiations) The table presents estimates from a cross-sectional correlation analysis, examining the relationship between labor negotiations and two outcome variables. Panel A focuses on the first-year increase in wages following a firm-union negotiation, while Panel B considers the cumulative three-year increase in wages. These variables serve as proxies for wage concessions during labor negotiations and are measured in units. The number of observations in each panel represents the number of negotiations in our sample for which we have data on the outcomes regarding wage increases. Data on labor negotiations is sourced from the Settlement Summaries database of Bloomberg BNA, covering the period from 1986 to 2020. Where indicated, the specification contains firm controls (size, profitability, and cash holding) and a negotiation characteristic (share of employees). Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the firm level. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A. Wage increase (first year)					
LT debt ratio(>5Y)	-0.035**	-0.024	-0.017			
	(0.017)	(0.024)	(0.024)			
ST debt ratio (≤5Y)				0.023	0.037*	0.041**
				(0.019)	(0.020)	(0.020)
Book leverage		0.007	0.004		-0.020	-0.021
		(0.020)	(0.021)		(0.016)	(0.017)
Adj. R2	0.0038	0.0294	0.0347	0.0015	0.0266	0.0306
Obs.	743	742	737	784	783	778
Cluster	237	237	234	251	251	248
	Panel B. Cumulative wage increase (three years)					
LT debt ratio(>5Y)	-0.102**	-0.086	-0.065			
	(0.047)	(0.071)	(0.069)			
ST debt ratio (≤5Y)				0.072	0.119**	0.134**
				(0.052)	(0.056)	(0.056)
Book leverage		0.026	0.020		-0.063	-0.066
		(0.057)	(0.059)		(0.046)	(0.048)
Adj. R2	0.0048	0.0243	0.0341	0.0024	0.0226	0.0313
Obs.	757	756	751	798	797	792
Cluster	241	241	238	255	255	252

Table 8. (Labor organization characteristics on labor negotiation wage increases) The table presents results for a cross-sectional analysis examining the relationship between wage increases from labor negotiations and union characteristics. The outcome variables are the percentage increase in wages over the first year and the cumulative wage increase over the first three years following a firm-union negotiation, reflecting wage concessions in labor negotiations. Both measures are expressed as percentage increases in wages. Labor organization data is sourced from the Form LM-2 and LM-3 filed with the Office of Labor-Management Standards (OLMS) and maintained by the U.S. Department of Labor. The standard errors, shown in parentheses, are robust and clustered at the labor organization level. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Wage increase in % (first year)				Cumulative wage increase in %			
Log(Fees)	0.603**	0.571**			2.071**	1.858*		
	(0.227)	(0.244)			(0.750)	(0.909)		
Log(Members)			0.472*	0.399*			1.669*	1.343
			(0.275)	(0.220)			(0.948)	(0.836)
Barg. unit-to-members		-0.028**		-0.026**		-0.105**		-0.093**
		(0.012)		(0.010)		(0.045)		(0.037)
Cash-to-members		0.000		0.000		0.001		0.001
		(0.000)		(0.001)		(0.002)		(0.002)
Leverage		0.141		1.149		-1.172		2.466
		(4.118)		(3.872)		(13.721)		(13.108)
Fees-to-members				0.003**				0.010**
				(0.001)				(0.004)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.1609	0.1625	0.1108	0.1523	0.1407	0.1377	0.1012	0.1292
Obs.	309	298	345	332	313	302	349	336
Cluster	27	26	31	30	27	26	31	30

Part

Internet Appendix

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A Proofs

A.1 Proof of Proposition 1

Game with Finite Horizon. We first characterize the equilibrium when t^* is finite. We consider the case $t^* = \infty$ at the end of this section. When $t^* < \infty$, the equilibrium is characterized by backward induction, starting from the last period before the firm goes bankrupt. The party making the last offer extracts all of the remaining surplus, i.e., $\delta^{t^*} - D$ (any offer that would leave the party making the offer a lower fraction of surplus would be suboptimal). The party receiving the offer always accepts it, as this party is indifferent between the offer and the bankruptcy payoff of 0.

Let $v_i(x, t^*)$ denote player i's expected payoff from negotiations if an agreement was struck at time x, when t^* is the maximal length of negotiations, with $i \in \{s, w\}$. Since w makes an offer with probability α and s with probability $1-\alpha$, we have:

$$v_s(t^*, t^*) = (1-\alpha)\left(\delta^{t^*} - D\right); \;\; v_w(t^*, t^*) = \alpha\left(\delta^{t^*} - D\right).$$

Continuing our way backward, the previous round of negotiations (i.e., at time t^*-1) follows the same logic. The party making the offer extracts as much surplus as possible, which implies making an offer that makes the party receiving the offer indifferent between accepting or refusing it. If s makes the offer y_{t^*-1}, this is such that $\delta^{t^*-1} - D - y_{t^*-1} = \delta_w \alpha\left(\delta^{t^*} - D\right)$ and, thus, $y_{t^*-1} = \delta^{t^*-1} - D - \delta_w \alpha\left(\delta^{t^*} - D\right)$. Similarly, w's offer would be $y_{t^*-1} = \delta_s(1-\alpha)\left(\delta^{t^*} - D\right)$.

It follows that we have:

$$\begin{aligned} v_s(t^*-1, t^*) &= (1-\alpha)\left[\delta^{t^*-1} - D - \delta_w v_w(t^*, t^*)\right] + \alpha\delta_s v_s(t^*, t^*) \\ &= (1-\alpha)\left(\delta^{t^*-1} - D\right) - (1-\alpha)\delta_w v_w(t^*, t^*) + \alpha\delta_s v_s(t^*, t^*) \\ &= (1-\alpha)\left(\delta^{t^*-1} - D\right) + \Delta(t^*); \end{aligned}$$

$$v_w(t^*-1, t^*) = \alpha\left(\delta^{t^*-1} - D\right) - \Delta(t^*),$$

where $\Delta(t^*) \equiv (1-\alpha)\alpha(\delta_s - \delta_w)\left(\delta^{t^*} - D\right)$.

Going one more period backward, we have:

$$\begin{aligned} v_s(t^*-2, t^*) &= (1-\alpha)\left[\delta^{t^*-2} - D - \delta_w v_w(t^*-1, t^*)\right] + \alpha\delta_s v_s(t^*-1, t^*) \\ &= (1-\alpha)\left(\delta^{t^*-2} - D\right) - (1-\alpha)\delta_w\left[\alpha\left(\delta^{t^*-1} - D\right) - \Delta(t^*)\right] \\ &\quad + \alpha\delta_s\left[(1-\alpha)\left(\delta^{t^*-1} - D\right) + \Delta(t^*)\right] \\ &= (1-\alpha)\left(\delta^{t^*-2} - D\right) - \delta_w(1-\alpha)\alpha\left(\delta^{t^*-1} - D\right) \\ &\quad + \delta_s\alpha(1-\alpha)\left(\delta^{t^*-1} - D\right) + \left[(1-\alpha)\delta_w + \alpha\delta_s\right]\Delta(t^*) \\ &= (1-\alpha)\left(\delta^{t^*-2} - D\right) + \Delta(t^*-1) + \left[(1-\alpha)\delta_w + \alpha\delta_s\right]\Delta(t^*); \end{aligned}$$

$$v_w(t^*-2, t^*) = \alpha\left(\delta^{t^*-2} - D\right) - \Delta(t^*-1) - \left[(1-\alpha)\delta_w + \alpha\delta_s\right]\Delta(t^*),$$

where $\Delta(t^*-1) \equiv (1-\alpha)\alpha(\delta_s - \delta_w)\left(\delta^{t^*-1} - D\right)$.

Following the same logic, we obtain:

$$
\begin{aligned}
v_s(t^*-3, t^*) &= (1-\alpha)\left[\delta^{t^*-3} - D - \delta_w v_w(t^*-2, t^*)\right] + \alpha\delta_s v_s(t^*-2, t^*) \\
&= (1-\alpha)\left(\delta^{t^*-3} - D\right) - (1-\alpha)\delta_w\left\{\alpha\left(\delta^{t^*-2} - D\right) - \Delta(t^*-1) - [(1-\alpha)\delta_w + \alpha\delta_s]\Delta(t^*)\right\} \\
&\quad + \alpha\delta_s\left\{(1-\alpha)\left(\delta^{t^*-2} - D\right) + \Delta(t^*-1) + [(1-\alpha)\delta_w + \alpha\delta_s]\Delta(t^*)\right\} \\
&= (1-\alpha)\left(\delta^{t^*-3} - D\right) + \Delta(t^*-2) + [(1-\alpha)\delta_w + \alpha\delta_s]\Delta(t^*-1) \\
&\quad + [(1-\alpha)\delta_w + \alpha\delta_s]^2\Delta(t^*);
\end{aligned}
$$

$$
\begin{aligned}
v_w(t^*-3, t^*) &= \alpha\left(\delta^{t^*-3} - D\right) - \Delta(t^*-2) - [(1-\alpha)\delta_w + \alpha\delta_s]\Delta(t^*-1) \\
&\quad - [(1-\alpha)\delta_w + \alpha\delta_s]^2\Delta(t^*),
\end{aligned}
$$

where $\Delta(t^*-2) \equiv (1-\alpha)\alpha(\delta_s - \delta_w)\left(\delta^{t^*-2} - D\right)$.

Continuing the sequence until time 0, we have:

$$
v_s(0, t^* > 0) = (1-\alpha)(1-D) + (1-\alpha)\alpha(\delta_s - \delta_w)\sum_{j=1}^{t^*}\left(\delta^j - D\right)[(1-\alpha)\delta_w + \alpha\delta_s]^{j-1}, \tag{4}
$$

$v_s(0,0) = (1-\alpha)(1-D)$, and $v_w(0,t^*) = 1 - D - v_s(0,t^*)$ for $t^* \geq 0$.

Since all offers players make in equilibrium are accepted, an agreement is reached immediately (i.e., at time $t = 0$) along the equilibrium path. $v_s(0,t^*)$ thus corresponds to s's expected share of surplus in equilibrium, that is, $v_s(0,t^*) = \mathbb{E}[y_0^*]$. The exact value of the equilibrium offer y_0^* depends on which player is selected to make the first offer. If $t^* = 0$, we have $y_0^* = 1 - D$ if s makes the offer, and $y_0^* = 0$ otherwise. If $t^* > 0$, we have $y_0^* = 1 - D - \delta_w v_w(1,t^*)$ if s makes the offer, and $y_0^* = \delta_s v_s(1,t^*)$ otherwise, where

$$
v_s(1, t^* > 0) = (1-\alpha)(\delta - D) + (1-\alpha)\alpha(\delta_s - \delta_w)\sum_{j=2}^{t^*}\left(\delta^j - D\right)[(1-\alpha)\delta_w + \alpha\delta_s]^{j-1}, \tag{5}
$$

and $v_w(1, t^* > 0) = \delta - D - v_s(1, t^* > 0)$.

Game with Infinite Horizon. The firm approaches an infinitely resilient debt structure, i.e., $t^* \to \infty$, when $(D,T) \to (0,\infty)$. Notice that $v_s(0,t^*)$ corresponds to $\mathbb{E}[y_0^*]$ in equilibrium. Taking the limit for $(D, T) \to (0, \infty)$ of the expression for $v_s(0, t^*)$ in Eqn. (4) yields:

$$\lim_{(D,T)\to(0,\infty)} v_s(0,t^*) = 1-\alpha+(1-\alpha)\,\alpha\,(\delta_s-\delta_w)\,\delta \lim_{t^*\to\infty}\sum_{j=1}^{t^*}\delta^{j-1}\left[(1-\alpha)\,\delta_w+\alpha\delta_s\right]^{j-1}$$
$$= \frac{(1-\alpha)\,(1-\delta\delta_w)}{1-\alpha\delta\delta_s-(1-\alpha)\delta\delta_w}. \tag{6}$$

Next, we show that the expression for $v_s(0, t^*)$ in Eqn. (6) is the same we obtain when $D = 0$ and there is no time limit to negotiations (that is, $t^* = \infty$). It follows that the equilibrium expressions described above converge to their equivalent in the game with infinite horizon as $t^* \to \infty$.

The construction of the equilibrium with infinite horizon is the same as in the random-proposers model in Muthoo (1999) (Section 7.2.4), so we defer to their manuscript for the proof of equilibrium uniqueness. The equilibrium strategies here are stationary, meaning that each player always makes the same offer whenever is its turn to make one. Since the first offer is always accepted, an agreement is reached immediately on the equilibrium path.

Since $D = 0$, if an agreement is reached at time t, the firm's surplus is δ_t. Let y^i describes the fraction of δ_t that goes to s, and $1 - y^i$ the fraction to w, when player $i \in \{s, w\}$ makes the offer. In equilibrium, each player offers a partition of surplus that leaves the other player indifferent between accepting or rejecting the offer. It follows that the equilibrium values of y^s and y^w solve the following system of equations:

$$1-y^s = \delta_w\delta[\alpha(1-y^w)+(1-\alpha)(1-y^s)]; \tag{7}$$
$$y^w = \delta_s\delta[\alpha y^w+(1-\alpha)y^s]. \tag{8}$$

It is worth stressing that, since the equilibrium strategies are stationary, the system of Eqns. (7) and (8) characterizes the equilibrium offers at any period, not just those that players make at time $t = 0$. Consider a generic time t. The players' offers at time t are such that $\delta^t(1 - y^s) = \delta_w\delta^{t+1}[\alpha(1-y^w)+(1-\alpha)(1-y^s)]$ and $\delta^t y^w = \delta_s\delta^{t+1}[\alpha y^w+(1-\alpha)y^s]$, which simplify to Eqns. (7) and (8), respectively. The solution to Eqns. (7) and (8) is $y^s = \frac{(1-\alpha\delta\delta_s)(1-\delta\delta_w)}{1-\alpha\delta\delta_s-(1-\alpha)\delta\delta_w}$ and $y^w = \frac{(1-\alpha)\delta\delta_s(1-\delta\delta_w)}{1-\alpha\delta\delta_s-(1-\alpha)\delta\delta_w}$.

Since w makes the first offer with probability α, we have:

$$\mathbb{E}[y_0^*] = \alpha y^w+(1-\alpha)y^s = \frac{(1-\alpha)\,(1-\delta\delta_w)}{1-\alpha\delta\delta_s-(1-\alpha)\delta\delta_w}. \tag{9}$$

A.2 Proof of Proposition 2

We prove Proposition 2 in two steps. Step One shows that $\mathbb{E}[u_s^*]$ always increases with T. Step Two proves that, depending on the model parameters, $\mathbb{E}[u_s^*]$ may increase or decrease with D.

Step One

Let $\mathbb{E}[u_s^*(T)]$ denote s's expected equilibrium payoff as a function of debt maturity T, holding fixed the value of leverage D, and consider two consecutive values of T, say T' and $T'+1$.

Recall that $t^* = \min\{T, \bar{t}\}$ if $D > 0$. If $T'+1 > \bar{t}$, we have $t^* = \bar{t}$ at both T' and $T'+1$. In this case, an increase in T does not affect t^* and, thus, $\mathbb{E}[u_s^*(T)]$ does not depend on T. If $T'+1 \leq \bar{t}$, we have $t^* = T$ at both T' and $T'+1$. Using the expression for $\mathbb{E}[y_0^*]$ in Eqn. (1), we can then write

$$\mathbb{E}[u_s^*(T'+1)] - \mathbb{E}[u_s^*(T')] = (1-\alpha)\,\alpha\,(\delta_s - \delta_w)\left(\delta^{T'+1} - D\right)[(1-\alpha)\,\delta_w + \alpha\delta_s]^{T'}. \tag{10}$$

Note that $T'+1 \leq \bar{t}$ implies $\delta^{T'+1} \geq D$, with strict inequality if either $T'+1 < \bar{t}$ or $\delta^{\bar{t}} > D$. Since $\delta_s > \delta_w$, the expression above is then always positive. It follows that $\mathbb{E}[u_s^*]$ always strictly increases with T for $T \leq \bar{t}-1$, and it does not change with T for $T > \bar{t}-1$. Finally, since $\bar{t}$ is such that $\delta^{\bar{t}} \geq D > \delta^{\bar{t}+1}$, the inequality $T \leq \bar{t}-1$ holds if and only if $\delta^{T+1} \geq D$.

Step Two

Let $\mathbb{E}[u_s^*(D)]$ denote s's expected equilibrium payoff as a function of leverage D. We consider three different levels of leverage, $D \in \{0, D', D''\}$, with $\delta > D'' > D' > 0$, and hold fixed the debt maturity at $T = 1$. It follows that, when $D > 0$, the firm goes bankrupt if a deal is not reached within two rounds of negotiations (i.e., $t^* = 1$). When $D = 0$, since the project is instead fully funded by equity, the firm is infinitely resilient to negotiations (i.e., $t^* = \infty$).

Using the expression for $\mathbb{E}[y_0^*]$ in Eqn. (1), we can write:

$$\begin{aligned}
\mathbb{E}[u_s^*(D \in \{D', D''\})] &= (1-\alpha)\,[1 - D + \alpha\,(\delta_s - \delta_w)\,(\delta - D)] - k + D; \\
\mathbb{E}[u_s^*(0)] &= \frac{(1-\alpha)\,(1-\delta\delta_w)}{1 - \alpha\delta\delta_s - (1-\alpha)\delta\delta_w} - k.
\end{aligned}$$

First, we compare $\mathbb{E}[u_s^*(D'')]$ and $\mathbb{E}[u_s^*(D')]$. We can write their difference as $\mathbb{E}[u_s^*(D'')] - \mathbb{E}[u_s^*(D')] = \alpha^2(D'' - D') > 0$, so we have $\mathbb{E}[u_s^*(D'')] > \mathbb{E}[u_s^*(D')]$ for any value of (δ_s, δ_w). Intuitively, the length of negotiations is the same for D'' and D', but D'' reduces the surplus exposed to the wage negotiations and, therefore, benefits s.

Second, we compare $\mathbb{E}[u_s^*(D'')]$ and $\mathbb{E}[u_s^*(0)]$. For simplicity, set $\delta_s = 1$ and $\delta_w = 0$:

$$\mathbb{E}[u_s^*(0)] - \mathbb{E}[u_s^*(D'')] = \frac{1-\alpha}{1-\alpha\delta} - (1-\alpha)\left[1 - D'' + \alpha(\delta - D'')\right] + D''. \tag{11}$$

If $D'' \leq \frac{\delta^2}{2-\delta}$, the expression above is positive for any $\alpha \in \left(0, \frac{1}{2}\right)$, so we have $\mathbb{E}[u_s^*(0)] > \mathbb{E}[u_s^*(D'')]$. It follows that $\mathbb{E}[u_s^*]$ is generally nonmonotone in D.

A.3 Proof of Proposition 3

We prove Proposition 3 in two steps. Step One demonstrates that, holding fixed D, the value of T that maximizes $\mathbb{E}[u_s^*]$ always increases with α. Step Two proves that, holding fixed T, the value of D that maximizes $\mathbb{E}[u_s^*]$ may instead increase or decrease with α.

Step One

Note that s has to choose a value of T only if $D > 0$, so we consider $D \in (0, k]$ in what follows. For a given D, s chooses T to maximize its expected total payoff $\mathbb{E}[u_s^*] = \mathbb{E}[y_0^*] - \kappa(k-d)$, where:

$$\mathbb{E}[y_0^*] = (1-\alpha)(1-D) + (1-\alpha)\alpha(\delta_s - \delta_w)\sum_{j=1}^{t^*}\left(\delta^j - D\right)\left[(1-\alpha)\delta_w + \alpha\delta_s\right]^{j-1}, \tag{12}$$

if $t^* > 0$, and $\mathbb{E}[y_0^*] = (1-\alpha)(1-D)$ if $t^* = 0$.

In what follows, we consider a fixed value of D and $\alpha \in [0, 1/2)$. Let $\mathbb{E}[y_0^*(T)]$, $d(T)$, and $t^*(T)$ denote, respectively, the values of $\mathbb{E}[y_0^*]$, d, and t^* as functions of T. Notice that $\mathbb{E}[y_0^*(T)]$ and $t^*(T)$ increase with T, while $d(T)$ decreases with T. Let T' denote s's optimal choice of T when w's bargaining power is $\alpha = \alpha'$. Since T belongs to the set of positive integers lower than $\overline{T} < \infty$, and $\mathbb{E}[u_s^*]$ is finite for any value of T, T' always exists. T' is such that, for any $T \leq \overline{T}$, we must have $\mathbb{E}[y_0^*(T')] - \kappa(k - d(T')) \geq \mathbb{E}[y_0^*(T)] - \kappa(k - d(T))$, which simplifies to

$$\mathbb{E}[y_0^*(T')] - \mathbb{E}[y_0^*(T)] \geq \kappa[d(T) - d(T')]. \tag{13}$$

First, we show that s's choice of T never decreases with α. Consider $T < T'$; we have

$$\mathbb{E}[y_0^*(T')] - \mathbb{E}[y_0^*(T)] = (1-\alpha')\,\alpha'\,(\delta_s - \delta_w) \sum_{j=t^*(T)}^{t^*(T')} \left(\delta^j - D\right) [(1-\alpha')\,\delta_w + \alpha'\delta_s]^{j-1}\,, \tag{14}$$

if $t^*(T) < t^*(T')$, and 0 if $t^*(T) = t^*(T')$.

The expression in Eqn. (14), which corresponds to the left-hand side of Inequality (13) when $T < T'$, increases with α' for any $\alpha' \in [0, 1/2)$. The right-hand side of Inequality (13) instead does not change with α'. Therefore, Inequality (13) continues to hold when we consider a level of α higher than α'. It follows that s continues to prefer T' compared to any $T < T'$.

Next, we show that s's choice of T may instead increase with α. Consider $T > T'$; we have

$$\mathbb{E}[y_0^*(T')] - \mathbb{E}[y_0^*(T)] = -\,(1-\alpha')\,\alpha'\,(\delta_s - \delta_w) \sum_{j=t^*(T')}^{t^*(T)} \left(\delta^j - D\right) [(1-\alpha')\,\delta_w + \alpha'\delta_s]^{j-1}\,, \tag{15}$$

if $t^*(T) > t^*(T')$, and 0 if $t^*(T) = t^*(T')$.

The expression in Eqn. (15), which corresponds to the left-hand side of Inequality (13) when $T > T'$, decreases with α' for any $\alpha' \in [0, 1/2)$. Similar to before, the right-hand side of Inequality (13) does not change with α'. Therefore, the inequality may no longer hold when we consider a level of α higher than α'. It follows that s may prefer some $T > T'$ after the increase in α.

Step Two

For a given T, s chooses D to maximize its expected total payoff $\mathbb{E}[u_s^*] = \mathbb{E}[y_0^*] - \kappa(k-d)$, where $\mathbb{E}[y_0^*]$ is as described in Eqn. (12). In what follows, we consider a fixed value of T and $\alpha \in [0, 1/2)$. Let $\mathbb{E}[u_s^*(D)]$, $\mathbb{E}[y_0^*(D)]$, $d(D)$, and $t^*(D)$ denote, respectively, the values of $\mathbb{E}[u_s^*]$, $\mathbb{E}[y_0^*]$, d, and t^* as functions of D. Notice that $\mathbb{E}[y_0^*(D)]$ and $t^*(D)$ decrease with D.

First, we prove that an optimal choice of D always exists. Note that, as D goes from 0 to $\underline{D}$, with $\underline{D}$ sufficiently close to 0, t^* goes from ∞ to $\overline{T} < \infty$. Since $\mathbb{E}[y_0^*]$ strictly increases with t^* and decreases with D, we have $\mathbb{E}[y_0^*(0)] > \mathbb{E}[y_0^*(\underline{D})]$. Notice also that d is continuous in D, and $d = D$ at $D = 0$. It follows that there always exists $\underline{D}$ sufficiently close to 0 such that $\mathbb{E}[y_0^*(0)] - \kappa > \mathbb{E}[y_0^*(\underline{D})] - \kappa(k - d(\underline{D}))$, so that s prefers $D = 0$ to $D = \underline{D}$. Now consider $D \in [\underline{D}, k]$. t^* is non-continuous in D at all the values of D such that $D = \delta^t$ with $t < T$. For such values of t and T, as D approaches δ^t from the right, we go from $t^* = t-1$ to $t^* = t$. However, $\mathbb{E}[y_0^*]$ (and so $\mathbb{E}[u_s^*]$) is still a continuous functions of D as, when $D = \delta^t$, we have $\sum_{j=1}^{t}\left(\delta^j - D\right)\left[(1-\alpha)\,\delta_w + \alpha\delta_s\right]^{j-1} = \sum_{j=1}^{t-1}\left(\delta^j - D\right)\left[(1-\alpha)\,\delta_w + \alpha\delta_s\right]^{j-1}$. Since $\mathbb{E}[u_s^*]$ is continuous in D for $D \in [\underline{D}, k]$, and $D \in [\underline{D}, k]$ is a closed interval, $\widehat{D} = \arg\max_{D\in[\underline{D},k]} \mathbb{E}[u_s^*]$ always exists (by the Extreme value theorem). It follows that s chooses $D = 0$ if $\mathbb{E}[u_s^*(0)] \geq \mathbb{E}[u_s^*(\widehat{D})]$, and $D = \widehat{D}$ otherwise.

Next, we prove that the optimal value of D may increase or decrease with α. For simplicity, set $T = 0$ (so that there can be only one round of negotiations if $D > 0$), $\delta_s = 1$, $\delta_w = 0$, and $D = d$ for any value of D. First, consider $\alpha = 0$. When $\alpha = 0$ and $D = d$, we have $\mathbb{E}[u_s^*] = 1 - D - \kappa(k - D)$ for any value of D. Since $\kappa > 1$, $\mathbb{E}[u_s^*]$ is maximized at $D = k$ when $\alpha = 0$.

Now consider strictly positive values of α. We have $t^*(0) = \infty$ and, thus, $\mathbb{E}[u_s^*(0)] = \frac{1-\alpha}{1-\alpha\delta} - \kappa k$. Since $T = 0$, we have instead $t^*(D > 0) = 0$ and, thus, $\mathbb{E}[u_s^*(D > 0)] = (1-\alpha)(1-D) - \kappa(k - D)$. Since $\mathbb{E}[u_s^*(D > 0)]$ strictly increases with D, s chooses between the two extreme values $D = 0$ and $D = k$. To simplify the exposition, let $\kappa \to 1$, so we can neglect κ in the expressions for $\mathbb{E}[u_s^*(0)]$ and $\mathbb{E}[u_s^*(k)]$. We have $\mathbb{E}[u_s^*(0)] > \mathbb{E}[u_s^*(k)]$ for any $\alpha \in (0, \frac{1}{2})$ if $\delta \in \left(\frac{2k}{k+1}, 1\right)$, and only for $\alpha \in (0, \overline{\alpha})$ if $\delta \in \left(k, \frac{2k}{k+1}\right)$, where $\overline{\alpha} = \frac{1}{2}\left[\sqrt{\frac{(\delta-k)^2}{\delta^2(1-k)^2}} + \frac{\delta-k}{\delta(1-k)}\right] < \frac{1}{2}$. It follows that, when $\delta \in \left(k, \frac{2k}{k+1}\right)$, s's optimal choice of D goes from k to 0 when α goes from 0 to $\alpha'' < \overline{\alpha}$, and then from 0 to k again when α goes from α'' to $\alpha''' > \overline{\alpha}$. Hence, s's choice of D may increase or decrease with α.

A.4 Joint Responses

In this section, we explore the joint response of leverage and maturity to changes in workers' bargaining power. The results we obtain here help us separate the strategic responses from their indirect effects in our empirical analysis.

Baseline Model. We first explore the joint response of D and T to α in numerical simulations of our baseline model. To find numerical solutions to s's optimization problem, we discretize the values of D and α to grids of adjacent values with 0.01 increments. The two panels in Figure IA1 plot the values of leverage D and maturity T that jointly maximize s's equilibrium payoff

($\mathbb{E}[y_0^*] - \kappa e$, where $\mathbb{E}[y_0^*]$ is as described in Eqn. 1) against α for two numerical examples.

In the left panel of Figure IA1, we set the functional form for $d(D, T)$ such that, for any $D > 0$, the interest rate $D - d$ increases with T but does not depend on D. This describes a setting where longer maturity increases the firm's cost of borrowing but increasing leverage does not. Since $\kappa > 1$, raising equity is costly for s. At $\alpha = 0$, w cannot extract any surplus from negotiations, so s chooses $D = k$ and $T = 0$ to avoid incurring financing costs. For $\alpha > 0$, the firm's surplus is exposed to the wage negotiation with w. For moderate values of α (approximately smaller than 0.2), s responds to increases in α by choosing a larger T, so as to increase the firm's resilience to negotiations t^*. As α becomes sufficiently high, however, s switches to fully funding the project with equity ($D = 0$ and $e = k$) so that t^* becomes infinity. It is worth emphasizing that equity is costlier than leverage in this example, so s chooses $D = 0$ only to gain resilience to strikes.

In the right panel of Figure IA1, we set the functional form for $d(D, T)$ such that $D - d$ increases with both T and D. Moreover, as D goes up, $D - d$ increases with T at a steeper rate, so increasing maturity is more costly when leverage is higher. Since $\kappa = 1$ here, raising equity has no direct cost. Finally, compared to the right panel, δ_w is closer to δ_s, so $\mathbb{E}[y_0^*]$ is less sensitive to t^*. At $\alpha = 0$, here s chooses $D = 0$ to avoid paying interest. For α sufficiently large, however, s switches to $D > 0$. Compared to the left panel, resilience here is less important for s's bargaining position. So s prefers to increase D and push surplus off the bargaining table when α goes up.

The response of T to changes in α is also interesting in this example. The cost of maturity (in terms of the interest rate) increases with D here, and s prefers to increase D when α goes up. Due to the increase in the cost of maturity, s prefers to reduce T from 3 to 2 when D increases to approximately 0.46. It is worth emphasizing that the reduction in T strictly hurts s's bargaining position ($\mathbb{E}[y_0^*]$ strictly decreases).[1] However, the increase in the cost of maturity has a stronger impact on its overall payoff, so s accepts a lower share of surplus to reduce the financing cost.

Model where only Maturity impacts Negotiations. Next, we consider a variation of the model where only T affects the outcome of negotiations. Our objective is to explore the patterns of joint

[1] In this example, $\bar{t} = 4$ at $D = k$, so we have $t^* = T$ for any $T \leq 4$. So $\mathbb{E}[y_0^*]$ strictly decreases when T goes from 3 to 2.

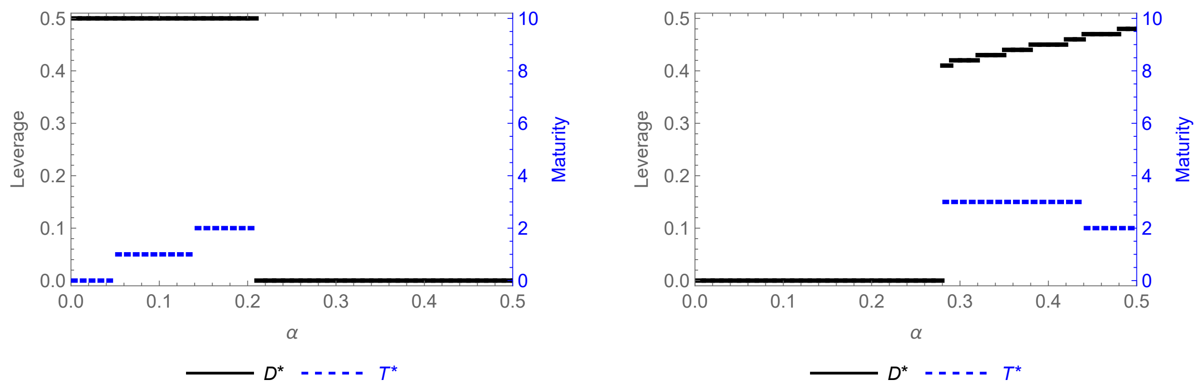


Figure IA1. (Baseline model) Both panels plot the values of D (solid black line) and T (blue dashed line) that jointly maximize s's expected equilibrium payoff against α. In each panel, the left Y-axis describes the values of D, and the right Y-axis describes the value of T. In both panels, we set $\overline{T} = 10$, $k = 0.5$, and $\delta_s = 1$. For the left panel, the other parameters are $\delta_w = 0.4$, $\delta = 0.9$, $\kappa = 1.06$, $d = D - \frac{T}{100}$ for $D > 0$, and $d = 0$ otherwise. For the right panel, the other parameters are $\delta_w = \delta = 0.85$, $\kappa = 1$, $d = D - \frac{D}{100}\left[T + \frac{1}{0.6-D}\right]$.

responses of D and T to α in a setting where only T can be used to influence negotiations. We make two slight modifications to our baseline model. First, we assume that, at each period, s and w bargain over the firm's residual surplus *gross* of the debt payment (that is, δ^t for $t \leq t^*$ and 0 for $t > t^*$), so that D has no effect on the negotiation surplus. Second, we assume that the maximal length of negotiations is always T and restrict the analysis to $D \in \left[\underline{D}, k\right]$, with $\underline{D} > 0$, so that t^* also does not depend on D.[2] In this version of the model, s's equilibrium payoff $\mathbb{E}[u_s^*]$ is:

$$\mathbb{E}[u_s^*] = (1-\alpha)\left\{1 + \alpha\left(\delta_s - \delta_w\right)\sum_{j=1}^{T}\delta^j\left[(1-\alpha)\,\delta_w + \alpha\delta_s\right]^{j-1}\right\} - D - \kappa e, \tag{16}$$

for $T > 0$, and $\mathbb{E}[u_s^*] = (1-\alpha) - D - \kappa e$ for $T = 0$.

The first term in the expression for $\mathbb{E}[u_s^*]$ in Eqn. (16) is s's equilibrium share of surplus $\mathbb{E}[y_0^*]$ in this version of the model. Note that here $\mathbb{E}[y_0^*]$ does not depend on D, so D has no impact on negotiations. Even if D has no strategic value, we show below that s may still want to adjust it when α increases, as an indirect effect of the strategic response in T.

Lemma 1. *Let (D^*, T^*) denote the value of (D, T) that maximizes $\mathbb{E}[u_s^*]$ in the model where only T impacts negotiations (Eqn. 16); T^* increases with α, while D^* may increase or decrease with α, for any $\alpha \in [0, \frac{1}{2})$.*

[2] When $D = 0$, there is no debt obligation, so t^* becomes ∞. To ensure t^* never depends on D, we restrict D to be positive.

When α increases, s chooses a larger T to curb workers' bargaining power in the negotiations. Note that the response of T to α is unambiguous here, even if we allow both D and T to vary with α. This is because D has no strategic use, so there are no indirect effects due to its strategic response to α. Holding fixed T, s chooses D to minimize the overall funding cost $D + \kappa(k - d)$, which does not depend on α. The optimal value of D, however, depends on α indirectly, since α affects the optimal choice of T, which in turn affects d. We prove the results in Lemma 1 below.

First, we show that T^* never decreases with α. Suppose, for the sake of contradiction, that (D^*, T^*) goes from (D', T') to (D'', T''), with $T' > T''$, when α goes from α' to $\alpha'' > \alpha'$. Let $\mathbb{E}[y_0^*(T)]$ denote $\mathbb{E}[y_0^*]$ as a function of T. Optimality of (D', T') implies that, at $\alpha = \alpha'$, we must have $\mathbb{E}[y_0^*(T')] - D' - \kappa(k - d(D', T') \geq \mathbb{E}[y_0^*(T'')] - D'' - \kappa(k - d(D'', T'')$, which implies

$$\mathbb{E}[y_0^*(T')] - \mathbb{E}[y_0^*(T'')] \geq D' + \kappa(k - d(D', T') - D'' - \kappa(k - d(D'', T''). \tag{17}$$

By the same logic, optimality of (D'', T'') implies, at $\alpha = \alpha''$, we must have instead

$$\mathbb{E}[y_0^*(T')] - \mathbb{E}[y_0^*(T'')] \leq D' + \kappa(k - d(D', T') - D'' - \kappa(k - d(D'', T''). \tag{18}$$

Using the expression for $\mathbb{E}[y_0^*]$ in Eqn. (16), for a given value of α, we can write

$$\mathbb{E}[y_0^*(T')] - \mathbb{E}[y_0^*(T'')] = (1-\alpha)\alpha\left(\delta_s - \delta_w\right) \sum_{j=T''}^{T'} \delta^j \left[(1-\alpha)\,\delta_w + \alpha\delta_s\right]^{j-1}. \tag{19}$$

Note that the $\mathbb{E}[y_0^*(T')] - \mathbb{E}[y_0^*(T'')]$ increases with α for any $\alpha \in [0, \frac{1}{2})$, and it is strictly positive for any $T' > T''$. The left-hand side of Inequality (17) is thus smaller than the left-hand side of Inequality (18), since the latter is evaluated at $\alpha'' > \alpha'$. The right-hand side of the two inequalities does not depend on α, so it is the same value for both. It follows that, when Inequality (17) holds at α', Inequality (18) cannot hold at $\alpha'' > \alpha'$, which contradicts that (D'', T'') can be optimal at α''.

The numerical examples in Figure IA2 prove that T^* may increase with α and that D^* may increase or decrease with α. The two panels plot the values of D^* and T^* that jointly maximize $\mathbb{E}[u_s^*]$ in Eqn. (16) against α, for a given set of parameters and two different functional forms for $d(D, T)$. In both panels, T^* increases with α. The indirect effect that the increase in T^* has on D^* depends on the properties of d. Since $\kappa > 1$ and $D - d > 0$ for any $D > 0$, both raising equity

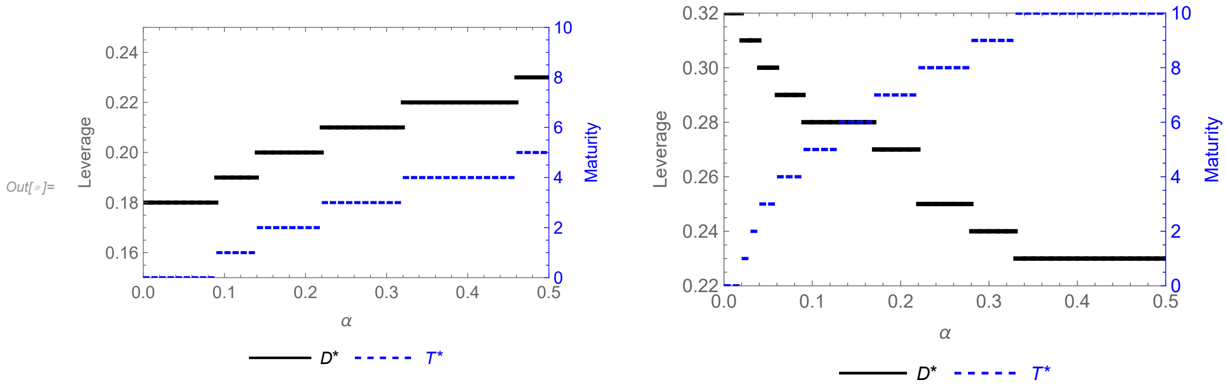


Figure IA2. (Model where only maturity impacts negotiations) Both panels plot the values of D (solid black line) and T (blue dashed line) that jointly maximize $\mathbb{E}[u_s^*]$ in Eqn. (16) against α. In each panel, the left Y-axis describes the values of D, and the right Y-axis describes the value of T. In both panels, we set $\overline{T} = 10$, $\underline{D} = 0.1$, $k = 0.5$, $\delta_s = 1$, $\delta_w = 0.7$, $\delta = 0.9$, and $\kappa = 1.2$. For the left panel, we set $d = D - \frac{1}{100}\left[2T + \frac{5D}{0.6-D} - T * D\right]$. For the right panel, we set $d = D - \frac{D}{100}\left[T + \frac{3}{0.6-D}\right]$.

and issuing debt are costly for s. At $\alpha = 0$, w cannot extract any surplus from negotiations, so s chooses $T^* = 0$ and D^* that minimizes the funding cost $D + \kappa[k - d(D, 0)]$.

As α increases, s responds by choosing a larger T^*, to increase the firm's resilience t^*. In the left panel, the indirect effect on leverage is positive. This is because $D - d$ increases less with D when T is larger, so increasing leverage becomes cheaper when T^* goes up, and D^* thus increases as well. In the right panel, the indirect effect is instead negative. In this case, $D - d$ increases less with T when D is larger. So s increases leverage to reduce the cost of choosing a larger T^*.

Model where only Leverage impacts Negotiations. Finally, we explore a model where only D impacts negotiations. To this purpose, we assume $t^* = \min\{\overline{t}, \overline{T}\}$ for $D > 0$, and $t^* = \infty$ for $D = 0$, so that t^* does not depend on s's choice of T. In this version of the model, s's equilibrium payoff $\mathbb{E}[u_s^*]$ is:

$$\mathbb{E}[u_s^*] = (1-\alpha)\left\{1 - D + \alpha\left(\delta_s - \delta_w\right)\sum_{j=1}^{t^*}(\delta^j - D)\left[(1-\alpha)\,\delta_w + \alpha\delta_s\right]^{j-1}\right\} - \kappa e, \tag{20}$$

for $t^* > 0$, and $\mathbb{E}[u_s^*] = (1-\alpha)(1-D) - \kappa e$ for $t^* = 0$.

The first term in the expression for $\mathbb{E}[u_s^*]$ in Eqn. (20) is the expected share of surplus $\mathbb{E}[y_0^*]$ that s receives in equilibrium in this version of the model. Here $\mathbb{E}[y_0^*]$ does not depend on T, since T

does not affect the firm's resilience t^*. Holding fixed D, s then chooses T to minimize $D + \kappa(k - d)$.

Lemma 2. *Let (D^*, T^*) denote the value of (D, T) that maximizes $\mathbb{E}[u_s^*]$ in the model where only D impacts negotiations (Eqn. 20); D^* may increase or decrease with α, while $T^* = 0$, for any $\alpha \in [0, \frac{1}{2})$.*

Since T has no strategic value here, and d always decreases with T, s is always better off choosing $T^* = 0$ here ($\mathbb{E}[y_0^*] - \kappa(k - d(D, T))$ is always maximized at $T = 0$). Like for our baseline model, D^* may instead increase or decrease with α, depending on the parameters of the model.[3]

It is worth emphasizing that the result that T^* is always 0 when maturity has no strategic value relies on the assumption that d always decreases with T (Assumption 1). In a richer model, s may have incentives to set $T > 0$ that are unrelated to the wage negotiations (see, e.g., He and Xiong 2012). In this case, the strategic response of D to α is likely to generate indirect effects on T^*.

B Model Extensions

In this appendix, we explore the robustness of our main results to alternative assumptions. Below, we briefly discuss the setup and main insights of each extension of our baseline model. We provide a complete analysis of each variation of the model in the remainder of the appendix.

Financial Resilience of Unions. Appendix B.1 develops an extension of the model where there is a limit to the length of strikes workers can endure: If negotiations reach time $t > t_w$, w returns to work and accepts its reservation value. w's resilience t_w is a strategic choice of the union that represents w in the negotiations, and captures the union's ability to organize and support a long walkout. Before negotiations begin, the union collects fees from w, which are then used as strike funds to increase t_w during negotiations. Since the other elements of the model stay the same, the firm's resilience (which we denote here by t_s) is the same as in our main model.

Negotiations break down when either w returns to work or the firm goes bankrupt, depending on which event occurs first. Our main result is that the share of surplus s receives in equilibrium decreases with t_w and increases with t_s. The intuition for this result is as follows. The easier it

[3]Since we always have $T^* = 0$ here, the proof of Proposition 3 also proves that D^* may increase or decrease with α.

is for w to endure a long strike compared to the firm (that is, the higher t_w and the lower t_s), the harder it is for s to extract surplus from w by threatening long negotiations. So each party has an incentive to increase its resilience before entering negotiations.[4] Since t_s is the same as in the main model, our insights about the impact of the firm's debt structure on wage negotiations continue to hold here. There are two interesting implications stemming from these results.

First, the workers' resilience to strikes represents an alternative measure of their bargaining power. We show that our qualitative results about the response of D and T to an increase in α also apply to an exogenous increase in t_w. So our empirical findings about the firms' response to changes in the collective bargaining environment can also be interpreted as a response to changes in workers' ability to organize strikes. Second, similar to firms, unions may also try to adjust their financials to mitigate the impact of hostile legislation, such as the introduction of RWLs. This second insight motivates our empirical analysis of unions' financials in Section 4.2.

Credit Market Frictions. In Appendix B.2, we consider a simple extension of the model that features bankruptcy costs and a competitive credit market. Our objective is to endogenize the non-strategic costs of leverage and maturity, which were captured in a reduced-form way in Section 2. We make two modifications to our main model. First, we add a competitive credit market featuring risk-neutral debtholders. The debtholders' zero-profit condition pins down the amount d raised by the firm as a function of its debt structure (D, T). Second, we introduce a stochastic component to the firm's revenue, which allows for the possibility of bankruptcy in equilibrium.[5] The wedge $D - d$ arises endogenously in this setting, since debtholders require compensation for both the bankruptcy risk and the time value of money. Our results continue to hold in this extension. An interesting new result is that, when α increases and s responds by choosing a more resilient debt structure, the firm becomes *safer*, as bankruptcy occurs with a smaller probability.

[4] This feature of the equilibrium holds here also when $\delta_s = \delta_w$, since we have an endogenous measure of w's resilience to negotiations in this version of the model.

[5] In the main model, the firm's revenue is deterministic and s and w reach an agreement immediately, so bankruptcy never occurs on the equilibrium path. The possibility that the firm goes bankrupt if negotiations continue for too long (due to the cost of labor walkouts), however, still affects the allocation of surplus in the negotiations.

Outside Options. In Appendix B.3, we study how workers' option to leave the firm and terminate the negotiations influences their outcome. We consider an extension of the main model in which, upon receiving an offer, w can choose to accept the offer, reject it and make a counteroffer, or terminate the negotiations altogether. In the latter case, the game ends and w receives a payoff of ω. To simplify the exposition, we normalize s's outside option to 0. First, we prove that our main results carry through in this extension. Second, we show that workers' outside option limits shareholders' ability to use the firm's debt structure to influence the outcome of negotiations. Intuitively, if ω is larger, w is more eager to leave the firm when s either threatens long negotiations or pushes surplus off the negotiation table. So we expect firms to be more likely to use debt structure strategically when the labor market is looser and ω is smaller.

Debt Rollover. In Appendix B.4, we introduce debt rollover to the model: if s and w have yet to agree at time $\min\{\bar{t}, T\}$, where (D, T) is the original debt contract, s tries to obtain a loan from new debtholders to pay the existing debt and continue the negotiations. The possibility of rollover affects the surplus available to negotiate and the maximal length of negotiations. So it affects the share of surplus that goes to each player in equilibrium. However, players agree immediately in equilibrium, so debt rollover never actually occurs on the equilibrium path. So when we refer to debt rollover "occurring" in the discussion below, we mean occurring off the equilibrium path.

The possibility of rollover does not affect our qualitative results. This is because of two main reasons. First, s may be unable to raise enough funds to pay D: due to the cost of the walkout, the residual income may be too little to obtain the new loan. The firm then goes bankrupt when negotiations reach time $\min\{\bar{t}, T\}$, even if rollover is allowed. Second, even if s obtains the new loan, the payment is larger than the original obligation whenever there is a chance that the firm defaults on the new debt (like in the model in Appendix B.2). The increase in the payment reduces the surplus available in the following rounds of wage negotiations. Since w is less patient, this reduction hurts s's bargaining position, as it limits its ability to extract surplus from w. Moreover, s cannot roll over on its debt indefinitely: If negotiations continue for too long, the firm eventually goes bankrupt. So the possibility of debt rollover, even when rollover does occur off the equilibrium path, does not eliminate s's incentive to build resilience in the first place.

Debt Renegotiation. In Appendix B.5, we modify our main model to study the role of debt renegotiation – that is, the possibility that s renegotiates the terms of the debt contract when the firm is unable to fulfill the original obligation. The modeling of the debt renegotiation follows the literature on incomplete contracts (e.g., Hart and Moore (1994) and Hart and Moore (1998)).

If s and w have yet to agree at time $\min\{\bar{t}, T\}$, s offers a new contract $\{D', T'\}$ to debtholders. Debtholders act as a single agent $\mathcal{D}$, who chooses between accepting the new contract and forcing the firm to liquidate. In the latter case, the payoff to $\mathcal{D}$ is μk, where $\mu \in (0, 1)$ captures the efficiency of liquidation. If $\mathcal{D}$ accepts the new contract, s and w continue the wage negotiations. This sequence of plays continues until either s and w agree on a division of surplus or $\mathcal{D}$ forces the firm to liquidate, with potentially multiple instances of debt renegotiation along the way. Similar to the extension with rollover, renegotiation never actually occurs in equilibrium (as s and w agree immediately), even though its possibility affects the equilibrium division of surplus. So when we refer to renegotiation "occurring" in the discussion below, we mean off the equilibrium path.

The possibility of debt renegotiation adds more nuances to our results. First, perhaps not surprisingly, it weakens the link between the maximal length of wage negotiations t^* and the original debt obligation: conditional on renegotiation occurring, t^* does not depend on (D, T). Second, if the debt payment is renegotiated downward, earlier renegotiation benefits s in the negotiation with w. This creates an incentive for s to lower T so that renegotiation occurs earlier off the equilibrium path. There are, however, two important caveats to these nuances. First, conditional on renegotiation occurring, the payment is always renegotiated *upward* if $\mu k \geq D$. Second, to simplify the analysis, we do not directly model creditors' coordination problems and shareholders' reputational costs of breaching the debt contract. A large body of theoretical work (e.g., Bolton and Scharfstein 1996; Eaton and Gersovitz 1981) and empirical evidence (e.g., Carletti, Colla, Gulati, and Ongena 2021; Ivashina, Iverson, and Smith 2016; Belenzon, Chatterji, and Daley 2017) shows that both channels create frictions to debt renegotiation. If these frictions impose a sufficiently large cost on s, renegotiation never occurs both on and off the equilibrium path.

B.1 Financial Resilience of Unions

In this section, we consider an extension of our baseline model where there is a limit to the length of a strike that workers can endure, and this limit depends on the strategic choice of resilience of the union that represents the workers in the negotiations with shareholders.

We denote the union by $\mathcal{U}$ and the maximal length of strike workers can endure by t_w. We assume t_w depends on the fees (ϕ) the union collects from workers at the beginning of the game.

Assumption 3. *The maximal length of strike workers can endure t_w is an increasing and concave function of the fees ϕ collected by the union, that is, $t_w = t(\phi)$.*

Assumption 3 implies that $\mathcal{U}$ needs to collect more fees upfront if it wants to help workers endure a longer strike in the wage negotiation with shareholders. In practice, union members pay regular union dues, which are used to support strike funds (that is, funds that unions distribute to striking workers to partially substitute their regular paychecks) and other union activities.

If negotiations reach time $t > t_w$, w returns to work and accepts its reservation value 0. To distinguish t_w from the maximal length of strike the firm can afford, here we denote the latter by t_s. Like for the main model, we have $t_s = \min\left\{\bar{t}, T\right\}$ if $D > 0$, and $t_s = \infty$ if $D = 0$.

Let $\mathbb{E}[y_0^*]$ denote the expected share of surplus s receives in equilibrium for given values of (D, T) and ϕ, which pin down the values of t_s and t_w, respectively. The expected share of surplus that goes to w is then $1 - D - \mathbb{E}[y_0^*]$, and its equilibrium payoff is $\mathbb{E}[u_w^*] = 1 - D - \mathbb{E}[y_0^*] - \phi$.

To simplify the analysis, here we consider a discrete strategy space for D ($D \in \{0, D_1, D_2, \ldots, k\}$) and assume that s and $\mathcal{U}$ move sequentially in the pre-negotiations game.[6] The sequence of events is: (i) s chooses (D, T); (ii) having observed (D, T), $\mathcal{U}$ chooses ϕ; (iii) s and w negotiate.

$\mathcal{U}$ chooses ϕ to maximize $\mathbb{E}[u_w^*]$. Fixing (D, T), $\mathcal{U}$'s optimal choice of ϕ then solves:

$$\max_{\phi} 1 - D - \mathbb{E}[y_0^*] - \phi. \tag{21}$$

[6] A discrete space for D ensures that a solution to Program (22) always exists. If s and $\mathcal{U}$ move simultaneously, an equilibrium always exists if the strategy space for ϕ is bounded, that is if $\phi \leq \overline{\phi} < \infty$. However, the equilibrium may no longer be in pure strategies.

Let ϕ^* denote the value of ϕ that solves Program (21) for a given (D, T). s then solves:

$$\max_{(D,T)} \mathbb{E}[y_0^*] - \kappa(k - d), \tag{22}$$

where $\mathbb{E}[y_0^*]$ is evaluated at ϕ^* for any given (D, T).

An equilibrium of the game is a collection of bargaining strategies and pre-negotiation choices $\{(D, T), \phi\}$, where the latter jointly solve programs (21) and (22). Finally, since here we have endogenous measures of both w's and s's resilience to negotiations, we no longer need to assume $\delta_s > \delta_w$ (Assumption 2). We begin our analysis by characterizing how negotiations unfold for fixed values of $\{(D, T), \phi\}$. We then describe the equilibrium choices of ϕ and (D, T).

Equilibrium Negotiations. We first characterize the maximal length of negotiations on the equilibrium path (t^*) in this extension of the model. If $t_w \geq t_s$, the limit to negotiations is determined by the firm's resilience, that is, $t^* = t_s$. In this case, negotiations unfold like in the main model, so we refer to Appendix A.1 for the characterization of the equilibrium strategies and payoffs.

If $t_w < t_s$, the firm would survive the longest strike workers can endure, so we have $t^* = t_w$. If an agreement between s and w has yet to be reached at time t_w, at time $t_w + 1$ then workers return to work and accept the reservation value of 0, and s appropriates the residual surplus $\delta^{t_w+1} - D$. Notice that $\delta^{t_w+1} - D \geq 0$ when $t_w \leq t_s$, since t_s is such that $\delta^{t_s} - D \geq 0$ and $\delta^{t_s+1} - D < 0$. It follows that negotiations break down here when either the firm goes bankrupt or workers return to work, depending on which of these two events occur earlier. That is, $t^* = \min\{t_s, t_w\}$.

Proposition 4 describes the equilibrium properties of the wage negotiation stage.

Proposition 4. *Fix the firm's (t_s) and the union's (t_w) resiliences to negotiations, and let $t^* = \min\{t_s, t_w\}$ denote the last period before bargaining breaks down. An equilibrium of the wage negotiation subgame always exists, is unique, and has the following features:*

1. *Part 1 and Part 2 of Proposition 1 continue to hold.*

2. *The expected share of surplus s receives in equilibrium $\mathbb{E}[y_0^*]$ always decreases with t_w and it increases with t_s for any $\delta_s \geq \delta_w$.*

Note that since $\mathbb{E}[y_0^*]$ continues to increase with the firm's resilience to strikes, the insights about the strategic use of debt structure we derive in the main model continue to hold here. In the remainder of this section, we prove and discuss the results in Proposition 4.

Since the equilibrium is the same as in the baseline model if $t_w \geq t_s$, we focus on $t_w < t_s$ in what follows. The equilibrium characterization follows the same logic as in the main model, that is, moving backward from t_w through a sequence of offers that make players indifferent between accepting or refusing. If w makes the offer at time t_w, this gives s a share of surplus $\delta_s(\delta^{t_w+1} - D)$, which is equal to the discounted value of s's continuation payoff. If s makes the offer, w receives 0 and s extracts all the surplus $\delta^{t_w} - D$, since w's continuation payoff is the reservation value 0. Since w makes an offer with probability α and s with probability $1 - \alpha$, we have:

$$v_s(t_w, t_w) = (1-\alpha)\left(\delta^{t_w} - D\right) + \alpha\delta_s(\delta^{t_w+1} - D); \;\; v_w(t_w, t_w) = \alpha\left(\delta^{t^w} - D - \delta_s(\delta^{t_w+1} - D)\right).$$

The previous round of negotiations (i.e., at time $t_w - 1$) follows the same logic; we have:

$$\begin{aligned} v_s(t_w - 1, t_w) &= (1-\alpha)\left[\delta^{t_w-1} - D - \delta_w v_w(t_w, t_w)\right] + \alpha\delta_s v_s(t_w, t_w); \\ v_w(t_w - 1, t_w) &= \alpha\left[\delta^{t_w-1} - D - \delta_s v_s(t_w, t_w)\right] + (1-\alpha)\delta_w v_w(t_w, t_w). \end{aligned}$$

Continuing our way backward, we obtain:

$$\begin{aligned} v_s(t_w - 2, t_w) &= (1-\alpha)\left(\delta^{t_w-2} - D - \delta_w v_w(t_w - 1, t_w)\right) + \alpha\delta_s v_s(t_w - 1, t_w); \\ v_s(t_w - 3, t_w) &= (1-\alpha)\left(\delta^{t_w-3} - D - \delta_w v_w(t_w - 2, t_w)\right) + \alpha\delta_s v_s(t_w - 2, t_w); \\ &\ldots, \end{aligned} \tag{23}$$

and $v_w(t_w - j, t_w) = \delta^{t_w-j} - D - v_s(t_w - j, t_w)$, for any j such that $t_w \geq j \geq 0$.

The sequence of equilibrium-path expected payoff is the same as in the main model (and in this extension when $t_w \geq t_s$), except for $v_s(t_w, t_w)$, which has the additional term $\alpha\delta_s(\delta^{t_w+1} - D)$, and $v_w(t_w, t_w)$, which has the additional term $-\alpha\delta_s(\delta^{t_w+1} - D)$. This property allows for a simple characterization of the expected share of surplus s receives in equilibrium ($\mathbb{E}[y_0^*]$); we have:

$$\mathbb{E}[y_0^*] = \begin{cases} \tilde{v_s} & \text{if } \; t_w \geq t_s = t^*; \\ \tilde{v_s} + \alpha[\alpha\delta_s + (1-\alpha)\delta_w]^{t_w}(\delta^{t_w+1} - D) & \text{if } \; t_w = t^* < t_s, \end{cases} \tag{24}$$

where

$$\tilde{v_s} = (1-\alpha)\left\{1 - D + \alpha(\delta_s - \delta_w)\sum_{j=1}^{t^*}\left(\delta^j - D\right)\left[(1-\alpha)\,\delta_w + \alpha\delta_s\right]^{j-1},\right\} \tag{25}$$

if $t^* > 0$, and $\tilde{v_s} = (1-\alpha)(1-D)$ if $t^* = 0$.

Next, we prove that $\mathbb{E}[y_0^*]$ always decreases with t_w. $\mathbb{E}[y_0^*(t_w)]$ denotes the value of $\mathbb{E}[y_0^*]$ as a function of t_w, holding t_s fixed. First, suppose t_w goes from t' to $t'+1$, with $t'+1 < t_s$ (so t^* goes from t' to $t'+1$); we have

$$\begin{aligned}\mathbb{E}[y_0^*(t_w = t'+1)] - \mathbb{E}[y_0^*(t_w = t')] &= (1-\alpha)\alpha(\delta_s - \delta_w)\left(\delta^{t'+1} - D\right)\left[(1-\alpha)\delta_w + \alpha\delta_s\right]^{t'} \\ &+\alpha[\alpha\delta_s + (1-\alpha)\delta_w]^{t'+1}(\delta^{t'+2} - D) - \alpha[\alpha\delta_s + (1-\alpha)\delta_w]^{t'}(\delta^{t'+1} - D).\end{aligned} \tag{26}$$

We can rewrite the right-hand side of Eqn. (26) as:

$$\alpha[\alpha\delta_s + (1-\alpha)\delta_w]^{t'+1}(\delta^{t'+2} - D) - \alpha[\alpha\delta_s + (1-\alpha)\delta_w]^{t'}(\delta^{t'+1} - D)\left[1 - (1-\alpha)(\delta_s - \delta_w)\right]. \tag{27}$$

Since $1 - (1-\alpha)(\delta_s - \delta_w) > \alpha\delta_s + (1-\alpha)\delta_w$, the expression in Eqn. (27) is negative, which implies $\mathbb{E}[y_0^*(t_w = t'+1)] - \mathbb{E}[y_0^*(t_w = t')] < 0$.

Second, suppose t_w goes from $t' < t_s$ to $t'' \geq t_s$ (so t^* goes from t' to t_s); we have:

$$\begin{aligned}\mathbb{E}[y_0^*(t_w = t'')] - \mathbb{E}[y_0^*(t_w = t')] &= (1-\alpha)\alpha\left(\delta_s - \delta_w\right)\sum_{j=t'+1}^{t_s}\left(\delta^j - D\right)\left[(1-\alpha)\,\delta_w + \alpha\delta_s\right]^{j-1} \\ &-\alpha[\alpha\delta_s + (1-\alpha)\delta_w]^{t'}(\delta^{t'+1} - D).\end{aligned} \tag{28}$$

Since $\delta < 1$, the right-hand side of Eqn. (28) is always smaller than the following expression:

$$\begin{aligned}&\alpha[\alpha\delta_s + (1-\alpha)\delta_w]^{t'}(\delta^{t'+1} - D)\left\{(1-\alpha)(\delta_s - \delta_w)\sum_{j=0}^{\infty}\left[(1-\alpha)\,\delta_w + \alpha\delta_s\right]^j - 1\right\} \\ &= \alpha[\alpha\delta_s + (1-\alpha)\delta_w]^{t'}(\delta^{t'+1} - D)\left\{\frac{(1-\alpha)(\delta_s - \delta_w)}{1 - (1-\alpha)\delta_w - \alpha\delta_s} - 1\right\}.\end{aligned} \tag{29}$$

Since $\frac{(1-\alpha)(\delta_s - \delta_w)}{1-(1-\alpha)\delta_w - \alpha\delta_s} < 1$, the expression in Eqn. (29) is negative, which implies $\mathbb{E}[y_0^*(t_w = t'')] - \mathbb{E}[y_0^*(t_w = t')] < 0$. Finally, when t_w goes from $t' > t_s$ to $t'' > t'$, t^* and so $\mathbb{E}[y_0^*(t_w)]$ do not change.

The better w is at enduring a long strike (i.e., the higher t_w), the lower the share of surplus s receives in the negotiations, since the threat of long negotiations is less effective at extracting surplus from w. It is worth emphasizing that this feature of the equilibrium does not rely on the assumption $\delta_s > \delta_w$, since t_w represents an endogenous measure of w's resilience to negotiations. Holding the union fee fixed, w thus benefits from a higher t_w even when $\delta_s < \delta_w$.

Finally, we prove that $\mathbb{E}[y_0^*]$ increases with t_s for any $\delta_s \geq \delta_w$. $\mathbb{E}[y_0^*(t_s)]$ denotes the value of $\mathbb{E}[y_0^*]$ as a function of t_s, now holding t_w fixed. First, suppose t_s goes from t' to $t'+1$, with $t'+1 < t_w$ (so t^* goes from t' to $t'+1$). In this case, t^* is pinned down by t_s, so we have $\mathbb{E}[y_0^*] = \tilde{v}_s$, which increases with t^* if $\delta_s \geq \delta_w$, and it decreases with t^* otherwise.

Second, suppose t_s goes from $t' < t_w$ to $t'' \geq t_w$ (so t^* goes from t' to t_w); we have:

$$\mathbb{E}[y_0^*(t_s = t'')] - \mathbb{E}[y_0^*(t_s = t')] = (1-\alpha)\alpha\,(\delta_s - \delta_w) \sum_{j=t'+1}^{t_w} \left(\delta^j - D\right) [(1-\alpha)\,\delta_w + \alpha\delta_s]^{j-1} + \alpha[\alpha\delta_s + (1-\alpha)\delta_w]^{t'}(\delta^{t'+1} - D). \tag{30}$$

The expression above is positive for any $\delta_s \geq \delta_w$, since both its terms are then positive. It is worth noticing that the expression above is positive even when $\delta_s < \delta_w$ but these two values are sufficiently close to each other, since the second term on the right-hand side of Eqn. (30) is always positive. Finally, when t_s goes from $t' > t_w$ to $t'' > t'$, t^* and so $\mathbb{E}[y_0^*(t_s)]$ do not change.

Similar to the main model, shareholders extract more surplus when the firm is more resilient to strikes. When t_s increases, either longer negotiations become feasible (when t_s goes from $t'+1 < t_w$ to t') or the firm becomes able to endure a longer strike than workers (when t_s goes from $t' < t_w$ to $t'' \geq t_w$). Either case strengthens the bargaining position of s vis-à-vis w.

Shareholders' response to changes in workers' resilience. Next, we show that our qualitative results about the response of D and T to an increase in α also apply to an exogenous increase in w's resilience to strikes. For simplicity, here we assume $\delta_s = \delta_w$.

Lemma 3. *Set $\delta_s = \delta_w$, and fix the workers' resilience to strikes t_w, with $t_w \leq \bar{t}_w$; the following comparative statics results hold in equilibrium:*

1. *Holding the debt level D fixed, the debt maturity T that maximizes shareholders' expected payoff $\mathbb{E}[u_s^*]$ increases with t_w.*

2. *Holding T fixed, the value of D that maximizes $\mathbb{E}[u_s^*]$ may increase or decrease with t_w.*

The threshold value $\bar{t}_w$ is defined in the proof of Lemma 3.

The logic behind Lemma 3 is similar to that for Proposition 3. T increases the firm's resilience to strikes t_s and, as a consequence, s's expected surplus from negotiations. Holding fixed D, s can then increase T to curb the effects of an increase in w's bargaining power, which is captured here by an increase in their resilience t_w.[7] Since D has an ambiguous effect on s's expected equilibrium payoff, its best response to an increase in t_w may be to increase *or* decrease D.

We prove Part 1 of Lemma 3 below. If $\delta_s = \delta_w = \delta_0$, s's expected share of surplus (Eqn. 24) simplifies to $\mathbb{E}[y_0^*] = (1-\alpha)(1-D)$ if $t_w \geq t_s$, and $\mathbb{E}[y_0^*] = (1-\alpha)(1-D) + \alpha\delta_0^{t_w}(\delta^{t_w+1} - D)$ if $t_w < t_s$, where $t_s = \min\{\bar{t}, T\}$. s chooses a value of T only if $D > 0$, so we consider $D \in (0, k]$ in what follows. For a given D, s chooses T to maximize its expected total payoff $\mathbb{E}[u_s^*] = \mathbb{E}[y_0^*] - \kappa(k-d)$. Let $\mathbb{E}[y_0^*(T)]$ and $d(T)$ denote, respectively, the values of $\mathbb{E}[y_0^*]$ and d as functions of T. $d(T)$ decreases with T, and $\mathbb{E}[y_0^*(T)]$ only changes with T when T moves t_s from $t_s \leq t_w$ to $t_s > t_w$.

It follows that s chooses between (a) the lowest T such that $t_s > t_w$ and (b) $T = 0$. If $\min\{\overline{T}, \bar{t}\} < t_w + 1$ (which is equivalent to $t_w > \min\{\overline{T}, \bar{t}\} - 1$), $t_s > t_w$ is not feasible, so s chooses $T = 0$. If $t_w \leq \min\{\overline{T}, \bar{t}\} - 1$, s chooses $T = t_w + 1$ if and only if $\mathbb{E}[y_0^*(t_w+1)] - \kappa[k - d(t_w+1)] \geq \mathbb{E}[y_0^*(0)] - \kappa[k - d(0)]$, which simplifies to

$$\alpha\delta_0^{t_w}(\delta^{t_w+1} - D) + \kappa d(t_w + 1) - \kappa d(0) \geq 0. \tag{31}$$

The left-hand side of Inequality (31) always decreases with t_w, so there exists a unique value $\widehat{t}_w$ such that the inequality holds for $t_w \leq \widehat{t}_w$, and it does not hold for $t_w > \widehat{t}_w$. It follows that s chooses $T = t_w + 1$ for any $t_w \leq \bar{t}_w \equiv \min\left\{\widehat{t}_w, \min\{\bar{t}, \overline{T}\} - 1\right\}$, and 0 otherwise. This proves that s's choice of T strictly increases with t_w, for any $t_w \leq \bar{t}_w$.

Next, we prove Part 2 of Lemma 3. For a given T, s chooses D to maximize its expected total payoff $\mathbb{E}[u_s^*]$. Let $\mathbb{E}[u_s^*(D)]$, $\mathbb{E}[y_0^*(D)]$, $d(D)$, and $t_s(D)$ denote, respectively, the values of $\mathbb{E}[u_s^*]$, $\mathbb{E}[y_0^*]$, d, and t_s as functions of D. We assume $\delta^2 > k$, and $\overline{T} > 2$, so that $\min\{\overline{T}, \bar{t}\} - 1 \geq 1$ for any $D \in [0, k]$. We also assume $d(D, T') = d(D, T'')$ for any $T'' \geq T'$ and $D \in [0, k]$, so that $\widehat{t}_w \geq 2$. This

[7] If t_w becomes too large, s gives up on trying to be more resilient than w and chooses $T = 0$ to minimize the financing cost, since the interest rate $D - d$ increases with T. The condition $t_w \leq \bar{t}_w$ allows us to rule out this possibility.

implies we always have $t_w \le \bar{t}_w$ in what follows. Finally, we set $T = 1$ so that there is only one round of negotiations if $D > 0$, and $\delta_0 = \delta$. It follows that we have $t^s(0) = \infty$ and $t^s(D > 0) = 1$.

First, consider $t_w = 0$. Since both $t^s(0)$ and $t^s(D)$ are larger than t_w, we have $\mathbb{E}[y_0^*] = (1-\alpha)(1-D) + \alpha(\delta - D)$ for all values of D. Suppose $d(D)$ is differentiable; taking the derivative of $\mathbb{E}[u_s^*(D)]$ with respect to D then yields $-1 + \kappa \frac{\partial d}{\partial D}$. So s chooses $D = 0$ iff $-1 + \kappa \frac{\partial d}{\partial D} \le 0$ at $D = 0$, which implies $-1 + \kappa \frac{\partial d}{\partial D} \le 0$ for all values D by the concavity of $d(D)$.

Now consider $t_w = 1$. Since $t_s(0) > t_w = t_s(D > 0)$, we have $\mathbb{E}[y_0^*(0)] = 1 - \alpha + \alpha\delta(\delta^2 - D)$ and $\mathbb{E}[y_0^*(D > 0)] = (1-\alpha)(1-D)$. If $\kappa = 1$, $\alpha \in \left(\frac{k-d(k)}{k-\delta^3}, 1\right]$, and $k \in (\delta^3, \delta^2)$, s goes from choosing $D = 0$ to $D > 0$ when t_w goes from 0 to 1. If $\kappa \in (1, \frac{\delta^3}{k})$, $D = d(D)$, $\alpha \in \left(\frac{k}{k-\delta^3}(1-\kappa), 1\right]$, and $k \in (\delta^3, \delta^2)$, s goes instead from choosing $D > 0$ to $D = 0$ when t_w goes from 0 to 1.

Union's Choice of Resilience. We begin our analysis of the pre-negotiations stage by describing $\mathcal{U}$'s choice of ϕ, which pins down w's ability to endure a strike t_w, for given values of (D, T), which pin down the firm's resilience to strikes t_s and the negotiation surplus $\delta^t - D$. $\mathcal{U}$ sets ϕ to maximize w's equilibrium payoff $\mathbb{E}[u_w^*] = 1 - D - \mathbb{E}[y_0^*] - \phi$, where $\mathbb{E}[y_0^*]$ is defined in Eqn. (24).

ϕ has a direct negative effect on $\mathbb{E}[u_w^*]$ but also an indirect positive effect, since $\mathbb{E}[y_0^*]$ decreases with t_w which, in turn, increases with ϕ. Let $\mathbb{E}[y_0^*(\phi)]$ denote the value of $\mathbb{E}[y_0^*]$ as a function of ϕ. It is WLOG to focus on the lowest values of ϕ that yield each given value of t_w. This is because, holding fixed t_w, $\mathbb{E}[u_w^*]$ decreases with ϕ, so w strictly prefers $\phi' < \phi''$ whenever $t(\phi') = t(\phi'')$. Since $1 - D - \mathbb{E}[y_0^*(\phi)]$ is finite for any ϕ, it is also WLOG to focus on finite values of ϕ.

We can thus restrict our attention to values $\phi \in \{\phi_1, \phi_2, \ldots, \phi_n\}$, where ϕ_j is the lowest ϕ such that $t(\phi_j) = j$, for $j \in \{1, 2, \ldots, n\}$ and $n < \infty$. It follows that a value ϕ^* that maximizes $\mathbb{E}[u_w^*]$ always exists (one can compute $\mathbb{E}[u_w^*]$ at all values $\phi \le \phi_n$ and choose the value where $\mathbb{E}[u_w^*]$ is largest). Notice that, since ϕ is finite in equilibrium, we always have $t_w < \infty$. So the horizon of negotiations t^* is finite in this version of the model. Next, we explore how ϕ^* changes with α.

Lemma 4. *Holding the firm's debt structure (D, T) fixed, the union fee ϕ that maximizes workers' expected payoff $\mathbb{E}[u_w^*]$ may increase or decrease with their bargaining power α.*

We first prove Lemma 4 and then discuss the intuition behind this result. Let ϕ' denote $\mathcal{U}$'s choice of ϕ when w's bargaining power is $\alpha = \alpha'$. ϕ' is such that, for any $\phi \leq \phi_n$, we must have $1 - D - \mathbb{E}[y_0^*(\phi')] - \phi' \geq 1 - D - \mathbb{E}[y_0^*(\phi)] - \phi$, which simplifies to

$$\mathbb{E}[y_0^*(\phi')] - \mathbb{E}[y_0^*(\phi)] \leq \phi - \phi'. \tag{32}$$

The left-hand side of Inequality (32) is the benefit to w of paying a fee higher than ϕ' since, by increasing t_w, a higher fee reduces s's share of surplus from $\mathbb{E}[y_0^*(\phi')]$ to $\mathbb{E}[y_0^*(\phi)]$. The right-hand side of the inequality is the cost to w of paying a higher fee. For any $\phi > \phi'$, the benefit is smaller than the cost, so w always prefers ϕ' to $\phi > \phi'$. By similar logic, for $\phi < \phi'$, the cost of increasing the fee is smaller than the benefit, so w also prefers ϕ' to any $\phi < \phi'$.

Suppose $\phi' = \phi_2$, so we have $t(\phi') = 2$ (note that, for any given value of the other model parameters, one can always choose $t(\phi)$ so that ϕ_2 is optimal). For simplicity, set $\delta = 1$ and $D = 0$, which implies $t_s = \infty > t_w$. Holding fixed ϕ', the right-hand side of Inequality (32) does not depend on α. It follows that how the optimal fee ϕ^* varies with α depends on how α changes the left-hand side of the inequality. First, we prove that ϕ^* may increase with α. We have $\mathbb{E}[y_0^*(\phi_2)] - \mathbb{E}[y_0^*(\phi_3)] = \alpha(1 - \delta_s)[\alpha\delta_s + (1 - \alpha)\delta_w]^2$, which increases with α if $\delta_s > \frac{2\delta_w}{3}$. In this case, there always exists $t(\phi)$ such that $\phi_3 - \phi_2 > \mathbb{E}[y_0^*(\phi_2)] - \mathbb{E}[y_0^*(\phi_3)]$ at $\alpha = \alpha'$ and $\phi_3 - \phi_2 < \mathbb{E}[y_0^*(\phi_2)] - \mathbb{E}[y_0^*(\phi_3)]$ at $\alpha = \alpha'' > \alpha'$, so that w prefers ϕ_2 at α' and ϕ_3 at α''.

We next prove that ϕ^* may decrease with α. We have $\mathbb{E}[y_0^*(\phi_1)] - \mathbb{E}[y_0^*(\phi_2)] = \alpha(1 - \delta_s)[\alpha\delta_s + (1 - \alpha)\delta_w]$, which decreases with α if $\delta_s < \frac{\delta_w}{2}$ and $\alpha > \frac{\delta_w}{2(\delta_w - \delta_s)}$. In this case, there always exists $t(\phi)$ such that $\phi_2 - \phi_1 < \mathbb{E}[y_0^*(\phi_1)] - \mathbb{E}[y_0^*(\phi_2)]$ at $\alpha = \alpha'$ and $\phi_2 - \phi_1 > \mathbb{E}[y_0^*(\phi_1)] - \mathbb{E}[y_0^*(\phi_2)]$ at $\alpha = \alpha'' > \alpha'$, so that w prefers ϕ_2 at α' and ϕ_1 at α''.

Next, we discuss the intuition behind Lemma 4. An increase in α has two different effects on w's incentives to be resilient in the negotiation with s. On the one hand, w extracts more surplus for any value of ϕ and $t(\phi)$, which reduces w's need to invest in resilience. On the other hand, the additional surplus w extracts from being more resilient to negotiations may also increase (e.g., when α moves from 0 to a positive value), which increases w's incentives to become resilient. Depending on which of these two effects dominate, ϕ^* may increase or decrease with α.

Equilibrium. Having characterized $\mathcal{U}$'s choice of ϕ for a given (D, T), we can now solve for s's choice and characterize the unique equilibrium of the game.

Proposition 5. *An equilibrium of the game always exists. In equilibrium, the wage negotiation between s and w is as described in Proposition 4, and $\{(D, T), \phi\}$ jointly solve programs (21) and (22).*

We have shown above that ϕ^* exists and is finite for any given (D, T). Since the strategy space for (D, T) is also finite, a solution to Program (22) always exists (given ϕ^*, one can compute $\mathbb{E}[u_s^*]$ at all possible values of (D, T) and choose the value where $\mathbb{E}[u_s^*]$ is largest). It follows that a collection $\{(D, T), \phi\}$ that jointly solve programs (21) and (22) always exists, and so does an equilibrium of the game. In knife-edge cases, ϕ^* may not be single-valued, and Program (22) may admit multiple solutions. Except for these cases, the equilibrium is unique.

B.2 Credit Market Frictions

This section develops a simple extension of our baseline model that endogenizes the non-strategic costs of leverage and maturity, which were captured in a reduced-form way in Section 2.

We make two modifications to our baseline model. First, we introduce a stochastic component to the firm's revenue, which allows for the possibility of bankruptcy in equilibrium (i.e., even if s and w reach an agreement immediately). Let $x \in \{0, \delta^t\}$ denote the firm's revenues if an agreement is reached at time t, where $x = \delta^t$ with probability $p \in (0, 1)$. The probability distribution for x is common knowledge, but its realization is observed only after the parties reach an agreement and w begins production. The parameter p captures the likelihood that the firm's project succeeds. For simplicity, the delay in production due to negotiations reduces the firm's revenues conditional on the project succeeding, but it does not affect p. Since the firm's revenue is 0 when the project fails, the firm repays its debt only when the project succeeds, and it goes bankrupt otherwise.

Second, we add a competitive credit market featuring risk-neutral debtholders with a discount factor $\delta_c \in (0, 1)$. Their breakdown condition pins down the amount d raised by the firm as a function of its debt structure (D, T). The firm's debt is non-callable, which means that it can only be paid at maturity. Therefore, when $T > 0$, even when the firm generates revenues immediately in equilibrium, debtholders will receive a premium to compensate for the delay in the payment.

Equilibrium Analysis. Like for the main model, the firm's resilience is $t^* = \min\left\{\bar{t}, T\right\}$ if $D > 0$, and $t^* = \infty$ if $D = 0$. Given t^*, the equilibrium characterization follows the same logic as in the main model, that is, moving backward from the last period before the firm goes bankrupt. Since the firm's surplus is 0 when the project fails, the two parties negotiate over the division of surplus conditional on the project succeeding, i.e., conditional on $x = \delta^t$. The party making the last offer extracts all of the remaining surplus $\delta^{t^*} - D$. The party receiving the last offer always accepts it, as this party is indifferent between the offer and the bankruptcy payoff of 0. Since w makes an offer with probability α and s with probability $1 - \alpha$, and since the project succeeds with probability p, the expected equilibrium-path payoffs from agreeing at time t^* are:

$$v_s\left(t^*, t^*\right) = p\left(1-\alpha\right)\left(\delta^{t^*} - D\right); \quad v_w\left(t^*, t^*\right) = p\alpha(\delta^{t^*} - D).$$

Continuing our way backward, the previous round of negotiations follows the same logic: the party making the offer proposes a division of surplus that makes the receiving party indifferent between accepting or refusing. If s makes the offer y_{t^*-1}, this is such that $p[\delta^{t^*-1} - D - y_{t^*-1}] = \delta_w v_w(t^*, t^*)$. Similarly, w's offer would be such that $p y_{t^*-1} = \delta_s v_s(t^*, t^*)$. It follows that we have:

$$\begin{aligned}
v_s\left(t^*-1, t^*\right) &= (1-\alpha)\left\{ p[\delta^{t^*-1} - D] - \delta_w v_w\left(t^*, t^*\right)\right\} + \alpha\delta_s v_s\left(t^*, t^*\right) \\
&= (1-\alpha)p[\delta^{t^*-1} - D] - (1-\alpha)\delta_w v_w(t^*, t^*) + \alpha\delta_s v_s\left(t^*, t^*\right) \\
&= (1-\alpha)p[\delta^{t^*-1} - D] + \Delta\left(t^*\right); \\
v_w\left(t^*-1, t^*\right) &= \alpha p[\delta^{t^*-1} - D] - \Delta\left(t^*\right),
\end{aligned}$$

where $\Delta\left(t^*\right) \equiv (1-\alpha)\alpha(\delta_s - \delta_w)p[\delta^{t^*} - D]$.

Continuing the sequence until time 0, we obtain s's expected share of surplus in equilibrium:

$$\mathbb{E}[y_0^*] = p(1-\alpha)\left\{1 - D + \alpha(\delta_s - \delta_w)\sum_{j=1}^{t^*}(\delta^j - D)\left[(1-\alpha)\,\delta_w + \alpha\delta_s\right]^{j-1}\right\}, \tag{33}$$

if $t^* > 0$, and $\mathbb{E}[y_0^*] = (1-\alpha)p(1-D)$ if $t^* = 0$. w instead receives $p(1-D) - \mathbb{E}[y_0^*]$ for $t^* \geq 0$.

Even though s and w always reach an agreement at $t = 0$ in equilibrium, the firm is able to pay back D only if its project succeeds, which occurs with probability p. If the project succeeds, debtholders receive the payment D at time T, since the debt is non-callable. If the project fails, debtholders receive the liquidation value of 0. For a given debt structure (D, T), debtholders break even if $-d + p\delta_c^T D = 0$. It follows that we have $d = p\delta_c^T D$ in equilibrium.

In equilibrium, s's total expected payoff $\mathbb{E}[u_s^*]$ is then equal to $\mathbb{E}[y_0^*] - \kappa e$, where $e = k - p\delta_c^T D$. Note that the expression for $\mathbb{E}[u_s^*]$ is isomorphic to the expression for $\mathbb{E}[u_s^*]$ in the baseline model, and the two expressions correspond if we set $d = p\delta_c^T D$ and $p = 1$. Therefore, all the results we obtain in the main model carry through in this extension. An interesting implication of this version of the model is that, when α increases and s responds by switching from $D > 0$ to $D = 0$, the firm becomes *safer*, as bankruptcy no longer occurs with positive probability.

B.3 Outside options

In this section, we study how workers' option to leave the firm and terminate the negotiations influences their outcome. We consider an extension of the main model in which, upon receiving an offer, w can choose to accept the offer, reject it and make a counteroffer, or terminate the negotiations altogether. In the latter case, the game ends and w receives a payoff of ω. To simplify the exposition, we normalize s's outside option to 0.

Equilibrium Analysis. w can always receive a payoff ω by terminating the negotiations, so any agreement must leave at least ω to w. Let $\bar{t}(x)$ be such that $\delta^{\bar{t}(x)} \geq x > \delta^{\bar{t}(x)+1}$ for any $x > 0$. Let t^* denote the last round of negotiations before bargaining breaks down, which occurs when either the firm goes bankrupt or w terminates the negotiations. If s and w reach an agreement at time $\min\{\bar{t}(D), T\}$ (i.e., before the firm goes bankrupt), the firm generates a surplus $\delta^{\min\{\bar{t}(D),T\}} - D$. If $\delta^{\min\{\bar{t}(D),T\}} - D \geq \omega$, then $\min\{\bar{t}(D), T\}$ is the firm's resilience to negotiations also here. Otherwise, w is better off terminating the negotiations and taking its outside option before time $\min\{\bar{t}(D), T\}$. In this case, the firm's resilience is $\bar{t}(\omega)$, where $\bar{t}(\omega)$ represents the maximal length of negotiations such that the firm can still pay w a wage higher than ω. So we have $t^* = \min\{\bar{t}(D), T, \bar{t}(\omega)\}$, since

$\bar{t}(\omega) < \min\{\bar{t}(D), T\}$ when $\delta^{\min\{\bar{t}(D),T\}} - D < \omega$. Note that, since $\omega > 0$, t^* is always finite here.

The following proposition characterizes the equilibrium of the bargaining game.

Proposition 6. *Fix the debt structure (D, T) and let $t^* = \min\{\bar{t}(D), T, \bar{t}(\omega)\}$ denote the last period before bargaining breaks down. An equilibrium always exists, is unique, and has the following features:*

1. *An agreement y_0^* is reached immediately, that is, at time $t = 0$.*
2. *The last offer before bargaining breaks down y_{t^*} leaves the player receiving the offer indifferent between accepting y_{t^*} and its outside option (i.e., ω for w and 0 for s). For any time $t < t^*$, the equilibrium offer y_t is such that the player receiving the offer is indifferent between accepting and refusing y_t.*

For a given value of t^*, the characterization of the equilibrium follows the same logic as in the main model, with the only difference being that w must receive at least ω at each round of negotiations. Proceeding by backward induction, the last round of negotiations (time t^*) leaves the players with the following expected payoff:

$$v_s(t^*, t^*) = (1-\alpha)(\delta^{t^*} - D - \omega); \;\; v_w(t^*, t^*) = \alpha(\delta^{t^*} - D) + (1-\alpha)\omega. \tag{34}$$

In the previous round of negotiations (i.e., at time $t^* - 1$), the party making the offer proposes a division of surplus that makes the receiving party indifferent between accepting or refusing the offer. If s makes the offer y_{t^*-1}, this is such that $\delta^{t^*-1} - D - y_{t^*-1} = \max\{\delta_w v_w(t^*, t^*), \omega\}$ and, thus, $y_{t^*-1} = \delta^{t^*-1} - D - \max\{\delta_w v_w(t^*, t^*), \omega\}$. Since we have normalized s's outside option to 0, w's offer would be instead $y_{t^*-1} = \delta_s(1-\alpha)(\delta^{t^*} - D - \omega)$. It follows that we have:

$$v_s\left(t^*-1, t^*\right) = (1-\alpha)\left(\delta^{t^*-1} - D - \max\{\delta_w v_w(t^*, t^*), \omega\}\right) + \alpha\delta_s v_s\left(t^*, t^*\right), \tag{35}$$

and $v_w\left(t^*-1, t^*\right) = \delta^{t^*-1} - D - v_s\left(t^*-1, t^*\right)$.

Continuing our way backward, we obtain:

$$\begin{aligned} v_s\left(t^*-2, t^*\right) &= (1-\alpha)\left(\delta^{t^*-2} - D - \max\{\delta_w v_w(t^*-1, t^*), \omega\}\right) + \alpha\delta_s v_s\left(t^*-1, t^*\right); \qquad (36)\\ v_s\left(t^*-3, t^*\right) &= (1-\alpha)\left(\delta^{t^*-3} - D - \max\{\delta_w v_w(t^*-2, t^*), \omega\}\right) + \alpha\delta_s v_s\left(t^*-2, t^*\right); \\ & \ldots, \end{aligned}$$

and $v_w(t^* - j, t^*) = \delta^{t^*-j} - D - v_s(t^* - j, t^*)$, for any j such that $t^* \geq j \geq 0$.

The outside option introduces kinks in the expected payoff sequences, making it hard to derive a closed-form expression for the equilibrium payoffs. To build intuition, we study the special case $\delta_w = 0$, for which we can derive closed-form expressions.

Special Case. Consider the special case when $\delta_w = 0$, which implies $\max\{\delta_w v_w(t^* - j, t^*), \omega\} = \omega$ for any $t^* > j > 0$. Continuing the sequence of payoffs in equations (34) to (36) until time $t = 0$, we obtain a closed-form expression for s's expected share of surplus from the negotiation:

$$\mathbb{E}[y_0^*] = (1-\alpha)\left\{1 - D - \omega + \alpha\delta_s \sum_{j=1}^{t^*} \left(\delta^j - D - \omega\right)[\alpha\delta_s]^{j-1}\right\}, \tag{37}$$

for $t^* > 0$, and $\mathbb{E}[y_0^*] = (1-\alpha)(1 - D - \omega)$ for $t^* = 0$.

Since $\delta^t - D - \omega \geq 0$ for any $t \leq t^*$, all else equal, $\mathbb{E}[y_0^*]$ increases with the firm's resilience to negotiations t^*. Since $\mathbb{E}[y_0^*]$ continues to increase with the firm's resilience to strikes, the insights about the strategic use of debt structure from the main model continue to hold here.[8] There are, however, two effects of w's outside options that are worth discussing. First, the outside option limits how much leverage the firm can take: the firm's surplus must be greater than ω in equilibrium (i.e., $1 - D > \omega$), otherwise w is always better off terminating the negotiations and leaving the firm. Therefore, when ω increases, s may be forced to reduce leverage. Second, the outside option limits the maximal length of negotiations: t^* decreases with $\bar{t}(\omega)$, which decreases with ω. Intuitively, when ω is larger, w is better off terminating the negotiations earlier.

B.4 Debt Rollover

In this section, we introduce the possibility of debt rollover into our analysis – that is, the possibility that the firm obtains a new loan to pay its existing debt and extend the horizon of negotiations.

[8]The properties we derive in the special case hold more broadly, even though the expression for $\mathbb{E}[y_0^*](t^*)$ is less compact. Consider for simplicity the cases with either one or two rounds of negotiations (i.e., $t^* \in 0, 1$). We can then write $\mathbb{E}[y_0^*](0)] = (1-\alpha)(1-D-\omega)$ and $\mathbb{E}[y_0^*](1)] = (1-\alpha)(1-D-\max\{\delta_w\alpha[(\delta-D)+(1-\alpha)\omega], \omega\})+\alpha\delta_s(1-\alpha)(\delta-D-\omega)$. In order for two rounds of negotiations to be feasible, we need to have $\delta - D > \omega$ and $T \geq 1$. If $\delta - D > \omega$, we have $\mathbb{E}[y_0^*](1)] > \mathbb{E}[y_0^*](0)]$.

We add the possibility of rollover to the model in Appendix B.2. Since rollover is only relevant when the firm has some debt obligation, we focus on $D > 0$ in this section.[9] Let $\bar{t}(x)$ be such that $\delta^{\bar{t}(x)} \geq x > \delta^{\bar{t}(x)+1}$ for any $x > 0$. If s and w have yet to reach an agreement at time $\min\{\bar{t}(D), T\}$, the firm is unable to repay the promised amount D at time T. In this case, we let s try to repay D to the existing debtholders by issuing a new loan contract $\{D', T'\}$ in the credit market, with D' being the payment promised to the new debtholders, and T' the maturity of the new loan. If s fails to obtain a new loan, the firm goes bankrupt and the game ends. If s succeeds in obtaining the new loan, the bargaining between s and w continues following the same protocol as in the main model. If s and w have yet to reach an agreement at time $\min\{\bar{t}(D'), T'\}$, the firm is unable to fulfill the new loan. s then tries again to obtain a new loan $\{D'', T''\}$ to pay the existing one.

The sequence of plays described above continues until either s and w agree on a division of surplus or the firm goes bankrupt, with potentially multiple instances of debt rollover along the way. The surplus available in the negotiation between s and w changes with the issuance of a new loan. For example, if the firm rolls over on its initial debt contract at the end of time t, the surplus on the bargaining table between s and w goes from $\delta^t - D$ at time t to $\delta^{t+1} - D'$ at time $t + 1$. To simplify the exposition, we set $\delta_c = 1$. Finally, since the modeling of the market for the initial debt obligation does not change here, we focus on the analysis of debt rollover in this section.

Equilibrium Analysis. We begin with describing the equilibrium strategies in the sub-games where s issues a new loan to pay off an existing debt. We conjecture (and verify) that debtholders always break even in expectation and that rollover occurs at most once off the equilibrium path.

First, suppose $T < \bar{t}(D)$. In this case, the first attempt to roll over occurs if the original debt contract expires before s and w reach an agreement. The zero-profit condition for the new loan is $-D + pD' = 0$, since the firm has to raise an amount D (to pay off the initial debt) and is able to repay the new loan only if the project succeeds, which occurs with probability p. Hence, s has to promise an amount $D' = \frac{D}{p}$ to the new debt-holders, so we must have $\delta^{T+1} > \frac{D}{p}$ (which is equivalent to $T < \bar{t}(\frac{D}{p})$) for the firm to be able to roll over on its initial debt. If this condition is

[9] The equilibrium is the same as in the main model when $D = 0$.

satisfied, s issues a new debt contract $\{D' = \frac{D}{p}, T' = \bar{t}(\frac{D}{p})\}$, and bargaining continues until at most time $\bar{t}(\frac{D}{p})$: Since $\delta^{\bar{t}(\frac{D}{p})+1} < \frac{D'}{p}$, the firm is not able to roll over on its debt again if s and w have yet to reach an agreement at time $\bar{t}(\frac{D}{p})$. If we have instead $\delta^{T+1} < \frac{D}{p}$, the firm cannot roll over on the original debt, so it goes bankrupt when s and w have yet to reach an agreement at time T.

Now suppose $T > \bar{t}(D)$. If s and w have yet to reach an agreement at time $\bar{t}(D)$, the firm is unable to fulfill its original debt contract even if the debt has not expired yet (due to the cost of the walkouts). In this case, s can never rollover on its debt obligation: Since we have $\delta^{\bar{t}(D)+1} < D < \frac{D}{p}$, s cannot promise a sufficiently large payment to new debtholders to be able to rollover on the firm's original obligation. Hence, the firm is not able to roll over on its initial debt when either $T > \bar{t}(D)$ or $\delta^{T+1} < \frac{D}{p}$. Since rollover never occurs in this case in any subgame of the full game, the equilibrium is the same as in our baseline model, where debt rollover is not allowed.

Summing up, we can write the maximal length of negotiations as $t^* = \min\left\{\max\{T, \bar{t}(\frac{D}{p})\}, \bar{t}(D)\right\}$. Similar to the main model, t^* increases with T and decreases with D. If $T > \bar{t}(\frac{D}{p})$, there is no debt rollover. So the game is the same as in our baseline model, and the surplus available in the negotiation between s and w changes only when the firm goes bankrupt, as it goes to 0 then. Otherwise, the firm rolls over on its debt if s and w have yet to reach an agreement at time T, and negotiations continue at most until $\bar{t}(\frac{D}{p})$. In this last case, the surplus changes both at bankruptcy and at rollover periods: the surplus is $\delta^t - D$ for $t \leq T$, $\delta^t - \frac{D}{p}$ for $T < t \leq \bar{t}(\frac{D}{p})$, and 0 for $t > \bar{t}(\frac{D}{p})$.

Having described how debt rollover unfolds in equilibrium, we can now characterize the equilibrium strategies in the bargaining game between s and w.

Proposition 7. *Fix the original debt structure (D, T), with $D > 0$. An equilibrium always exists, is unique, and has the following features:*

1. *Debt rollover occurs off the equilibrium path, only once and if $T < \bar{t}(\frac{D}{p})$, and with a contract $\{D' = \frac{D}{p}, T' = \bar{t}(\frac{D}{p})\}$. The last period before bargaining breaks down is $t^* = \min\left\{\max\{T, \bar{t}(\frac{D}{p})\}, \bar{t}(D)\right\}$.*
2. *Part 1 and Part 2 of Proposition 1 continue to hold.*

The characterization follows the same logic as in the main model, except that now the surplus available to negotiate changes when the firm issues a new loan. Let $z_j = \frac{D}{p}$ if the debt contract has already been rolled over at time j (that is, if $j > \min\{T, \bar{t}(D)\}$), and $z_j = D$ otherwise, for any $j > 0$). The last round of negotiations leaves the players with the following expected payoff:

$$v_s(t^*, t^*) = (1-\alpha)p(\delta^{t^*} - z_{t^*}); \;\; v_w(t^*, t^*) = \alpha p(\delta^{t^*} - z_{t^*}). \tag{38}$$

In the previous round of negotiations $(t^* - 1)$, s's offer is $y_{t^*-1} = \delta^{t^*-1} - z_{t^*-1} - \delta_w \alpha(\delta^{t^*} - z_{t^*})$, and w's offer is $y_{t^*-1} = \delta_s(1-\alpha)(\delta^{t^*} - z_{t^*})$. It follows that we have:

$$v_s\left(t^*-1, t^*\right) = (1-\alpha)[p(\delta^{t^*-1} - z_{t^*-1}) - \delta_w v_w(t^*, t^*)] + \alpha \delta_s v_s\left(t^*, t^*\right), \tag{39}$$

and $v_w\left(t^*-1, t^*\right) = \alpha[p(\delta^{t^*-1} - z_{t^*-1}) - \delta_s v_s(t^*, t^*)] + (1-\alpha)\delta_w v_w\left(t^*, t^*\right)$.

Continuing the sequence until a given time $t^* - r$, with $r < t^*$, we have:

$$v_s\left(t^*-r, t^*\right) = p\left(1-\alpha\right)\left\{\delta^{t^*-r} - z_{t^*-r} + \alpha\left(\delta_s - \delta_w\right)\sum_{j=t^*-r+1}^{t^*}\left(\delta^j - z_j\right)\left[\left(1-\alpha\right)\delta_w + \alpha\delta_s\right]^{j-r}\right\}. \tag{40}$$

Suppose the firm needs to issue a new loan to pay off its existing debt at a given time $t^* - r - 1$. s's expected continuation payoff is $v_s\left(t^*-r, t^*>0\right)$ as described in in Eqn. (40). Notice that $v_s\left(t^*-r, t^*>0\right)$ decreases with z_j for any $j > 0$. It follows that s is always better off if it promises the smallest possible payment to the new debtholders.

Notice also that equilibria in which debt rollover occurs more than once are not consistent with s's optimal strategy: The surplus on the negotiating table shrinks every time the firm rolls over on a previous debt contract (e.g., s has to promise $D'' = \frac{D'}{p} > D'$ for the firm to roll over also on the second debt contract), which induces smaller values for the sequence of z_j in Eqn. (40) and, as a result, a lower $v_s\left(t^*-r, t^*>0\right)$. Therefore, s sets the contract $\{D', T'\}$ so that there is no further rollover. Our initial conjecture that debtholders break even in expectation and that rollover occurs at most once off the equilibrium path is thus satisfied in equilibrium.

Continuing the sequence described above until time 0, we obtain s's expected share of surplus:

$$\mathbb{E}[y_0^*] = p(1-\alpha)\left\{1 - D + \alpha(\delta_s - \delta_w)\sum_{j=1}^{t^*}\left(\delta^j - z_j\right)[(1-\alpha)\delta_w + \alpha\delta_s]^{j-1}\right\}, \tag{41}$$

if $t^* > 0$, and $\mathbb{E}[y_0^*] = p(1-\alpha)(1-D)$ if $t^* = 0$. w's expected share is $p(1-D) - \mathbb{E}[y_0^*]$ for any $t^* \geq 0$.

It is worth emphasizing that the possibility of debt rollover affects the surplus available in the later rounds of negotiations and, thus, the share of surplus that goes to each player. However, players agree immediately in equilibrium, so debt rollover never actually occurs on the equilibrium path. The total surplus the players bargain over is thus the same as in the main model (that is, $1 - D$), even though its distribution between s and w is different (except when $T < \bar{t}(D)$ and $\delta^T < \mu k$, in which case debt rollover does not occur off the equilibrium path either).

Next, we describe how $\mathbb{E}[y_0^*]$ changes with the original debt structure (D, T).

Lemma 5. *In equilibrium, shareholders' expected share of surplus $\mathbb{E}[y_0^*]$ increases with the original debt maturity T and decreases with the original leverage D.*

Similar to the main model, $\mathbb{E}[y_0^*]$ increases with the firm's resilience to strikes, thus increasing with T and decreasing with D. Like for the previous extensions, our main insights about the strategic use of debt structure thus continue to hold in this version of the model.

We prove Lemma 5 below. First, we prove that $\mathbb{E}[y_0^*]$ increases with T. T affects both t^* and the rollover period. Suppose T goes from T' to $T'' > T'$. If $T'' < \bar{t}(\frac{D}{p})$, debt rollover occurs at T, and $t^* = \bar{t}(\frac{D}{p})$ at both T' and T''. Since the negotiation surplus shrinks after the rollover (z_j goes from D to $\frac{D}{p}$), and rollover occurs earlier at T', $\mathbb{E}[y_0^*]$ increases with T in this case. If $T' < \bar{t}(\frac{D}{p})$ but $T'' \geq \bar{t}(\frac{D}{p})$, we have $t^* = \bar{t}(\frac{D}{p})$ at T' and $t^* = \min\{T'', \bar{t}(D)\} > \bar{t}(\frac{D}{p})$ at T'', as rollover no longer occurs at T''. Since t^* is larger and z_j is always D at T'', $\mathbb{E}[y_0^*]$ increases with T also in this case. Finally, if $T' \geq \bar{t}(\frac{D}{p})$ rollover occurs for neither values of T. In this case, the equilibrium is the same as in our main model, where $\mathbb{E}[y_0^*]$ increases with T.

Next, we prove that $\mathbb{E}[y_0^*]$ decreases with D. Holding fixed t^* and the rollover period, an increase in D directly reduces $\mathbb{E}[y_0^*]$ by decreasing the negotiation surplus. Since the direct effect is always negative, we focus on the indirect effects in what follows. Suppose D goes from D' to $D'' > D'$. If $T < \bar{t}(\frac{D''}{p})$, debt rollover occurs at T, and $t^* = \bar{t}(\frac{D}{p})$ at both D' and D''. Since $\bar{t}(\frac{D}{p})$ decreases with D and $\mathbb{E}[y_0^*]$ increases with t^*, $\mathbb{E}[y_0^*]$ decreases with D in this case. If $T < \bar{t}(\frac{D'}{p})$ but $T \geq \bar{t}(\frac{D''}{p})$, we have $t^* = \bar{t}(\frac{D'}{p})$ at D' and $t^* = \min\{T, \bar{t}(D'')\} < \bar{t}(\frac{D'}{p})$ at D'', as rollover no longer occurs at D''. Since t^* is larger at D', and $z_j = D$ for at least as many periods as for D'' (at D', the debt is still rolled over at T, which is never smaller than $\min\{T, \bar{t}(D'')\}$), $\mathbb{E}[y_0^*]$ decreases with D also in this case. Finally, if $T \geq \bar{t}(\frac{D'}{p})$, rollover occurs for neither values of D. So we are back to the baseline model in this case, where $\mathbb{E}[y_0^*]$ always decreases with D.

B.5 Debt Renegotiation

In this section, we modify our main model to study the role of debt renegotiation – that is, the possibility that shareholders renegotiate the terms of their debt obligation when they are unable to fulfill the original obligation. The modeling of the debt renegotiation follows the literature on incomplete contracts (e.g., Hart and Moore (1994) and Hart and Moore (1998)).

We consider a simple protocol for the renegotiation of debt contracts. Renegotiation is only relevant when the firm has some debt obligation, so we focus on $D > 0$ in this section.[10] Let $\bar{t}(x)$ be such that $\delta^{\bar{t}(x)} \geq x > \delta^{\bar{t}(x)+1}$ for any $x > 0$. If s and w have yet to agree at time $\min\{\bar{t}(D), T\}$, so that the firm is unable to pay its debt, s offers a new contract $\{D', T'\}$ to debtholders. For simplicity, we assume that debtholders coordinate and act as a single agent ($\mathcal{D}$). $\mathcal{D}$ then chooses between accepting the new contract and forcing the firm into liquidation. In the case of liquidation, $\mathcal{D}$ seizes the firm's assets and receives a payoff μk, where $\mu \in (0, 1)$ captures the efficiency of liquidation. If $\mathcal{D}$ accepts the new contract, the bargaining between s and w continues following the same protocol as in the main model. If s and w have yet to reach an agreement at time $\min\{\bar{t}(D'), T'\}$, the firm is unable to fulfill also the renegotiated contract. s then offers another contract $\{D'', T''\}$ and $\mathcal{D}$ chooses again between liquidating the firm and accepting the new contract.[11]

The sequence of plays described above continues until either s and w agree on a division of surplus or $\mathcal{D}$ forces the firm into liquidation, with potentially multiple instances of debt renegotiation along the way. The surplus available in the negotiation between s and w changes with the renegotiation of debt contracts. For example, if the payment promised to $\mathcal{D}$ is renegotiated to D' at the end of time t, the surplus on the bargaining table between s and w goes from $\delta^t - D$ at

[10]The equilibrium is the same as in the main model when $D = 0$.

[11]An implicit assumption in the modeling of renegotiation is that both s's and w's human capitals are essential and inalienable for the firm's production, so $\mathcal{D}$ cannot seize control of the firm and replace either party when the firm breaches a given contract.

time t to $\delta^{t+1} - D'$ at time $t+1$. To simplify the exposition, we assume that $\mathcal{D}$ does not discount future payments. The remaining elements of the model are the same as in our baseline model.

Equilibrium Analysis. We begin with describing the equilibrium strategies in the debt renegotiation sub-games. We first focus on equilibria where renegotiation occurs at most once off the equilibrium path and show that such an equilibrium always exists and is unique. We then show that equilibria where renegotiation occurs more than once may also exist, but players' expected payoff and bargaining strategies in such equilibria are the same as in the one where renegotiation occurs at most once. We conjecture (and verify) that, in case of renegotiation, s offers a new contract that makes $\mathcal{D}$ indifferent between accepting the new contract and liquidating the firm.

First, consider the case where $T \leq \bar{t}(D)$, so that the first renegotiation is triggered when the debt expires before s and w agree. If $\delta^T \leq \mu k$, which is equivalent to $T \geq \bar{t}(\mu k)$, the residual surplus is not enough to convince $\mathcal{D}$ to renegotiate: s cannot promise a payment D' large enough to dissuade $\mathcal{D}$ from liquidating the firm. Therefore, if $T \in [\bar{t}(\mu k), \bar{t}(D)]$, the firm is liquidated when it breaches the original debt contract. Since renegotiation does not occur in any subgame, the equilibrium is the same as in the model where debt renegotiation is not allowed.

Now consider the case when $T \leq \bar{t}(D)$ but $\delta^T > \mu k$, and s and w have yet to reach an agreement at time T. In this case, s offers a new contract $\{D' = \mu k, T' = \bar{t}(\mu k)\}$, which makes $\mathcal{D}$ indifferent between accepting the contract and liquidating the firm. $\mathcal{D}$ accepts the new contract, and the bargaining between s and w can continue at most until time $\bar{t}(\mu k)$: Since $\delta^{\bar{t}(\mu k)+1} < \mu k$, $\mathcal{D}$ would prefer to liquidate the firm if it were to breach also the renegotiated contract. The same outcome occurs when $T > \bar{t}(D)$ and s and w have yet to reach an agreement at time $\bar{t}(D)$.

We can then write the maximal length of the wage negotiations as follows:

$$t^* = \begin{cases} T & \text{if } T \in [\bar{t}(\mu k), \bar{t}(D)]; \\ \bar{t}(\mu k) & \text{otherwise.} \end{cases} \tag{42}$$

In the first case in Eqn. (42), the surplus available in the wage negotiations is $\delta^t - D$ for $t \leq T$, and 0 for $t > T$ (as the firm is liquidated if s and w have yet to agree at time T). In the second case, the surplus is $\delta^t - D$ for $t \leq \min\{T, \bar{t}(D)\}$, $\delta^t - \mu k$ for $t \in (\min\{T, \bar{t}(D)\}, \bar{t}(\mu k)]$, and 0 for $t > \bar{t}(\mu k)$.

The value of t^* is uniquely pinned down in equilibrium. However, when $T \notin [\bar{t}(\mu k), \bar{t}(D)]$, there are multiple debt renegotiation paths that lead to the same equilibrium outcomes. For example, s could offer a contract $\{D' = \mu k, T' = \bar{t}(\mu k) - 1\}$, when the firm breaches the first debt contract, and then a new contract $\{D'' = \mu k, T'' = \bar{t}(\mu k)\}$, when it breaches the second one, with $\mathcal{D}$ accepting both contracts in the continuation game. However, the renegotiation of the second contract does not affect t^* or the surplus available to negotiate, so it is without loss of generality to consider the equilibria in which only the original debt contract is renegotiated off the equilibrium path.

Having described how debt is renegotiated along the equilibrium path, we can now characterize the equilibrium strategies in the bargaining game between s and w.

Proposition 8. *Fix the original debt structure (D, T), with $D > 0$. An equilibrium where renegotiation occurs at most once off the equilibrium path always exists, is unique, and has the following features:*

1. *Debt renegotiation occurs off the equilibrium path and only if $T \notin [\bar{t}(\mu k), \bar{t}(D)]$, and the renegotiated contract is $\{D' = \mu k, T' = \bar{t}(\mu k)\}$. The last period before bargaining breaks down is t^* in Eqn. (42).*

2. *Part 1 and Part 2 of Proposition 1 continue to hold.*

The characterization of the equilibrium of the bargaining stage follows the same logic as in the main model, except that now the surplus available to negotiate changes when the debt contract is renegotiated. Let $z_j = \mu k$ if the debt contract has already been renegotiated at time j (that is, if $j > \min\{T, \bar{t}(D)\}$), and $z_j = D$ otherwise, for any $j > 0$). The last round of negotiations (time t^*) leaves the players with the following expected payoff:

$$v_s(t^*, t^*) = (1 - \alpha)(\delta^{t^*} - z_{t^*}); \;\; v_w(t^*, t^*) = \alpha(\delta^{t^*} - z_{t^*}). \tag{43}$$

In the previous round of negotiations ($t^* - 1$), s's offer is $y_{t^*-1} = \delta^{t^*-1} - z_{t^*-1} - \delta_w \alpha(\delta^{t^*} - z_{t^*})$, and w's offer is $y_{t^*-1} = \delta_s(1 - \alpha)(\delta^{t^*} - z_{t^*})$. It follows that we have:

$$v_s\left(t^* - 1, t^*\right) = (1 - \alpha)\left(\delta^{t^*-1} - z_{t^*-1} - \delta_w \alpha(\delta^{t^*} - z_{t^*}\right) + \alpha \delta_s v_s\left(t^*, t^*\right), \tag{44}$$

and $v_w(t^*-1, t^*) = \delta^{t^*-1} - z_{t^*-1} - v_s(t^*-1, t^*)$.

Continuing the sequence until a given time $t^* - r$, with $r < t^*$, we have:

$$v_s(t^*-r, t^*>0) = (1-\alpha)\left\{\delta^{t^*-r} - z_{t^*-r} + \alpha(\delta_s - \delta_w)\sum_{j=t^*-r+1}^{t^*}\left(\delta^j - z_j\right)[(1-\alpha)\delta_w + \alpha\delta_s]^{j-r}\right\}, \quad (45)$$

and $v_w(t^*-r, t^*) = \delta^{t^*-r} - z_{t^*-r} - v_s(t^*-r, t^*)$.

Suppose the firm breaches the debt contract at time $t^* - r - 1$, so that s has to renegotiate it with $\mathcal{D}$. s's expected continuation payoff is $v_s(t^*-r, t^*>0)$, which decreases with z_j for any $j > 0$. It follows that s is always better off if it promises the smallest possible payment to $\mathcal{D}$ (i.e., a payment μk) when it renegotiates a debt contract. So our initial conjecture that s makes $\mathcal{D}$ indifferent between accepting the new contract and liquidating the firm is always satisfied in equilibrium.

Continuing the sequence described above until time 0, we obtain s's expected share of surplus:

$$\mathbb{E}[y_0^*] = (1-\alpha)\left\{1 - D + \alpha(\delta_s - \delta_w)\sum_{j=1}^{t^*}\left(\delta^j - z_j\right)[(1-\alpha)\delta_w + \alpha\delta_s]^{j-1}\right\}, \quad (46)$$

if $t^* > 0$, and $\mathbb{E}[y_0^*] = (1-\alpha)(1-D)$. w's expected share of surplus is $1 - D - \mathbb{E}[y_0^*]$ for $t^* \geq 0$.

The possibility of debt renegotiation affects the surplus available to negotiate in the following rounds of negotiations and, thus, the share of surplus that goes to each player in equilibrium. However, an agreement is reached immediately in equilibrium, so the debt contract is never actually renegotiated on the equilibrium path. The surplus players bargain over is thus the same as in the main model (i.e., $1 - D$), even though its distribution between s and w is different (except when $T \in [\bar{t}(\mu k), \bar{t}(D)]$, in which case debt is not renegotiated off the equilibrium path either).

Lemma 6. *In equilibrium, shareholders' expected share of surplus $\mathbb{E}[y_0^*]$ may increase or decrease with both the original debt maturity T and leverage D.*

The comparative statics in Lemma 6 differ from those we obtain in the baseline model, since $\mathbb{E}[y_0^*]$ may now decrease with T and increase with D, which was never the case in the main model. Below, we first briefly discuss the intuition behind the results and then proceed to formally prove the lemma. A more detailed discussion of the results is at the end of this section.

If $\delta^T > D > \mu k$, the debt contract is renegotiated when the bargaining continues beyond time T (since $\delta^T > D$ implies $\min\{T, \bar{t}(D)\} = T$). Through the renegotiation, s obtains a reduction in the payment promised to $\mathcal{D}$ (since $D > \mu k$), which increases the surplus available in the continuation of the bargaining game between s and w. Since w is more impatient than s, s benefits relatively more from the increase in future surplus. When T is smaller, debt is renegotiated earlier, and there are thus more rounds of negotiations with relatively more surplus. So $\mathbb{E}[y_0^*]$ decreases with T in this case. By a similar logic, when $D < \mu k$, and D increases slightly so that $\bar{t}(D)$ goes down and debt is renegotiated earlier, $\mathbb{E}[y_0^*]$ may increase with D.

If $\min\{\mu k, \delta^T\} \geq D$, we recover the result that $\mathbb{E}[y_0^*]$ always increases with T and decreases with D. If $\mu k > \delta^T \geq D$, $\mathcal{D}$ prefers to liquidate the firm when it breaches the debt contract, so there is no renegotiation off the equilibrium path either and we are back to our main model. If $\delta^T > \mu k \geq D$, if the firm breaches the contract, $\mathcal{D}$ agrees to extend the debt maturity but also requires a larger payment (since $\mu k \geq D$). When T is smaller, debt is renegotiated earlier, and there are thus more rounds of negotiations with relatively less surplus. It follows that $\mathbb{E}[y_0^*]$ increases with T and decreases with D, as the negotiation surplus always decreases with D in this case.

We prove Lemma 6 below. Let $\mathbb{E}[y_0^*(T)]$ denote the value of $\mathbb{E}[y_0^*]$ as a function of T. Suppose T goes from $T' = 1$ to $T'' = 2$, and δ, D, and μk are such that $\bar{t}(\mu k) = \bar{t}(D) = 3$. Since $T < \bar{t}(\mu k)$, renegotiation occurs at time T and $t^* = 3$ at both T' and T''. We can then write $\mathbb{E}[y_0^*(2)] - \mathbb{E}[y_0^*(1)] = -(1-\alpha)\alpha(\delta_s - \delta_w)[(1-\alpha)\delta_w + \alpha\delta_s](D - \mu k)$. $\mathbb{E}[y_0^*(2)] - \mathbb{E}[y_0^*(1)]$ is then positive if $\mu k > D$, and negative otherwise, which proves that $\mathbb{E}[y_0^*]$ may increase or decrease with T. Next, we prove that $\mathbb{E}[y_0^*]$ may increase or decrease with D. Let $\mathbb{E}[y_0^*(D)]$ denote the value of $\mathbb{E}[y_0^*]$ as a function of D. Suppose D goes from D' to $D'' > D'$, where $D' = \delta^2$, and $D'' \in (\delta^2, \delta)$. For simplicity, set also $\delta_s = 1$, $\delta_w = 0$, $\mu k = \delta^3$, and $T > 3$. In this example, we have $t^* = 3$, and renegotiation occurring at time $\bar{t}(D') = 2$ at D', and at time $\bar{t}(D'') = 1$ at D''. We can then write $\mathbb{E}[y_0^*(D'')] - \mathbb{E}[y_0^*(D')] = (1-\alpha^3)\delta^2 - (1-\alpha^2)D'' - (1-\alpha)\alpha^2\mu k$. At $\alpha = \frac{1}{2}$, $\mathbb{E}[y_0^*(D'')] - \mathbb{E}[y_0^*(D')]$ is positive for $D'' \in (\delta^2, \frac{1}{6}\delta(7\delta - \delta^2))$, and negative for $D'' \in (\frac{1}{6}\delta(7\delta - \delta^2), \delta)$.

Discussion of Results. The possibility of debt renegotiation adds more nuances to how the firm's debt structure influences its negotiations with labor. First, renegotiation weakens the link between the maximal length of wage negotiations t^* and the original debt obligation: conditional on renegotiation occurring off the equilibrium path, t^* no longer depends on (D, T). Second, if the debt payment is renegotiated downward, the surplus available in the rounds of bargaining that follow the debt renegotiation increases. Since w is less patient, the increase in surplus improves s's bargaining position, as it would be less costly for s to haggle until renegotiation occurs. This creates an incentive for s to lower maturity, so renegotiation occurs earlier off the equilibrium path.

There are, however, a number of caveats to these nuances. First, when renegotiation is triggered by the expiration of the original maturity ($T \leq \bar{t}(D)$), the debt payment is renegotiated *upward* if $D \leq \mu k$. It is worth noticing that, if the debt contract is generally not enforceable (that is, even when the profits are sufficient to pay D, like in Hart and Moore 1994), $D > \mu k$ is not "renegotiation-proof" and so not feasible in equilibrium: $\mathcal{D}$ anticipates that any $D > \mu k$ would be renegotiated down to $D' = \mu k$ also on the equilibrium path. So s is restricted to choose $D \leq \mu k$ in this case.

Second, if $D > \mu k$ and debt renegotiation occurs off the equilibrium path, the maximal length of wage negotiations $\bar{t}(\mu k)$ may be relatively short. So s may still be better off choosing (D, T) such that renegotiation never occurs also off the equilibrium path. Finally, to simplify the analysis, we have abstracted from coordination problems among creditors and shareholders' reputational concerns with breaching the original debt contract (see Appendix B for references to some of the literature on these issues). A simple way to include these frictions in our model is to assume that renegotiating the original debt contract imposes a private cost c on s. A sufficient condition for debt renegotiation to never occur both on and off the equilibrium path would be $c \geq \delta^{\min\{\bar{t}(D),T\}+1} - \mu k$.[12]

[12]The surplus s receives in the continuation of the wage negotiations following debt renegotiation cannot be higher than $\delta^{\min\{\bar{t}(D),T\}+1} - \mu k$. So if $\delta^{\min\{\bar{t}(D),T\}+1} - \mu k - c \leq 0$, s is always better off not renegotiating the original contract.

C Data Appendix

C.1 List of data sources

C.1.1 Compustat

The Compustat Annual updates dataset contains balance sheet and income statement information for firms. The dataset covers the period from 1950 to 2020. Our sample includes all publicly traded US firms, excluding those in the financial sector (SIC code 60) and utilities (SIC code 49). We use this dataset for various empirical analyses. In Section 4.1, we employ the headquarters location information in Compustat to match it with the adoption of RWLs across different US states. Following the approach of Fortin et al. (2023), the sample period for this analysis is from 2007 to 2019, excluding states that had already adopted these laws before 2007. In Section 5.1, we combine the Compustat data with the Bloomberg BNA dataset, which provides information on labor-firm negotiations. The sample period for this analysis is from 1986 to 2020. In Section E, we match the Compustat data with a sample of union elections collected from the National Labor Relations Board. The sample period for this analysis spans from 1977 to 2014.

C.1.2 Strikes data

The data, available on the US Bureau of Labor Statistics website, includes information on work stoppages (strikes) of US companies. The sample consists of labor strikes involving more than 1,000 workers and covers the period from 1993 to 2019. To link this dataset with financial information, we matched it with the Compustat quarterly dataset using company names. This allowed us to obtain financial data for the firms whose workers were involved in a strike. The financial information was used to create Figure 1.

C.1.3 Labor negotiations

The dataset provides information on labor negotiations, including the employer's name, industry classification, union name, agreement date, contract duration, and a summary of the deal. We sourced this data from the Settlement Summaries database of Bloomberg BNA, which collects information on union-firm negotiations from Bloomberg BNA reports, union publications, and other press sources. To link this dataset with Compustat, we used the employers' names as identifiers, as Bloomberg BNA data does not have direct connections with Compustat identifiers. Through a string-matching procedure and manual checks, we identified 470 unique firms and 1,288 labor negotiations spanning the period from 1986 to 2020.

C.1.4 Union elections

This dataset contains information on union certifications of establishments within US firms. The data is collected from two different sources: data from 1977 to 1999 is provided by Holmes (2006), and data from 2000 to 2014 is hand-collected from the National Labor Relations Board (NLRB). We matched this dataset with Compustat using the company names. Through a string-matching procedure and manual checks, we identified 1,463 firm-year elections for 1,246 unique firms. To avoid overlapping elections within different establishments of the same parent company, we ensured that firms had not hosted an election in the previous four years. The sample size varies depending on the availability of financial information in Compustat, and the number of observations is reported in all tables.

The union certification process begins with the filing of a petition and associated documents with the NLRB Regional office, indicating support from at least 30% of employees. Once the NLRB confirms the possibility of an election, it works with the employer, the union, and other involved parties to agree on the date, location, language, and eligible workers for voting on union representation. In the final step of the certification process, eligible workers cast their votes via a secret ballot to determine whether they support union representation. If more than 50% of the votes are in favor of the union, the unit of eligible workers becomes unionized. Once the union is certified as the exclusive bargaining representative for employees, failure to engage in collective bargaining becomes an unfair labor practice.

C.1.5 Labor organizations membership and financials

This dataset contains information on the balance sheets and income statements of US labor organizations. The data is maintained by the US Department of Labor. Labor organizations that fall under the Labor Management Reporting and Disclosure Act (LMRDA), the Civil Service Reform Act (CSRA), or the Foreign Service Act (FSA) are required to submit a financial report, either Form LM-2, LM-3, or LM-4, to the Office of Labor-Management Standards (OLMS) of the US Department of Labor each year. These laws apply to labor organizations representing employees in private industry, the US Postal Service, and most federal government employees. Labor organizations representing state, county, or municipal government employees are not covered by these laws and are not obligated to file.

The filing requirements for labor organizations depend on their total annual receipts. The term "total annual receipts" refers to all the financial receipts the labor organization receives during its fiscal year, regardless of the source. Labor organizations with total annual receipts of $250,000 or more are required to file Form LM-2, those with total annual receipts of $10,000 or more but less than $250,000 must file Form LM-3, and labor organizations with total annual receipts of less than $10,000 are required to file Form LM-4. In our sample, we include all labor organizations that filed Forms LM-2 and LM-3. The data spans from 2000 to 2022, but the specific time period used for each table depends on the test and is specified accordingly. Table 2 presents summary statistics for all relevant variables.

Variable Label	Description
	Panel A: Main dependent variables
Book leverage	Ratio between the total book value of debt (Compustat variables dltt + dlc) over the total value of assets.
Market leverage	Ratio between the book value of debt (Compustat variables dltt + dlc) over the sum of market value of equity (Compustat variables csho times prcc_f) plus the book value of debt.
Inventory	Ratio between the value a firm's total inventory (Compustat variable *invt*) and the cost of good sold (Compustat variable *cogs*).
LT debt ratio(>3Y)	The ratio between debt maturity longer than three years (Compustat variables dltt - dd2 - dd3) over the total value of assets (Compustat variable at).
LT debt ratio(>5Y)	The ratio between debt with maturity longer than three years (Compustat variables dltt - dd2 - dd3 - dd4 - dd5) over the total value of assets (Compustat variable at).
ST debt ratio (≤3Y)	The ratio between debt maturing withing three years (Compustat variables dd2 + dd3) and the total asset value (Compustat variable at).
Debt mat.(>3Y)	Fraction of debt with maturity longer than three years. It is computed as the dollar value of debt with maturity longer than three years (Compustat variables dltt - dd2 - dd3) over the total dollar value of debt (Compustat variables dltt + dlc).
Debt mat.(>5Y)	Fraction of debt with maturity longer than three years. It is computed as the dollar value of debt with maturity longer than three years (Compustat variables dltt - dd2 - dd3 - dd4 - dd5) over the total dollar value of debt (Compustat variables dltt + dlc).

(Continued)

Variable Label	Description
Wage increase	The % wage increase from the negotiation of collective agreements between a firm and the representative union.
Cumulative wage increase	The three-year cumulative % wage increase from the negotiation of collective agreements between a firm and the representative union.
	Panel B: Labor negotiations
Negotiation	An indicator variable equal to one in the year a firm negotiates a collective agreement with a union, and zero otherwise.
Bargaining unit	Number of employees involved in a given firm-union negotiation of a collective bargaining agreement.
Bargaining unit (tot)	Total number of employees with which a firm has negotiated a collective bargaining agreement in a year.
Share of employees	The ratio between the total number of employees with which a firm has negotiated a collective bargaining agreement in a year and the total number of its employees (Compustat variable *emp*).
	Panel C: Union elections
Total votes	Number of valid votes cast in an election at the firm's establishment level.
Votes for union	Number of valid votes cast in an election in favor of the unionization of the firm's establishment.
Votes against union	Number of valid votes cast in an election against the unionization of the firm's establishment.
Eligible voters	Total number of employees with the right to vote in an union election.

(Continued)

Variable Label	Description
Share of votes	The ratio between the variable *Votes for Union* and the variable *Total Votes*.
Dummy win	Dummy variable which takes value one if the union is the winner of a given election, and zero otherwise.
Union coverage	Fraction of worker in an industry covered by a collective bargaining agreement or a union contract. Data is from Union Membership and Coverage Database at www.unionstats.com , maintained by Barry Hirsch and David Macpherson.
	Panel D: Firm-level controls
Total asset	Total value of assets (Compustat variable at).
Total debt	Total value of debt outstanding (Compustat dltt plus dlc).
Cash	Ratio between cash and short term investment (Compustat variable che) and the total value of assets.
Market-to-book (M/B)	Ratio of market value of assets (Compustat variables at plus csho times prcc_f-ceq) over the total value of assets.
Size	Natural logarithm of the sales.
Collateral (Cltr)	Ratio between the sum of inventories (Compustat variable *invt*) and property, plant and equipment (Compustat variable *ppent*) over the total value of assets.
Profitability (ROA)	The ratio of earnings before interest, taxes, depreciation and amortization (Compustat variable *ebitda*) scaled by the total value of assets.
Pre-tax income	The ratio between earnings before interest and tax plus interest income minus interest expense (Compustat variable *pi*) scaled by the total value of assets.

(Continued)

Variable Label	Description
Net income	The ratio between income or loss reported by a company after expenses and losses have been subtracted from all revenues and gains including extraordinary items (Compustat variable *ni*) scaled by the total value of assets.
Z-Score	The modified Altman Z-Score, which is computed as $$\begin{aligned} \text{Z-Score} =& 3.3\frac{\text{EBITDA}}{\text{total assets}} + \frac{\text{sales}}{\text{total assets}} \\ &+ 1.4\frac{\text{retained earnings}}{\text{total asset}} + 1.2\frac{\text{working capital}}{\text{total assets}} \end{aligned} \quad (47)$$
	Panel E: State-level controls
GDP growth	State-level gross domestic product (GDP) growth rate. Data are from the Bureau of Economic Analysis.
Unempl. rate	State-level unemployment rate. Data is from the regional and state employment and unemployment by the US Bureau of Labor Statistics.
House price index	State-level house prices index (HPI). The HPI is a weighted, repeat-sales index. It measures average price changes in repeat sales or refinancing on the same properties. Data are from the Federal Housing Finance Agency (FHFA).[13]
	Panel F: Labor organization membership and financials
Receipts	Total value of union receipts. Statement B of the LM-2 (item 49) and LM-3 (item 44) forms from the Labor Organization Annual Report. Mandatory filings for labor organizations with more than $10,000 in total annual receipts.

(Continued)

[13]The Federal Housing Finance Agency is an independent federal agency created as the successor regulatory agency resulting from the statutory merger of the Federal Housing Finance Board (FHFB), the Office of Federal Housing Enterprise Oversight (OFHEO), and the US Department of Housing and Urban Development.

Variable Label	Description
Assets	Total value of a union assets. Statement A of the LM-2 and LM-3 forms.
Leverage	Ratio between the total book value of liabilities and the total value of assets.
Cash	Total value of cash holding. Statement A of the LM-2 and LM-3 forms.
Members	Number of union members at the end of the reporting period. Schedule 13 of LM-2 form and item 19 of LM-3 form.
Fees	The total value of dues and agency fees. Statement B of the LM-2 (item 36) and LM-3 (item 38) forms.
Strike funds	An indicator variable equal to one if a union has used funds to support strike activities, and zero otherwise. Statement B of the LM-2 (item 57) and LM-3 (item 50) forms.

Table IA1. (Summary statistics – RWLs) The table presents summary statistics for the sample used in the difference-in-differences analysis discussed in Section 4.1. The statistics are derived from a sample of firms with complete data for the maturity and leverage variables, which are our main outcome variables. We follow the approach of Fortin et al. (2023) and analyze data from the period between 2007 and 2019, excluding states that implemented RWLs laws before 2007. This sample is used to estimate the difference-in-differences specification presented in Equation (2). Financial variables are winsorized at the 1% tails. Refer to the Variable List and Description table for more details about variables' definition and computation.

	Mean	Std. Dev.	Min	Median	Max
	Panel A. Dependent variables				
Book leverage	0.164	0.217	0.000	0.036	0.874
Market leverage	0.149	0.219	0.000	0.023	0.917
LT debt ratio (>3Y)	0.095	0.162	0.000	0.000	0.989
LT debt ratio (>5Y)	0.062	0.122	0.000	0.000	0.989
ST debt ratio (≤1Y)	0.021	0.074	0.000	0.000	0.987
ST debt ratio (≤3Y)	0.024	0.058	0.000	0.000	0.904
Debt mat.(>3Y)	0.482	0.374	0.000	0.552	1.000
Debt mat.(>5Y)	0.329	0.325	0.000	0.260	1.000
	Panel B. Firm characteristics				
Total asset ($M)	3104.059	7643.268	0.361	189.064	37125.238
Total Debt ($M)	874.113	2204.546	0.000	0.884	10445.342
Cash	0.321	0.299	0.000	0.214	0.952
Investment	0.040	0.060	0.000	0.022	0.436
Market-to-book	3.122	4.339	0.520	1.692	23.209
Collateral	0.256	0.244	0.000	0.182	1.000
Firm size	5.168	3.015	-2.364	5.376	10.361
Profitability (ROA)	-0.028	0.369	-2.000	0.085	0.625
Z-score	4.488	15.971	-37.852	3.091	68.746

Table IA2. (Summary statistics – Negotiations) The table reports summary statistics for the sample of firms undergoing negotiations of collective bargaining agreements with unions. Data on labor negotiations is from Settlement Summaries database of Bloomberg BNA. Sample period goes from 1986 to 2020. Financial variables have been winsorized at 1% tails. Refer to the Variable List and Description table for more details about variables' definition and computation.

	Mean	Std. Dev.	Min	Median	Max
	Panel A. Dependent variables				
Book leverage	0.305	0.175	0.000	0.284	0.874
Market leverage	0.306	0.217	0.000	0.259	0.917
LT debt ratio (>3Y)	0.210	0.155	0.000	0.185	0.985
LT debt ratio (>5Y)	0.149	0.130	0.000	0.122	0.977
ST debt ratio (≤1Y)	0.021	0.043	0.000	0.009	0.975
ST debt ratio (≤3Y)	0.052	0.063	0.000	0.031	0.666
Debt mat.(>3Y)	0.666	0.247	0.000	0.710	1.000
Debt mat.(>5Y)	0.480	0.262	0.000	0.485	1.000
	Panel B. Negotiations				
Bargaining unit	4758.890	10907.629	10.000	1200.000	73,000
Bargaining unit (tot)	6813.815	16593.125	10.000	1400.000	107,000
Share of employees	0.138	0.210	0.000	0.051	1.000
Wage increase (%) - First year	4.253	5.821	0.000	3.000	37.000
Cum. wage increase (three years)	11.082	15.115	0.000	7.689	81.585
	Panel C. Firm characteristics				
Total asset ($M)	8288.659	10899.769	0.493	3189.677	37125.238
Total Debt ($M)	2360.112	3105.975	0.000	927.100	10445.342
Cash	0.073	0.092	0.000	0.041	0.952
Investment	0.058	0.047	0.000	0.046	0.436
Market-to-book	1.608	0.820	0.520	1.390	23.209
Collateral	0.497	0.224	0.000	0.507	1.241
Firm size	7.991	1.617	-1.726	8.072	10.361
Profitability (ROA)	0.146	0.091	-3.099	0.140	0.625
Z-score	3.135	2.248	-28.981	2.793	68.746

Table IA3. (Summary statistics – Union elections) The table reports summary statistics for variables of firms holding union elections. Financial information is from Compustat. Union election data is from Holmes (2006) for the period 1977-1999. Data from 2000 to 2014 is hand-collected from the National Labor Relations Board website. The sample consists of 1,463 firm-year observations (1,246 unique firms) for which we have information about union elections, and there is a four-year gap between elections held within the same firm. Financial variables have been winsorized at 1% tails. Refer to the Variable List and Description table for more details about variables' definition and computation.

	Mean	Std. Dev.	Min	Median	Max
	Panel A. Dependent variables				
Book leverage	0.286	0.180	0.000	0.265	0.870
Market leverage	0.330	0.220	0.000	0.303	0.939
LT debt ratio (>3Y)	0.181	0.155	0.000	0.154	0.984
LT debt ratio (>5Y)	0.137	0.133	0.000	0.108	0.984
Debt mat. (>3Y)	0.611	0.260	0.000	0.669	1.000
Debt mat. (>5Y)	0.460	0.258	0.000	0.477	1.000
	Panel B. Union elections				
Win	0.357	0.479	0.000	0.000	1.000
Share of votes	0.456	0.218	0.000	0.418	1.000
Eligible voters	222.304	362.365	50	119	5300
	Panel C. Firm characteristics				
Total asset ($M)	3534.703	7222.587	0.762	595.338	31189.223
Total Debt ($M)	974.012	2035.448	0.000	147.350	8784.787
Cash	0.070	0.084	0.000	0.038	0.613
Investment	0.078	0.062	0.000	0.063	0.453
Market-to-book	1.078	0.923	0.074	0.982	16.456
Collateral	0.577	0.189	0.000	0.603	0.936
Firm size	6.741	1.981	-2.659	6.702	10.248
Profitability (ROA)	0.150	0.094	-1.205	0.149	0.442
Z-score	3.641	2.828	-2.423	3.152	56.447

Table IA4. (Summary statistics – Compustat-Capital IQ merged dataset) The table contains summary statistics for the merged Compustat-Capital IQ capital structure dataset. There are 8,308 unique firms for 51,443 firm-year observations.The sample period is from 2007 to 2019.

	Mean	Std. Dev.	Min	Median	Max
Commercial paper	0.006	0.039	0.000	0.000	1.000
Revolving debt	0.305	0.352	0.000	0.145	1.000
Term loans	0.260	0.337	0.000	0.066	1.000
Bonds and notes	0.324	0.358	0.000	0.170	1.000
Capital lease	0.061	0.197	0.000	0.000	1.000
Hybrid securities	0.001	0.011	0.000	0.000	0.734
Other borrowings	0.043	0.146	0.000	0.000	1.000

Table IA5. (Summary statistics – CDS dataset) This table reports summary statistics for the Credit Default Swap (CDS) dataset matched with Compustat. Sample selection and period follow Fortin et al. (2023). Specifically, we exclude US states that have adopted RWLs before 2007 and stop our sample in 2019 to avoid confounding effects due to the Covid-19 pandemic. The sample comprises 217 unique firms and 2,076 firm-year observations with no missing data for 5-year CDS spread data. Financial variables are winsorized at 1% tails. Refer to the Variable List and Description table for more details about variables' definition and computation.

	Mean	Std. Dev.	Min	Median	Max
Par-spread 1Y	0.013	0.088	0.000	0.003	2.632
Par-spread 5Y	0.020	0.058	0.000	0.009	1.615
Par-spread 10Y	0.023	0.051	0.001	0.012	1.468
Par-spread 30Y	0.023	0.042	0.001	0.014	1.129
Recovery rate	0.388	0.036	0.094	0.400	0.577
Leverage	0.309	0.165	0.000	0.285	0.874
Cash	0.120	0.110	0.001	0.087	0.952
LT debt ratio(>5Y)	0.130	0.095	0.000	0.112	0.708
Market-to-book	1.842	0.846	0.566	1.614	9.432
Profitability (ROA)	0.140	0.093	-2.194	0.136	0.431
Collateral	0.326	0.189	0.008	0.302	0.897

Table IA6. (List of states adopting RWLs) This table reports the years in which US states adopted RWLs. Given Compustat data availability, every change that happened before 1950 will not be captured by our difference-in-differences model. Data can be found at https://www.ncsl.org/research/labor-and-employment/right-to-work-laws-and-bills.aspx

State	*Year RWLs*	*Introduction*	*State*	*Year RWLs*	*Introduction*
Alabama	1953		Nebraska	1946	
Alaska	No		Nevada	1951	
Arizona	1946		New Hampshire	No	
Arkansas	1947		New Jersey	No	
California	No		New Mexico	No	
Colorado	No		New York	No	
Connecticut	No		North Carolina	1947	
Delaware	No		North Dakota	1947	
District of Columbia	No		Ohio	No	
Florida	1944		Oklahoma	2001	
Georgia	1947		Oregon	No	
Hawaii	No		Pennsylvania	No	
Idaho	1985		Rhode Island	No	
Illinois	No		South Carolina	1954	
Indiana	2012		South Dakota	1946	
Iowa	1947		Tennessee	1947	
Kansas	1958		Texas	1947	
Kentucky	2017		Utah	1955	
Louisiana	1976		Vermont	No	
Maine	No		Virginia	1947	
Maryland	No		Washington	No	
Massachusetts	No		West Virginia	2016	
Michigan	2012		Wisconsin	2015	
Minnesota	No		Wyoming	1963	
Mississippi	1954				
Missouri	No				
Montana	No				

D Additional Robustness

D.1 Correlation between Debt Structure and industry-level unionization

Table IA7 reports results from a panel regression estimating the correlation between firms' maturity or leverage and industry-level union coverage. Consistent with the idea that union coverage partly determines union's bargaining power, results show that firms with large union coverage are more likely to exhibit longer debt maturities.

D.2 Correlation between industry-level union coverage and average union membership

Figure IA3 shows the union coverage and average union membership for the top 10 and bottom 10 industries in terms of coverage and reports the correlation across all industries. Industries with higher coverage are not the industries with the largest unions, which are the ones that can respond by increasing fees in response to RWLs.

D.3 Additional Robustness Regarding RWLs

D.3.1 Validity of DiD design

Figures IA4 and IA5 repeats the estimation of Figure 2 following Borusyak et al. (2022) and Cengiz et al. (2019), respectively.

D.3.2 Margins of Response – Robustness

Figure IA6 provides evidence on alternative margins of response to increase financial resilience following changes in RWLs. Inventory and cash are not the main margins of response following the passage of RWLs.

D.3.3 Heterogeneous Response to RWLs Conditional on Union Coverage

Table IA8 reports the results from estimating the DID model in Equation (2) for leverage and maturity, measured as percentage of long-term and short-term debt, for high union coverage industries as classified by Fortin et al. (2023). Estimates in Panel A show a statistically significant reduction in the long-term debt ratio. Recall that we find a 1.7–1.9 percentage points reduction in the long-term debt ratio (LT debt ratio (>5Y) variable) following the passage of RWLs (columns 1 and 2). Columns (3) to (6) underline that most of the effect comes from the subsample of relatively more unionized industries. Moreover, highly unionized industries increase their use of short-term debt as they decrease their reliance on long-term debt (columns 3–4 of Panel C). This across-group difference is statistically significant, as shown by results in Columns (7) and (8), where we estimate a triple difference-in-differences specification. Firms in industries with relatively higher union coverage reduce debt maturity more than those in all other industries (note that we follow Fortin et al. (2023) in selecting high union industries).

Panel B of Table IA8 reports the results for the book leverage. The estimates in Columns (1) and (2) provide evidence in favor of strategic leverage: firms reduce their debt ratios in response to the adoptions of RWLs. However, the subsample analysis and the triple difference-in-differences results (columns 3 to 8) reveal a sharp heterogeneity in the effect of RWLs on firm leverage: firms in industries with high union coverage *increase* leverage after the adoption of RWLs. So the aggregate effect is actually driven by firms in industries with relatively lower union coverage.

Interestingly, the industries with high union coverage are also those for which strikes are likely to be more costly (e.g., transportation and public administration, for which stockpiling of finished products is arguably more difficult). This suggests that the firms that behave according to the resilience paradigm (i.e., those that increase leverage when workers become less powerful) are also those with higher incentives to build resilience against strikes.

D.3.4 Substitution Across Sources of Debt

A potential confounder for our results is that firms may substitute bank loans with public debt when facing more powerful employees: Since the latter is harder to renegotiate with creditors, it may be more effective in pushing surplus off the negotiation table with workers (Qiu 2016). Given that public debt tends to have longer maturity, our results may be driven by this substitution rather than the firms' interest in financial resilience. To test for this alternative mechanism, we use data on firms' debt structure to separate different sources of financing. Results in Table IA11 show that firms do not adjust the relative weights of their sources of debt (including the fractions of bank and public debt), which suggests that this alternative mechanism is not at play in our sample.

D.3.5 Effect of RWLs on Firms' Credit Ratings and Credit Default Swaps Spreads

Another potential mechanism is that following the passage of RWLs, lenders might regard corporate debt more or less risky in firms that are covered by RWLs. This would then be reflected in the firms' credit ratings, their bond prices, or the spreads in credit default swaps. We presented results showing that bond prices do not change in Figure 5. In Table IA12, we also show that credit ratings remain unchanged as well, showing that credit rating agencies do not evaluate the creditworthiness of the firm differently following passage RWLs. As is the case with bond prices, we also show in Table IA13 that CDS spreads do not meaningfully change either, showing that the market does not consider the passage RWLs as improving the creditworthiness of corporate debt.

D.3.6 Effect of RWLs on Firms' Cumulative Abnormal Returns (CARs)

Consistent with the lack of response stemming from credit markets documented above, we show that cumulative abnormal stock returns (CARs) for firms newly exposed to RWLs do not change (Table IA14). This is consistent with prior evidence (Lee and Mas 2012) showing no short-term response and a slow long-term response to unionization events in equity markets.

D.3.7 Lack of Heterogeneous Response to RWLs Conditional on High Fixed Costs

Here we test for whether the connection between financial leverage/debt maturity and RWLs is driven by substitution between operational and financial leverage. Simintzi et al. (2015) argue for this trade-off using cross-country variation in employment protection.

We test for this by evaluating whether there exists a heterogeneous response to the passage of RWLs in firms that have high fixed costs. Following the literature (e.g., Gorodnichenko and Weber, 2016), we measure fixed costs by using Compustat variables: selling, general and administrative expenditures (Compustat item XSGA), advertising (Compustat item XAD), and research and development expenses (Compustat item XRD). We then divide these by sales. Results are shown in Table IA15. High fixed costs firms do not respond differently to the passage of RWLs.

D.3.8 Heterogeneous Response to RWLs Conditional on Profit Variability

Table IA16 presents estimates of RWLs on maturity and leverage conditional on profit variability, as discussed in Section 4.1.2.

D.3.9 Heterogeneous Response to RWLs Conditional on Pretreatment Size and Profitability

Table IA17 presents estimates of RWLs on maturity and leverage conditional on firms' pretreatment size and profitability, as discussed in Section 4.1.3.

D.4 Additional Robustness Regarding Labor Negotiations

D.4.1 Selection into Labor Negotiations

An interesting alternative mechanism that could have taken place is that workers, aware of firms' levels of debt maturity, decide to trigger labor negotiations for firms that have more short-term debt. While we cannot fully rule out that this type of selection is taking place, we can provide evidence that is inconsistent with this view. To show this, we present estimates of a regression of labor negotiations on firm characteristics. Table IA18 shows our results. Column (1) presents estimates on a characteristic by characteristic basis, to assess the individual impact of each trait. Column (2) shows joint estimation of several characteristics. None of the traits seem to be predictive of labor negotiations.

D.4.2 Length of Labor Negotiations

Table IA19 shows estimates from Equation (3) using different lengths of period following the start of labor negotiations. $T = 0$ corresponds to the instantaneous effect of labor negotiations, which is of special interest because, along the equilibrium path, agreements should take place instantaneously. $T = 5$ corresponds to the effect of labor negotiations through five years following the start of negotiations. In Panel A the dependent variable is leverage, our main margin of response. In Panels B and C, the dependent variables are Cash and Inventory, respectively. As in our previous analysis, debt is responsive to negotiations, while cash and inventory are not.

The effect of negotiations on leverage is virtually constant throughout different lengths of time following the start of negotiations.

D.4.3 Effects of Labor Negotiations on Leverage by Unionization Quantiles

Table IA20 presents estimates of the effects of labor negotiations on leverage by unionization quantiles. Effects become progressively stronger as unionization levels increase.

D.4.4 Channels Driving Reduction in Leverage following Labor Negotiations

Table IA21 focuses on the effect of labor negotiations on key variables that determine leverage. Columns (1) and (2) show that following labor negotiations, dividends and acquisitions decrease by 20 and 40 basis points, respectively. Capital expenditures (column 3), in contrast, shows no statistically significant change. Firms do not appear to hold more cash (column 4), consistent with prior results, neither they increase their equity issuance (column 5). Instead, firms significantly increased their retained earnings (column 6). Reductions in costs are plausible but effects are noisy (columns 7 and 8).

D.5 IV Results

We instrument the state-level industry unionization using the interactions between a RWL status dummy (indicating whether a state has adopted RWLs) and nine one-digit Standard Industry Classification (SIC) indicator variables. The introduction of RWLs negatively affects union coverage. To the extent that this effect is heterogeneous across industries within adopting states, the adjustments in firms' debt structure should reflect this heterogeneity. Specifically, we expect stronger effects for firms in relatively more affected industries.

We estimate a two-stage least square (2SLS) model using all firms in Compustat for which the SIC industry code variable is available. We employ data from the merged outgoing rotation group files of the Current Population Survey (MORG CPS) to compute the yearly industry-level union coverage for all state. Our sample selection criteria and the computation of industry unionization rates are based on Fortin et al. (2023), Fortin, Lemieux, and Lloyd (2021), and Lemieux (2006).

Our objective is to estimate the impact of labor unions on firms' debt structure. This impact can be described by the following linear regression:

$$y_{ijst} = a_t + a_s + \lambda Unionization_{jst} + \sum_{z=1}^{9} \phi_z \mathbf{1}_{\{I_{it}=z\}} + \kappa X_{ijst} + \omega_{ijst}, \tag{48}$$

where y is the outcome variable of interest for a firm i, in industry j (one-digit SIC industry code excluding financials and utilities), in state s, at time t. The variable $Unionization$ is the time-varying union coverage for a firm in a given industry and state. Specifically, two firms in the same state and with the same one-digit SIC industry code have the same union coverage, which describes the fraction of workers covered by a collective bargaining agreement or a union contract. The variable I is a categorical variable indicating the one-digit SIC industry affiliation. Finally, we saturate the model by including time and state fixed effects, and firm-level controls.

The specification in Equation (48) suffers from endogeneity problems. First, the debt structure of firms might affect the decision of workers to become unionized (i.e., reverse causality). Second, there might be an unobservable variable affecting both firms' debt structure and union coverage (i.e., omitted variable). To address these endogeneity problems, we instrument the variable unionization using the interaction between industry dummies and the RWL status of a state.

In the first step of the 2SLS, we estimate the following first-stage regression model:

$$Unionization_{jst} = a_t + a_s + \sum_{z=1}^{9} \tau_z \mathbf{1}_{\{I_{it}=z\}} \times RWL_s + \gamma W_{st} + \upsilon_{jst}, \tag{49}$$

where the RWL variable is equal to one if a state has RWLs in place, and zero otherwise. The model specification does not require this variable to change over time. However, we will let this dummy switch if a state changes its status in the 2007–2019 sample period (results are not affected). The variable W is a set of time-varying state controls, which includes unemployment rate, GDP growth, and house price index.

The main identifying assumption of the instrumental variable (IV) approach is that, conditional on observables, the inter-industry debt structures would be the same across states in the absence of RWLs. Under this assumption, we can interpret the effect of RWLs as causal if industries where the adoption of RWLs reduces unionization rates the most also display larger differences in firms' debt structures within RWLs states. The exclusion restriction is that the interaction between industry dummies and RWLs status affects firms' debt structure only through its impact on the industry-level unionization coverage in RWLs states.[14]

In the second and last step, we use the predicted unionization, $\widehat{Unionization}$, that we obtain from estimating Equation (49), to estimate the second stage regression in Equation (48). Our parameter of interest is λ, which captures the effect of unionization on firms' debt structure.

Table IA22 reports result for the 2SLS estimation. To ease the exposition, we report the first-stage coefficients by grouping industries in high, medium, and low coverage and interacting them with the RWL status indicator. Coefficients in Columns (1) and (2) are relative to the excluded low industry variable. Results confirm that the adoption of RWLs has a stronger negative impact on the union coverage of relatively more unionized industries. These first-stage effects are in line with the results in Fortin et al. (2023) both qualitatively and quantitatively.

Columns (3) to (6) report the IV estimates for debt maturity and leverage. The second stage estimates show a positive and significant effect of union coverage on debt maturity. The effect on leverage is weaker. There is a positive and significant effect at 10% level, which loses its statistical significance once we control for firm and state specific time-varying characteristics. Overall, our results support the idea that firms' interest in being resilient to strikes shapes their financing decisions.

D.6 Placebo Tests Regarding Political Status

A potential concern is that the political environment might determine the passage of RWLs at the state of enactment. In this subsection, we test whether the election of Republican governors explains our outcomes of interest.

D.6.1 DiD Estimates of Republican Government on Leverage/Debt Maturity

In the first analysis, we use the election of Republican governors and see whether their election affects leverage and debt maturity choices at the firm level. We implement this in a DiD analysis.

[14] Fortin et al. (2023) provide a further discussion of the exclusion restriction and model identification.

Table IA23 shows our results. The election of a Republican governor does not have an effect on neither maturity or leverage regardless of controls.

D.6.2 Stacked DiD Estimates of Republican Government on Leverage/Debt Maturity

We also perform a similar analysis where we estimate the effect of electing a Republican governor on maturity and leverage, but this time using a stack DiD approach: For each election event we choose a 4-year window around the election and then stack this data together similar to the approach followed by Cengiz et al. (2019). After constructing this stacked dataset of elections, we then estimate the effect of a Republican governorship using standard DiD methods centered around a single election event. We include a combination of firm, industry × year, and event-time fixed effects, as well as firm controls. Results are presented in Table IA24. We find no effects on debt maturity, regardless of specification. For leverage, we find no results in five out of our six specifications (columns 7–10 and 12). Only the inclusion of all fixed effects but no firm controls yields a marginally statistically significant effect (column 11). The direction of this effect, however, goes in the opposite direction of our main empirical findings – thus if Republicans are more likely to enact RWLs, this effect would suggest our estimates of RWLs on leverage are being attenuated.

D.6.3 RDD Estimates of Republican Government on Leverage/Debt Maturity

We can also concentrate our analysis of political status around close gubernatorial elections. Figure IA7 plots the density of the share of votes in favor of Republican candidates and shows that there is no discontinuity in votes around the 50% threshold. Optimal bandwidths for estimation follow Calonico et al. (2014). Estimates are shown in Table IA25. As before, political status does not seem to play a role in determining either firm's debt maturity or leverage.

D.7 Tables and Figures

Table IA7. (Debt structure and industry-level unionization) This table reports results from estimating a panel regression explaining firms' maturity and leverage decisions using industry-level union coverage, which captures the union bargaining power. This variable is the industry-level fraction of workers cover by a collective bargaining agreement or a union contract. The union coverage data is publicly available (http://www.unionstats.com) and actively maintained by Barry Hirsch and David Macpherson. The sample period goes from 1983 (the first year for which we have data on industry-level union coverage) to 2019. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at industry level (4-digit NAICS). ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
	LT debt ratio (>3Y)	LT debt ratio (>5Y)	Debt Mat. (>3Y)	Debt Mat. (>5Y)	Book leverage
Union coverage	0.060	0.053*	0.146***	0.140***	0.043
	(0.036)	(0.029)	(0.056)	(0.046)	(0.047)
Size	0.018***	0.013***	0.049***	0.039***	0.012***
	(0.001)	(0.001)	(0.003)	(0.003)	(0.001)
Collateral	0.088***	0.059***	0.059**	0.042*	0.212***
	(0.016)	(0.012)	(0.027)	(0.022)	(0.022)
Market-to-book	-0.003***	-0.002***	-0.004***	-0.002***	-0.005***
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Profitability (ROA)	-0.023***	-0.019***	0.017**	0.002	-0.059***
	(0.003)	(0.002)	(0.009)	(0.006)	(0.008)
Year FE	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.1448	0.1365	0.1983	0.1787	0.1156
Obs.	90,022	78,908	72,447	61,338	116,911
Cluster	213	210	213	210	216

Figure IA3. (Industry coverage and union membership) The figure plots the industry union coverage and average union membership by the two-digit Standard Industrial Classification (SIC) codes. We report the ten industries with the lowest and highest industry union coverage with the respective average number of members across unions in each industry. The correlation of -0.37 reported on the plot is computed using all two-digit SIC codes available. The union coverage data is publicly available (http://www.unionstats.com) and actively maintained by Barry Hirsch and David Macpherson. The union membership is from Form LM-2 and LM-3 filed with the Office of Labor-Management Standards (OLMS) and maintained by the U.S. Department of Labor. The sample period 2000–2021 is restricted by the availability of union membership data. Refer to the Variable List and Description table for more details about variables' definition and computation.

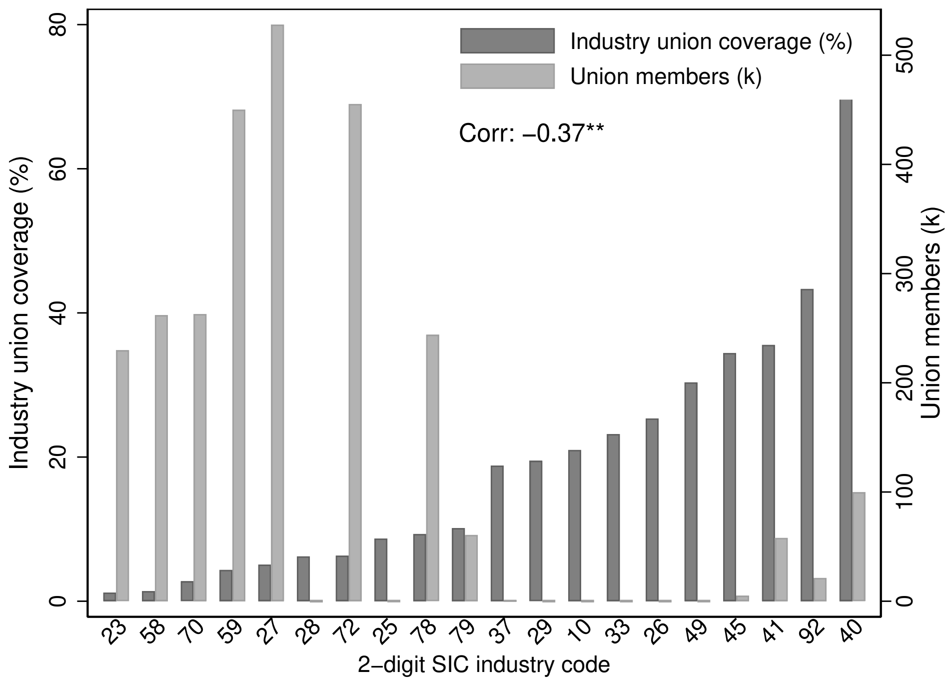


Table IA8. (Debt structure response to RWLs by Unionization Coverage) This table presents results from a difference-in-differences estimation, specifically Equation (2), by union coverage. High union coverage is classified following Fortin et al. (2023). The table includes results for two measures of debt maturity. Panel A displays results for debt with maturity longer than five years (LT debt ratio(>5Y)), Panel C presents results for debt with maturity shorter or equal to five years (ST debt ratio(≤5Y)). Panel B reports results for book leverage. The sample selection and estimation procedure follow Fortin et al. (2023). Specifically, we exclude states that implemented RWLs before 2007 and focus on the sample period from 2007 to 2019. Some specifications include financial controls such as Size, Profitability (ROA), Collateral, and Market-to-book ratio. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the state level. * * *, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All industries		High union industries		Other industries		All industries (triple-diff)	
A. Effect of RWL on maturity								
RWL	-0.017***	-0.019***	-0.062***	-0.149***	-0.014**	-0.015**	-0.014**	-0.016**
	(0.005)	(0.007)	(0.019)	(0.034)	(0.005)	(0.007)	(0.005)	(0.007)
RWL × High union							-0.049**	-0.131***
							(0.019)	(0.038)
Adj. R2	0.6526	0.6709	0.6378	0.6159	0.6469	0.6651	0.6527	0.6712
Obs.	17,633	14,213	2,116	1,311	15,517	12,902	17,633	14,213
Cluster	28	28	26	24	27	27	28	28
B. Effect of RWL on leverage								
RWL	-0.018**	-0.020*	0.049	0.141***	-0.023**	-0.024*	-0.023**	-0.024*
	(0.008)	(0.012)	(0.064)	(0.030)	(0.010)	(0.013)	(0.010)	(0.013)
RWL × High union							0.072	0.170***
							(0.068)	(0.047)
Adj. R2	0.7622	0.8060	0.7439	0.8258	0.7572	0.7920	0.7622	0.8062
Obs.	17,633	14,213	2,116	1,311	15,517	12,902	17,633	14,213
Cluster	28	28	26	24	27	27	28	28
C. Effect of RWL on short term debt								
RWL	0.003	0.004	0.072***	0.174***	-0.002	0.000	-0.002	0.000
	(0.004)	(0.005)	(0.022)	(0.021)	(0.005)	(0.006)	(0.005)	(0.006)
RWL × High union							0.074***	0.178***
							(0.024)	(0.032)
Adj. R2	0.6632	0.6765	0.6358	0.5962	0.6601	0.6753	0.6634	0.6772
Obs.	17,633	14,213	2,116	1,311	15,517	12,902	17,633	14,213
Cluster	28	28	26	24	27	27	28	28
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table IA9. (Robustness – Debt structure response to RWLs by Unionization Coverage, conditional on maturity or leverage) This table presents results from a difference-in-differences estimation, specifically Equation (2), by union coverage. High union coverage is classified following Fortin et al. (2023). The table includes results for two measures of debt maturity. Panel A displays results for debt with maturity longer than five years (LT debt ratio(>5Y)), Panel C presents results for debt with maturity shorter or equal to five years (ST debt ratio(≤5Y)). Panel B reports results for book leverage. The sample selection and estimation procedure follow Fortin et al. (2023). Additionally, we include leverage as a control variable in the specification with debt maturity as the outcome variables, and vice versa. The sample selection and estimation procedure follow the methodology outlined in Fortin et al. (2023). Specifically, we exclude states that implemented RWLs prior to 2007, and the sample period covers the years 2007 to 2019. All specifications include the firm's book leverage. When indicated, the model incorporates the following financial controls: Size, Profitability (ROA), Collateral, and Market-to-book ratio. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the state level. * * *, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

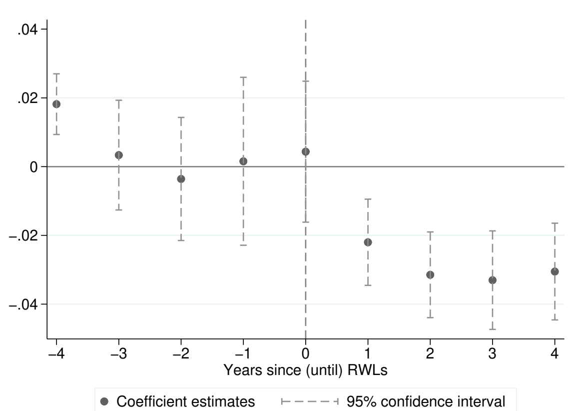
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All industries		High union industries		Other industries		All industries (triple-diff)	
A. Effect of RWL on maturity								
RWL	-0.011***	-0.011***	-0.074***	-0.206***	-0.006**	-0.006*	-0.006**	-0.006*
	(0.004)	(0.003)	(0.025)	(0.024)	(0.003)	(0.003)	(0.003)	(0.003)
Book leverage	0.315***	0.377***	0.247***	0.401***	0.330***	0.376***	0.316***	0.378***
	(0.022)	(0.024)	(0.042)	(0.059)	(0.020)	(0.027)	(0.022)	(0.024)
RWL × High union							-0.071**	-0.195***
							(0.026)	(0.023)
Adj. R2	0.6526	0.6709	0.6378	0.6159	0.6469	0.6651	0.6527	0.6712
Obs.	17,633	14,213	2,116	1,311	15,517	12,902	17,633	14,213
Cluster	28	28	26	24	27	27	28	28
B. Effect of RWL on leverage								
RWL	-0.008	-0.009	0.078	0.202***	-0.014**	-0.014	-0.015**	-0.014
	(0.006)	(0.008)	(0.064)	(0.020)	(0.006)	(0.009)	(0.007)	(0.010)
LT debt ratio(>5Y)	0.621***	0.613***	0.468***	0.406***	0.656***	0.656***	0.622***	0.614***
	(0.048)	(0.060)	(0.050)	(0.070)	(0.045)	(0.055)	(0.047)	(0.059)
RWL × High union							0.102	0.250***
							(0.067)	(0.027)
Adj. R2	0.8087	0.8508	0.7733	0.8540	0.8098	0.8433	0.8089	0.8512
Obs.	17,633	14,213	2,116	1,311	15,517	12,902	17,633	14,213
Cluster	28	28	26	24	27	27	28	28
C. Effect of RWL on short term debt								
RWL	0.007**	0.009***	0.063***	0.135***	0.003	0.006*	0.003	0.006*
	(0.003)	(0.003)	(0.013)	(0.016)	(0.003)	(0.003)	(0.003)	(0.003)
Book leverage	0.205***	0.241***	0.175***	0.276***	0.211***	0.237***	0.204***	0.240***
	(0.023)	(0.025)	(0.039)	(0.042)	(0.026)	(0.026)	(0.023)	(0.025)
RWL × High union							0.059***	0.137***
							(0.014)	(0.023)
Adj. R2	0.6987	0.7151	0.6611	0.6316	0.6990	0.7162	0.6989	0.7155
Obs.	17,633	14,213	2,116	1,311	15,517	12,902	17,633	14,213
Cluster	28	28	26	24	27	27	28	28
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table IA10. (Debt structure response to RWLs – Sample period 1974–2019) The table reports results for the difference-in-differences estimation exploiting the staggered introduction at state-level of righ-to-work laws for the sample period from 1974 to 2019. The beginning of the sample period is dictated by the availability of the maturity variables in Compustat. The table comprises results for leverage and maturity measures. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the state level. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
	Book leverage	LT debt ratio (>3Y)	LT debt ratio (>5Y)	Debt Mat. (>3Y)	Debt Mat. (>5Y)
RWLs	-0.020**	-0.021***	-0.010*	-0.022	-0.002
	(0.008)	(0.006)	(0.005)	(0.016)	(0.017)
Profitability (ROA)	-0.040***	-0.021***	-0.016***	0.006	0.004
	(0.003)	(0.002)	(0.001)	(0.005)	(0.005)
Size	0.017***	0.018***	0.013***	0.042***	0.031***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Collateral	0.135***	0.027***	0.015***	-0.057***	-0.055***
	(0.010)	(0.006)	(0.005)	(0.012)	(0.011)
Market-to-book	-0.003***	-0.003***	-0.002***	-0.003***	-0.002***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.5763	0.5932	0.5810	0.5290	0.5508
Obs.	181,903	144,079	129,589	119,843	105,283
Cluster	51	51	51	51	51

Figure IA4. (Parallel trends in diff-in-diffs framework – Debt maturity) The figure plots the dynamic effect of RWLs on the debt maturity variable, following the estimation procedure in Borusyak et al. (2022). We centered the adoption of the Right-work-law at date zero and estimated a model with indicators for every year relative to the adoption date. We exclude the time-zero indicator variable such that estimates are relative to the time of the law adoption. Following Fortin et al. (2023), the sample excludes states that adopted RWLs before 2007. The regressions include industry-by-year and firm fixed effects. Standard errors are clustered at the state level.

(a) Debt maturity: more than 3 year



(b) Debt maturity: more than 5 year

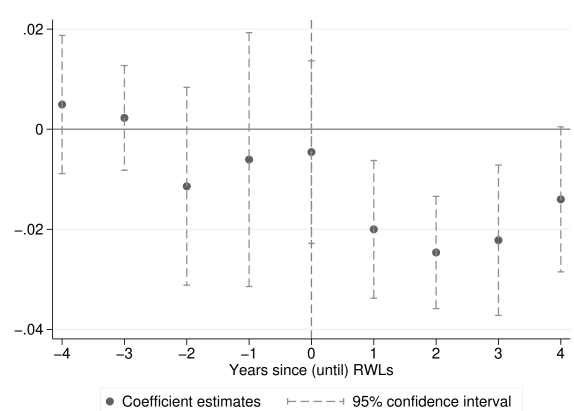


Figure IA5. (Parallel trends in diff-in-diffs framework – Debt maturity) The figure plots the dynamic effect of RWLs on the debt maturity variable, following the estimation procedure in Cengiz et al. (2019). We centered the adoption of the Right-work-law at date zero and estimated a model with indicators for every year relative to the adoption date. We exclude the time-zero indicator variable such that estimates are relative to the time of the law adoption. Fallwoing Fortin et al. (2023), the sample excludes states that adopted RWLs before 2007. The regressions include industry-by-year and firm fixed effects. Standard errors are clustered at the state level.

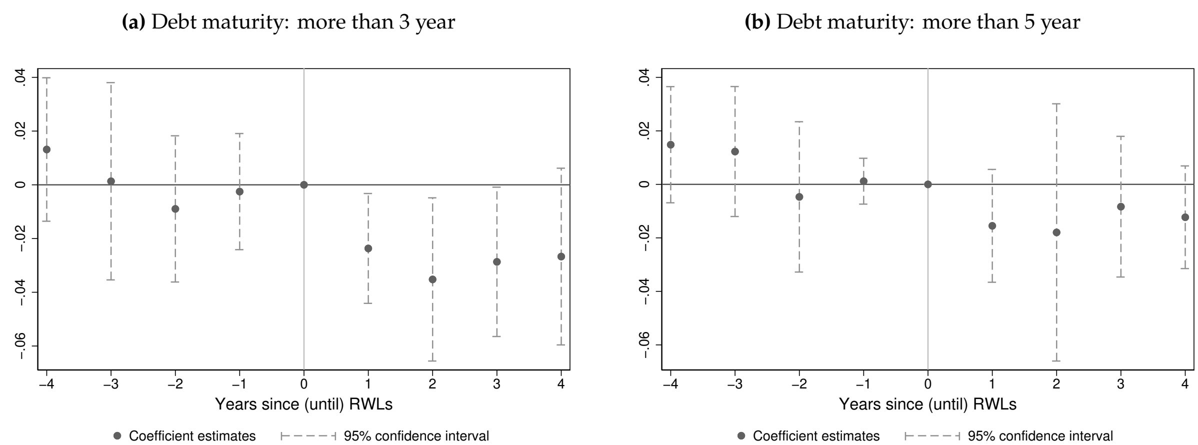
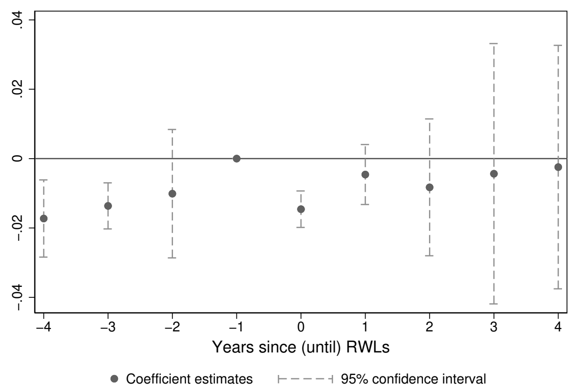
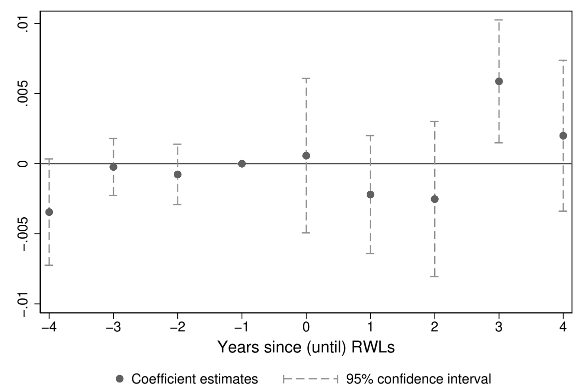


Figure IA6. (Parallel trends in diff-in-diffs framework – Cash, Inventory, and Book leverage) The figure plots the dynamic effect of RWLs on cash, inventory, and book leverage variables, following the estimation procedure in Sun and Abraham (2021). We centered the adoption of the Right-work-law at date t-1 and estimated a model with indicators for every year relative to the year before the adoption date. Following with Fortin et al. (2023), the sample excludes states that adopted RWLs before 2007. The regressions include industry-by-year and firm fixed effects. Standard errors are clustered at the state level.

(a) Cash



(b) Inventory (finished goods)



(c) Book leverage

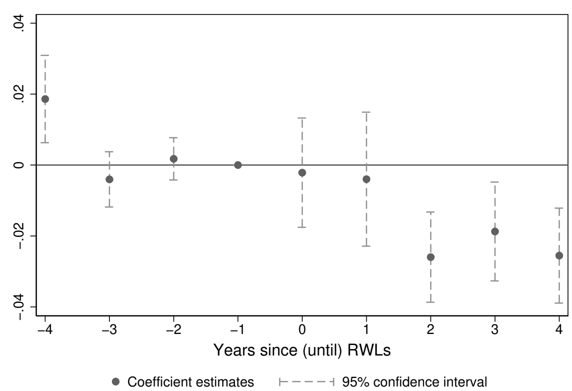


Table IA11. (Debt structure – Several sources of debt) This table presents results obtained from estimating the difference-in-differences model, as depicted in Equation (2), where the dependent variables are calculated as the fractions of various debt types relative to the total outstanding debt of the firm. The sample selection and estimation procedure follow the methodology outlined in Fortin et al. (2023). Specifically, we exclude states that implemented RWLs prior to 2007, and the sample period covers the years from 2007 to 2019. Industry fixed effects are incorporated at the two-digit Standard Industrial Classification (SIC) level for all specifications. The reported standard errors, shown in parentheses, are robust and clustered at the state level. Refer to the Variable List and Description table for more details about variables' definition and computation. * * *, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dep var.: Fraction of the following debt types						
	Commercial paper	Revolving debt	Term loans	Bonds and notes	Capital lease	Hybrid securities	Other borrowings
RWL	0.003	-0.007	-0.004	0.007	-0.001	-0.000	0.003
	(0.003)	(0.029)	(0.026)	(0.031)	(0.008)	(0.000)	(0.009)
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.594	0.647	0.611	0.641	0.528	0.852	0.400
Obs.	22,759	22,759	22,759	22,759	22,759	22,759	22,759
Cluster	29	29	29	29	29	29	29

Table IA12. (DiD: Effects of RWLs on credit ratings) This table presents the results obtained from estimating the DiD model, as shown in Equation (2), with firms' credit ratings as the outcome variable. In columns (1) and (2), credit ratings are expressed as ratios between an integer number assigned to a specific credit rating and the total number of possible ratings. Specifically, we code D as 1/22 (representing the lowest rating) and AAA as 22/22 (representing the highest rating). Therefore, this measure ranges between 0.04545 and 1. In columns (3) and (4), credit ratings are defined on a scale where AAA is assigned a value of 1 (representing the highest rating), and D is assigned a value of 22 (representing the lowest rating). To ensure comparability with our main DiD results using the adoptions of RWLs, we select our sample following the methodology used in Fortin et al. (2023). Specifically, we exclude states that implemented RWLs before 2007, and the sample period covers the years from 2007 to 2019. If indicated, the specification includes the following financial controls: Size, Profitability (ROA), Collateral, and Market-to-book ratio. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the state level. * * *, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
	Credit Ratings		Credit Ratings (Ranking)	
RWL	0.016	0.013	-0.346	-0.290
	(0.015)	(0.014)	(0.327)	(0.300)
Adj. R2	0.9159	0.9221	0.9159	0.9221
Obs.	7,836	7,137	7,836	7,137
Cluster	26	26	26	26
Firm controls	No	Yes	No	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes

Table IA13. (DiD RWLs: Credit Default Swaps) The table presents the results of the difference-in-differences estimation using Equation (4) with differences in CDS spreads as the outcome variables. Columns (1) and (2) show the difference between the five-year CDS spread and the one-year CDS spread. Columns (3) and (4) display the difference between the ten-year CDS spread and the five-year CDS spread. Similarly, columns (5) and (6) present the difference between the twenty-year CDS spread and the ten-year CDS spread, while columns (7) and (8) show the difference between the thirty-year CDS spread and the twenty-year CDS spread. Lastly, columns (9) and (10) provide the results for the recovery rate. To construct the sample, we follow the sample selection and estimation procedure outlined in Fortin et al. (2023). We exclude states that implemented RWLs before 2007 and consider the period from 2007 to 2019. In this sample, we find qualitatively similar effects of RWLs on firm debt maturity (with a point estimate of −0.023) and leverage (with a point estimate of −0.031) compared to our main estimates in Table 3. If indicated, the specification includes the following financial controls: Size, Profitability (ROA), Collateral, and Market-to-book ratio. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the state level. * * *, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Spread 5Y minus 1Y		Spread 10Y minus 5Y		Spread 20Y minus 10Y		Spread 30Y minus 20Y		Recovery rate	
RWL	0.003	0.004	0.001	0.001	0.002***	0.003**	0.000	0.000	0.004	0.005
	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.003)	(0.003)
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.3697	0.3708	0.3681	0.3685	0.3727	0.3758	0.3334	0.3401	0.5548	0.5338
Obs.	1,906	1,872	1,946	1,910	1,759	1,739	1,716	1,699	2,030	1,985
Cluster	21	21	21	21	21	21	21	21	21	21

Table IA14. (Cumulative Abnormal Stock Returns) The table presents estimates of cumulative abnormal returns following the implementation of RWLs. The dependent variable measures the cumulative abnormal return for each firm during specific event windows. In Panel A, the event window spans 5 business days before and 5 business days after the passage of RWLs. In Panel B, the event window extends to 20 business days before and 20 business days after the passage of RWLs. Standard errors, shown in parentheses, are robust and clustered at the state level. * * *, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)
	Panel A. Time window: [-5 +5] days to/from RWL	
	Abn. returns CAPM	Abn. returns 3-Factors
RWL	-0.001	-0.001
	(0.001)	(0.001)
R2	0.0006	0.0005
Obs.	1,754	1,754
Cluster	5	5
	Panel B. Time window: [-20 +20] days to/from RWL	
	Abn. returns CAPM	Abn. returns 3-Factors
RWL	0.001	0.001
	(0.001)	(0.001)
R2	0.0001	0.0002
Obs.	6,531	6,531
Cluster	5	5

Table IA15. (Debt structure response to RWLs – Fixed costs) This table presents results obtained from the difference-in-differences estimation, as shown in Equation (2), by introducing treatment heterogeneity based on the magnitude of fixed costs before the implementation of RWLs. We measure fixed costs by using Compustat variables, namely selling, general, and administrative expenditures (XSGA), advertising (XAD), and research and development expenses (XRD), divided by sales (Gorodnichenko and Weber, 2016). The table includes results for measures of maturity (LT debt ratio(>5Y)) and book leverage. The sample selection and estimation procedure follow the methodology outlined in Fortin et al. (2023). Specifically, we exclude states that implemented RWLs before 2007, and the sample period covers the years from 2007 to 2019. If indicated, the specification includes the following financial controls: Size, Profitability (ROA), Collateral, and Market-to-book ratio. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the state level. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	High fixed costs firms		Other firms		All firms (triple-diff)	
A. Effect of RWL on maturity						
RWL	-0.025**	-0.028**	-0.031***	-0.034***	-0.031***	-0.035***
	(0.011)	(0.011)	(0.006)	(0.008)	(0.006)	(0.007)
RWL × High fixed costs					0.010	0.015
					(0.010)	(0.010)
Adj. R2	0.5397	0.5435	0.6415	0.6629	0.6471	0.6608
Obs.	1,719	1,621	3,620	3,373	5,408	5,053
Cluster	21	21	26	26	27	27
B. Effect of RWL on leverage						
RWL	-0.073***	-0.069***	-0.041***	-0.050***	-0.043***	-0.054***
	(0.017)	(0.016)	(0.013)	(0.016)	(0.012)	(0.014)
RWL × High fixed costs					-0.018	-0.002
					(0.014)	(0.015)
Adj. R2	0.6670	0.6816	0.8170	0.8332	0.7973	0.8145
Obs.	1,719	1,621	3,620	3,373	5,408	5,053
Cluster	21	21	26	26	27	27
Firm controls	No	Yes	No	Yes	No	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes

Table IA16. (Debt structure response to RWLs and profit variability) The table presents results from a difference-in-differences estimation, specifically Equation (2), which exploits staggered adoptions of RWLs at the state level. We interact the main variable of interest, RWL, with the firm's pre-RWL profit variability, computed as the standard deviation of earnings before interest and taxes as in Matsa, 2010. The table includes results for two measures of debt maturity. In columns (1) and (2), the results are displayed for debt with maturity longer than five years, labeled as LT debt ratio(>5Y). Columns (3) and (4) show the findings for book leverage, while columns (5) and (6) present the results for debt with maturity equal to or shorter than five years, labeled as ST debt ratio(≤5Y). The sample selection and estimation procedure follow Fortin et al. (2023). Specifically, we exclude states that implemented RWLs before 2007 and focus on the sample period from 2007 to 2019. Some specifications include financial controls such as Size, Profitability (ROA), Collateral, and Market-to-book ratio. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the state level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	LT debt ratio(>5Y)		Book leverage		ST debt ratio(≤5Y)	
RWL	-0.020**	-0.022**	-0.013	-0.011	0.010**	0.015***
	(0.008)	(0.010)	(0.008)	(0.014)	(0.004)	(0.004)
RWL × Pre-RWL Profit variab.	0.007	0.007	-0.010**	-0.019**	-0.014***	-0.022***
	(0.006)	(0.007)	(0.005)	(0.008)	(0.005)	(0.002)
Firm controls	No	Yes	No	Yes	No	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.6526	0.6709	0.7622	0.8061	0.6632	0.6767
Obs.	17,633	14,213	17,633	14,213	17,633	14,213

Table IA17. (Treatment Heterogeneity by pre-RWL Profitability and Size) This table presents results obtained from the difference-in-differences estimation, as depicted in Equation (2), by incorporating treatment heterogeneity based on firm profitability and size in the year preceding the implementation of RWLs. We measure profitability using return on assets (ROA) and size using total assets. The table includes results for measures of maturity (LT debt ratio(>5Y)) and book leverage. The sample selection and estimation procedure follow the methodology outlined in Fortin et al. (2023). Specifically, we exclude states that implemented RWLs before 2007, and the sample period covers the years from 2007 to 2019. If indicated, the specification includes the following financial controls: Size, Profitability (ROA), Collateral, and Market-to-book ratio. Single order pre-RWL size and profitability terms are absorbed by fixed effects. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the state level. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	LT debt ratio(>5Y)				Book leverage				ST debt ratio(≤5Y)			
RWL	-0.017***	-0.019***	-0.014**	-0.025**	-0.021**	-0.031**	-0.055*	-0.087***	0.001	-0.006	-0.024	-0.034*
	(0.005)	(0.006)	(0.006)	(0.011)	(0.009)	(0.012)	(0.030)	(0.011)	(0.006)	(0.009)	(0.019)	(0.018)
RWL × ROA pre RWL	-0.006	0.002			0.011	0.078***			0.010	0.076*		
	(0.007)	(0.043)			(0.014)	(0.023)			(0.012)	(0.043)		
RWL × Assets pre RWL			-0.001	0.001			0.005	0.010***			0.004	0.006**
			(0.001)	(0.002)			(0.004)	(0.002)			(0.002)	(0.002)
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.6489	0.6684	0.6490	0.6684	0.7614	0.8056	0.7615	0.8057	0.6634	0.6780	0.6635	0.6781
Obs.	17,480	14,110	17,491	14,114	17,480	14,110	17,491	14,114	17,480	14,110	17,491	14,114
Cluster	28	28	28	28	28	28	28	28	28	28	28	28

Table IA18. (**Labor negotiations – Selection**) The table presents results from a selection model where we predict our variable of interest, *Negotiation*, in Equation (3), using firm financial characteristics. Column (1) shows the results of estimating a univariate regression for each independent variable. Column (2) presents the point estimates of a multivariate model that includes all firm characteristics (note that some variables are omitted due to collinearity). Column (3) reports the baseline mean and standard deviation of the firms' characteristics. All regression specifications include firm and industry-year fixed effects. Standard errors are clustered at the firm level. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Dependent var.: Negotiation		
	Univariate specs	Mutivariate spec	Baseline mean
Book leverage$_{t-1}$	0.112	0.156	0.294
	(0.215)	(0.415)	(0.173)
Book leverage$_{t-2}$	0.105	0.229	0.297
	(0.187)	(0.306)	(0.181)
Cash$_{t-1}$	-0.201	-0.462	0.065
	(0.228)	(0.383)	(0.087)
ROA$_{t-1}$	-0.341	-0.355	0.155
	(0.404)	(0.582)	(0.086)
LT debt ratio(>3Y)$_{t-1}$	0.058	-0.065	.21109
	(0.244)	(0.361)	(0.160)
LT debt ratio(≤3Y)$_{t-1}$	-0.225		0.052
	(0.303)		(0.077)
Det mat.(>3Y)$_{t-1}$	0.051		0.669
	(0.112)		(0.249)
LT debt ratio(≤1Y)$_{t-1}$	-0.147		0.019
	(0.473)		(0.044)
LT debt ratio(>1Y)$_{t-2}$	-0.095		0.251
	(.216)		(0.179)

Table IA19. (Labor negotiations – Different time windows) The table presents estimates from a linear regression using firm book leverage, cash, and inventory as outcome variables. The data on labor negotiations is obtained from the Settlement Summaries database of Bloomberg BNA, covering the period from 1986 to 2020. The explanatory variable of interest, *Negotiation*, is an indicator variable that equals one in the year when a firm negotiates a collective agreement with a union, and zero in non-negotiation years. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the firm level. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	T=0	T=1	T=2	T=3	T=4	T=5
	Panel A. Book leverage					
Negotiation	-0.011**	-0.010**	-0.010*	-0.011*	-0.011*	-0.009
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Adj. R2	0.5435	0.5650	0.5794	0.5932	0.6054	0.6203
Obs.	10,948	10,444	9,945	9,460	8,983	8,521
	Panel B. Cash					
Negotiation	-0.001	0.000	0.002	0.002	0.002	0.001
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Adj. R2	0.4688	0.4801	0.4866	0.4982	0.5096	0.5206
Obs.	10,953	10,449	9,950	9,466	8,989	8,527
	Panel C. Inventory					
Negotiation	0.003	0.001	0.000	0.002	0.002	0.004
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Adj. R2	0.7015	0.7164	0.7426	0.7402	0.7752	0.8291
Obs.	10,859	10,372	9,879	9,402	8,930	8,471
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table IA20. (Robustness – Effects of labor negotiations on leverage by unionization quantiles) The table presents results obtained by estimating the model in Equation (3) for different subsets of the industry unionization distribution (Union coverage variable) based on quantiles. For instance, Column (1) estimates the regression model using a sample of firms operating in industries with union coverage above the median of the distribution. The dependent variable for all specifications is the firm's book leverage. Data on labor negotiations is sourced from the Settlement Summaries database of Bloomberg BNA, covering the period from 1986 to 2020. The variable of interest, *Negotiation*, is an indicator variable that takes a value of one in years when a firm engages in collective bargaining with a union and zero in non-negotiation years. When specified, the model includes firm controls (size, profitability, and cash holding) and a negotiation characteristic (share of employees). Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the firm level. $***$, **, and $*$ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: Book leverage				
	Above median	3^{rd} tercile	4^{th} quartile	5^{th} quintile	6^{th} sextile
Negotiation	-0.012	-0.014	-0.025**	-0.032**	-0.047***
	(0.008)	(0.010)	(0.012)	(0.015)	(0.016)
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.5753	0.5337	0.5046	0.4776	0.4177
Obs.	3,929	2,494	1,848	1,454	1,027
Cluster	221	165	146	130	110

Table IA21. (Negotiations – Mechanism to reduce leverage) This table presents the results of estimating the model in Equation (3) using various outflows as dependent variables: Dividends, Acquisition costs, Capital expenditures, Cash, Equity issuance, Retained earnings, Cost of goods sold, Cost of goods sold + selling, general, and administrative costs, and operating costs. Operating costs are calculated as the sum of Cost of goods sold, selling, general, and administrative costs, dividends, and acquisition costs, divided by total assets. The reported standard errors, shown in parentheses, are robust to heteroscedasticity. Standard errors in parenthesis are robust to heteroscedasticity. $***$, $**$, and $*$ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dividends	Acquisition	Capex	Cash	Equity iss.	Retained earn.	Cogs plus Xsga	Operating costs
Labor negotiation	-0.002**	-0.004*	0.001	-0.001	-0.002	0.017**	-0.011	-0.019
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.007)	(0.012)	(0.013)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.3254	0.1025	0.5396	0.4689	0.2315	0.6448	0.8394	0.8404
Obs.	10,864	10,174	10,869	10,946	10,053	10,764	9,630	8,938
Cluster	458	454	459	459	459	455	435	427

Table IA22. (Instrumental variable – Differential exposure approach) This table presents results obtained through an instrumental variable approach based on the methodology proposed by Fortin et al. (2023). State-level industry unionization is instrumented using the interaction between nine one-digit SIC industry indicators and a variable indicating whether a state has adopted RWLs. This variable takes a value of one for states with RWLs and zero for states without. In Columns (1) and (2), the dependent variable, *Industry union*, represents the fraction of workers covered by a collective bargaining agreement or union contract. This is computed using data from the merged outgoing rotation group files of the Current Population Survey (MORG CPS). High union coverage industries include mining, construction, transportation, communication, and public administration (one-digit SIC codes 1, 4, and 9). Medium union coverage industries consist of manufacturing and services (one-digit SIC codes 2, 3, and 8). Finally, low union coverage industries comprise agriculture, forestry, fishing, wholesale and retail trade, and services (one-digit SIC codes 0, 5, and 7). Standard errors in parenthesis are robust and clustered at the state level. Refer to the Variable List and Description table for more details about variables' definition and computation. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	First stage		Instrumental Variable					
	Industry union		LT debt ratio(>5Y)		ST debt ratio(≤5Y)		Book leverage	
State w/ RWL × High Union	-0.149***	-0.128***						
	(0.028)	(0.025)						
State w/ RWL × Med. Union	-0.014	-0.017						
	(0.013)	(0.011)						
Unionization (RWL × ind. as IV)			0.098**	0.147**	0.033	0.052	0.166*	0.221
			(0.041)	(0.068)	(0.053)	(0.061)	(0.094)	(0.142)
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes
State controls	No	Yes	No	Yes	No	Yes	No	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	No	No	Yes	Yes
State FE	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Adj. R2	0.8409	0.8015	-0.0037	0.1090	-0.0036	0.1564	-0.0031	0.1560
Obs.	27,586	22,317	27,586	22,317	27,586	22,317	27,586	22,317
Cluster	50	50	50	50	50	50	50	50

Table IA23. (Baseline DiD: Republican on maturity and leverage) The table presents results for the DiD model that examines the impact of Republican influence on firm maturity (measured by the LT debt ratio) and leverage decisions using US Gubernatorial elections as a proxy. To ensure comparability with our main results based on RWLs' adoptions, we follow the sample selection criteria of Fortin et al. (2023). Specifically, we exclude states that implemented RWLs before 2007 and consider the sample period from 2007 to 2019. Where indicated, the model includes the following financial controls: firm size, profitability (ROA), collateral, and market-to-book ratio. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the state level. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
	LT debt ratio(>5Y)		Book leverage	
Republican	0.000	0.002	0.000	0.001
	(0.002)	(0.002)	(0.004)	(0.004)
Adj. R2	0.6528	0.6712	0.7620	0.8060
Obs.	17,608	14,195	17,608	14,195
Cluster	27	27	27	27
Firm controls	No	Yes	No	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes

Table IA24. (Stack DiD: Republican on maturity and leverage) The table presents results for the DiD model that examines the influence of Republicans on firm maturity (measured by the LT debt ratio) and leverage decisions using US Gubernatorial elections as a proxy. We follow the stack difference-in-differences estimation method proposed by Cengiz et al. 2019. To ensure comparability with our main results based on the adoption of RWLs, we adopt the same sample selection criteria as outlined in Fortin et al. (2023). This involves excluding states that implemented RWLs before 2007 and focusing on the sample period from 2007 to 2019. The model specification includes financial controls such as firm size, profitability (ROA), collateral, and market-to-book ratio. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the state level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	LT debt ratio(>5Y)						Book leverage					
Republican	0.002	0.002	0.006	0.002	0.006	0.004	0.009	0.006	0.011	0.007	0.013*	0.009
	(0.005)	(0.005)	(0.008)	(0.008)	(0.005)	(0.005)	(0.008)	(0.006)	(0.016)	(0.018)	(0.007)	(0.006)
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry-by-year FE	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Time-to-election FE	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.6889	0.7013	0.6653	0.6842	0.6889	0.7011	0.7720	0.8292	0.7600	0.8200	0.7720	0.8292
Obs.	11,829	9,312	11,939	9,433	11,829	9,312	11,829	9,312	11,939	9,433	11,829	9,312
Cluster	24	24	24	24	24	24	24	24	24	24	24	24

Figure IA7. (McCrary test – US Gubernatorial elections) The figure displays the density plot of the share of votes in favor of Republican candidates in US Gubernatorial elections spanning from 1991 to 2019. We employ the approach outlined by McCrary (2008) to examine any discontinuity in the distribution of this variable at the critical threshold of 50%. The thin solid line represents the 95% confidence interval around the estimated density. The data on elections and their outcomes were collected manually using various online resources.

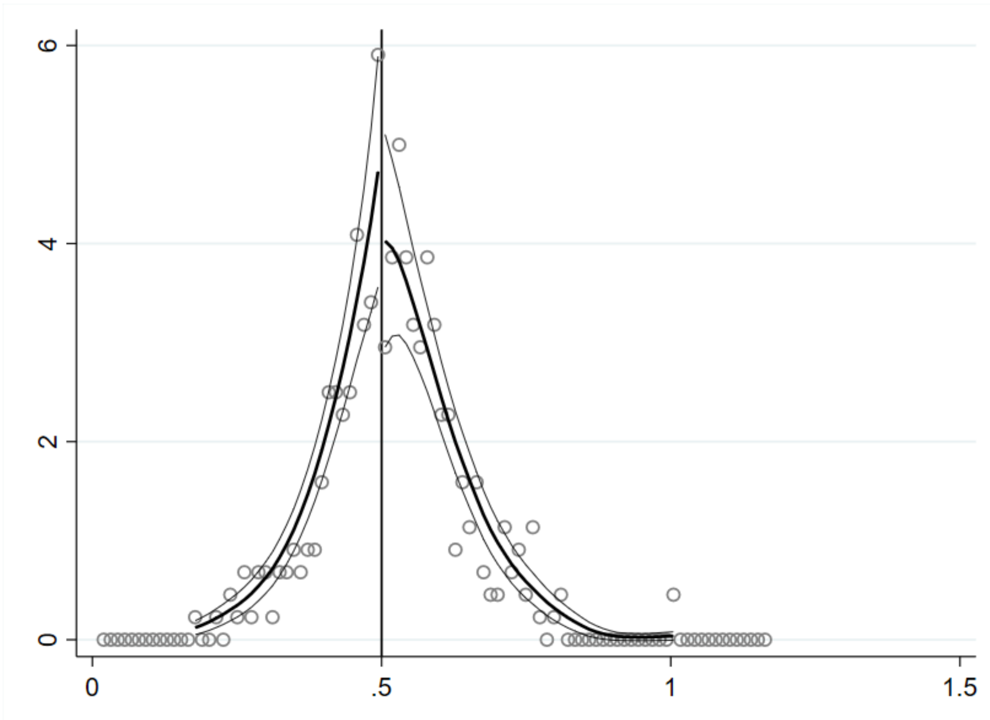


Table IA25. (Rdd: Republican governor on maturity and leverage) The table presents the results of a regression discontinuity model analyzing the impact of US Gubernatorial elections on firms' maturity and leverage decisions. Specifically, we compare the outcomes for firms located in states where a Republican Governor narrowly won against those in states where the Republican candidate narrowly lost the election. Our models use changes in maturity and leverage as the dependent variables, and the share of votes cast for Republican candidates (including its squared term) as the variable determining the assignment of firms to treated and control groups. Treated firms, indicated by Republican = 1, are those located in states where the Republican candidate emerged as the winner, receiving more than 50% of the votes. Control firms, indicated by Republican = 0, are those situated in states where the Republican candidate lost the election, receiving less than 50% of the votes. The outcome variables represent the logarithmic changes in maturity and leverage before and after the election years. We compute different measures for each outcome variable. In Columns (1) and (4), the measures represent the logarithmic differences between one year after and one year before the election year, excluding the election year itself. Columns (2) and (5) display the logarithmic differences in averages over a three-year period before and after the election year. Columns (3) and (6) differ from the previous measures by excluding the election year when computing the three-year average. Following the approach of Calonico et al. (2014), the estimation employs optimal bandwidths of 0.07 for maturity and 0.062 for leverage around the 50% threshold. Standard errors, presented in parentheses, are robust and clustered at the state level. * * *, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	US Gubernatorial elections from 1991 to 2019					
	Maturity			Leverage		
Republican	-0.058	-0.002	-0.137	-0.010	0.034	-0.018
	(0.108)	(0.098)	(0.121)	(0.065)	(0.062)	(0.073)
Obs.	4,415	2,567	2,087	3,944	3,266	2,834
Cluster	48	46	45	47	47	45

E Additional Robustness: Close Union elections

In this section, we use establishment-level unionization events to capture increases in workers' bargaining power and study how firms adjust their debt structure in response to such events. We find that firms respond to labor unionization by increasing debt maturity, without systematically increasing their financial leverage.

E.1 Data description

We collect establishment-level data on union elections from 1977 to 2014. The dataset contains full information about the certification procedure of a union for a specific firm's establishment. Data on elections from 1977 to 1999 are from Holmes (2006). For the 2000–2014 period, we hand-collect the data from the National Labor Relations Board (NLRB). All elections in our dataset involve the certification of one labor union. For every union election, we have information about the firm's name, the calendar date on which the election was officially closed, the number of workers eligible to vote, the valid votes cast, the votes in favor and against the formation of a bargaining unit, and the outcome of the election.

The union certification process begins with employees signing authorization cards, which affirm their interest in being represented by a union. Once at least 30% of the employees working in an establishment have signed these cards, they can ask the NLRB to conduct a union certification by a secret ballot. The election outcome ascertains whether workers want to be represented by the union. The NLRB posts an election notice and defines the bargaining unit (i.e., employees who are eligible to vote and who will be represented by the union if it is certified). Supervisors and managers cannot vote. The union is certified if more than half of the votes cast in the election are in its favor. In case of union victory, the NLRB certifies the union as the exclusive bargaining agent for all the employees of the establishment. The employer then has to bargain with the union over wages, working hours, benefits, and other employment terms.

We follow previous studies (i.e., DiNardo and Lee, 2004; Lee and Mas, 2012) and use companies' legal name to match the election data to the financial information contained in Compustat. This procedure leads to a total of 3,400 elections for which we could verify the correctness of the matches manually. Of these elections, around 21% are in the same state as the firm's headquarter while 41% of establishments have the same 2-digit Standard Industrial Classification (SIC) code as the headquarter (with 63% of them exhibiting the same 1-digit SIC code).[15] Finally, around 70% of elections are in firms with a 2-digit SIC code from 10 to 40, which includes Mining and Construction (SIC from 10 to 17) and Manufacturing (SIC from 20 to 39). These statistics match those in DiNardo and Lee (2004) and Lee and Mas (2012).

In order to minimize the overlapping of elections in different establishments of the same company, our baseline analysis is based on a sample of firms that have not hosted an election in the past four years. This reduces the risk that firms appear in both the treated and control groups due to two different certification elections being held a few years from each other. This brings down the number of elections to 1,463. We report the number of observations in each table based on the availability of leverage and maturity variables.

Table 1 reports averages and standard deviations of our union election-Compustat matched dataset for variables common to the three datasets used in this study. Table IA3 contains more detailed statistics on firm- and union election-specific variables. We follow the literature and exclude both financial and utility firms from the sample. Our data roughly matches the sample size and the variables' first moments of the data used in other papers that exploit union elections as the empirical identification strategy (see, e.g., Campello et al., 2018).

E.2 Empirical methodology – Regression Discontinuity

We employ a regression discontinuity design (RDD) to establish a causal link between increased employees' bargaining power (captured by unionization events) and firms' debt structure decisions. Firms undergoing union elections are assigned to the treated and control groups depending on whether the union wins or loses, respectively. Election rules exogenously determine the threshold separating treated and control firms: a union wins if more than 50% of eligible workers vote

[15]The state and the industry codes of establishments and headquarters are not necessarily the same, given that firms can have establishments in multiple states and they can operate in several industries.

in favor of a collective bargaining unit. We measure firms' leverage and debt maturity responses to unionization as the discontinuous jump of these variables at the 50% threshold point.

We estimate the following regression:

$$\Delta y_i = \alpha + \beta_2 \text{Win}_i + f(X_i) + \epsilon_i, \tag{50}$$

where Δy_i is the change in a firm's i debt structure in response to unionization, Win_i is an indicator variable equal to one if a union wins an election in firm i and zero otherwise, and $f(X_i)$ is a flexible functional form of the variable X_i, which is the share of votes cast in favor of the union and is generally referred to as *running variable* in the jargon of the RDD. We assign firms to the treated or control groups based on whether X_i is greater or lower than 50%, respectively.

We define the response to unionization with the following equation:

$$\Delta y_i = \ln(\bar{y}_{i;t,t+m-1}) - \ln(\bar{y}_{i;t-1,t-n}), \tag{51}$$

where t is the fiscal year in which the election takes place for firm i, and $\bar{y}_{i;t,t+m-1}$ and $\bar{y}_{i;t-1,t-n}$ are the averages of the financial response variable – that is, the leverage or debt maturity measures – computed over m years after the election and n years before the election, respectively. All the RDD results presented in the tables are obtained by setting $n = 3$ and $m = 2$. Firms' debt maturity dynamic is downward sloping over the years (Custódio, Ferreira, and Laureano, 2013), so that taking an average over more years in the past makes it harder to find a positive jump in the long-term debt maturity measures. Setting $n = 3$ thus stacks the deck against finding any results, and so our findings can be interpreted as a conservative estimate of the effect of unionization on debt maturity. The qualitative results remain the same if we use different values for n and m.

E.3 Results

We find a positive and statistically significant effect of unionization on firms' debt maturity – firms respond to unionization by lengthening the average maturity of their debt. Panel A in Table IA26 reports the estimated effect of unionization on debt maturity variables. We use several proxies to measure debt maturity and find similar qualitative results across them. The most conservative estimate shows that unionized firms increase the ratio of long-term debt to assets (LT debt ratio (>5) variable, which includes debt with maturity longer than five years) by about 25% more than those avoiding unionization. This is equivalent to a 3.4 percentage points increase in the sample mean, which is about $30 million for the average firm (around 1% of the total value of assets). We obtain similar qualitative effects using other measures of debt maturity as dependent variables. Results are robust to different polynomial functions f, i.e., polynomials of different orders – Columns (1) to (4) – of the running variable X_i.

We do not find a significant leverage change in response to unionization (Schmalz (2015) finds the same result using a larger sample of elections). Panel B in Table IA26 presents the coefficients from estimating the model in Equation (50) using book and market leverage as dependent variables. Columns (1) to (4) report results for the model with polynomials of different degrees. All estimates for the two dependent variables are not statistically significant. Consistent with the model insight that the leverage response to changes in workers' bargaining power is ambiguous (Proposition 3), we do not find evidence that firms increase leverage in response to unionization events.

Figures IA9 provides graphical evidence of the discontinuity of debt maturity and leverage around the 50% cutoff. These figures confirm the results of the regression analysis. The top panels display a jump at the 50% cut-off for the debt maturity measures. Results are similar when using two different measures of debt maturity (i.e., LT debt ratio (>3Y) and LT debt ratio (>5Y) variables). The bottom panels show no jumps at the 50% cutoff for either measure of firm leverage, suggesting that the average firm that becomes unionized does not increase its leverage compared to the average firm that escapes unionization.

E.4 Robustness tests

We perform several robustness and validity tests to corroborate our main findings. First, we estimate the RDD leverage and debt maturity models on a sample of firms that undergo union elections for the first time and exclude any other election held later by the same firms. Results are in Table IA27. These estimates are consistent with those we obtain when we include firms holding multiple elections, which mitigates the concern that sample selection might be driving our results.

Second, we address the concern that the polynomial approach may use elections for which the share of votes cast in the election, X_i, is far from the critical 50% cutoff. This improves the statistical power by employing a larger sample of elections but can introduce bias in the estimates (elections with sharp results may be easier to predict and, thus, less random). Table IA28 reports the estimates for local linear regressions that use only elections for which X_i is within a given bandwidth around the 50% threshold and within the optimal bandwidths suggested by Calonico et al. (2014) (Column 1) and Imbens and Kalyanaraman (2012) (Column 2). The qualitative results of the local linear regressions are similar to those we obtain using the global polynomial.

Finally, we run a series of placebo tests using arbitrarily chosen thresholds to separate firms into the treated and control groups. Results are presented in Table IA29. The indicator variable Win (which is now 1 if X_i is above an arbitrary winning threshold, and 0 otherwise) has no positive and statistically significant effect on leverage for any of the thresholds, while it has a positive and significant effect on maturity only when we use the 50% threshold. This supports the idea that the results for the debt maturity variables capture the firms' response to unionization.

E.5 Assumptions and validity tests

The RDD setting relies on the assumption that union elections' outcomes cannot be fully predicted. If either firms or workers can systematically influence the outcome of elections, our estimates may suffer from reverse causality or selection bias issues.[16] We take steps to mitigate this concern.

First, we include only polls with at least 50 eligible workers, since forecasting the elections' result is arguably more challenging as the number of voters grows (Table IA3 reports summary statistics about the number of workers casting votes in our sample of union elections). Second, we account for the potential manipulation of election outcomes by controlling for the winning margins, since sharper outcomes (e.g., everybody voting in favor or against the union) are more likely in case of manipulation. Third, we provide evidence on the continuity of the running

[16]Firms may adjust their debt structure to influence the outcome of elections, rather than in response to unionization. Workers may request a union election only when they are positive that the union will be certified, which may be correlated to the firm's debt structure. Our estimates would suffer from reverse causality in the former case and from selection bias in the latter.

variable at the 50% cutoff point, which goes against manipulation. Following McCrary (2008), we perform a discontinuity test procedure. Figure IA8 plots the estimated distribution of the running variable. The density function is statistically continuous at the 50% threshold. The formal statistical test confirms the visual evidence. The Z-statistic obtained by using McCrary's test is 0.76, so we cannot reject the null hypothesis that the distribution is continuous at the 50% threshold.[17]

Finally, we mitigate the concern that treated and control firms might be *ex-ante* systematically different in observable characteristics. We test the continuity of firms' observable characteristics at 50% cutoff and find that the unionized and escapee firms in our sample are comparable from the observable perspective. We run a standard validity test by looking at firm-level characteristics in the year preceding an election. Table IA30 shows that, in the year before the election, the characteristics of the firms in the treated and control groups are not statistically different. We obtain these results by estimating the same model in Equation (50) where the dependent variables are firms' observable characteristics.

[17]It is worth noticing that while the petition for requiring a union election needs 30% of eligible workers, it is required a majority of 50% of votes to appoint a union. This generates *ex-ante* uncertainty about the election's result.

E.6 Tables and Figures

Figure IA8. (RDD – Continuity of the running variable share of votes cast) The figure displays the density plot of the running variable, Share of Votes, which represents the ratio of votes for union to the total valid votes cast in an election. We follow the method outlined in McCrary (2008) to examine if there is a discontinuity in the distribution of the running variable at the critical threshold of 50%. The thin solid line represents the 95% confidence interval around the fitted density. The data for union elections are obtained from the National Labor Relations Board (NLBR).

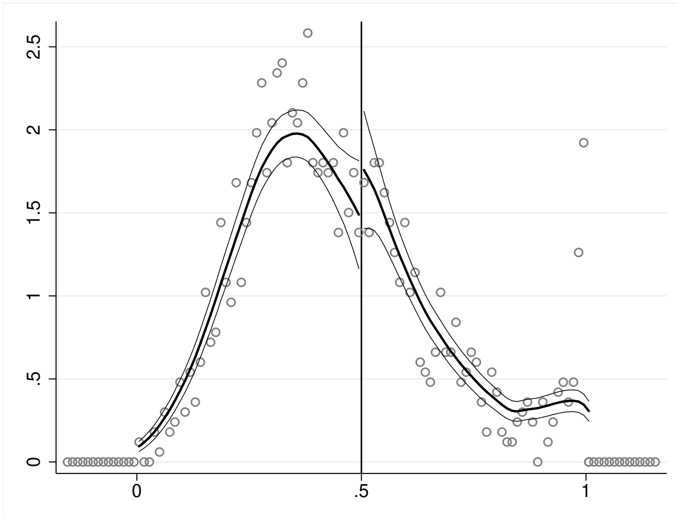


Figure IA9. (Maturity and Leverage responses to unionization) The figure illustrates the response of debt maturity and leverage to a unionization election. The top panels show the changes in the (log)ΔLT debt ratio (>3Y) and (log)ΔLT debt ratio (>5Y), representing the shifts in the proportion of debt with maturities longer than three and five years, respectively, relative to the firm's total assets. The bottom panels depict the (log)ΔLeverage and (log)ΔMarket Leverage, which capture the changes in book and market leverage following unionization. The x-axis displays the running variable "Share of Votes," indicating the fraction of total votes in favor of unionization. The solid lines represent fitted quadratic polynomial estimates, while the dashed lines indicate the 90% confidence interval. The dots represent averages of the maturity and leverage variables calculated over 20 evenly distributed bins. The discontinuity observed at the 50% threshold of the "Share of Votes" variable signifies the estimated causal effect of unionization. The election data is sourced from the National Labor Relations Board (NLRB), and the firms' debt maturity and leverage variables are obtained from Compustat.

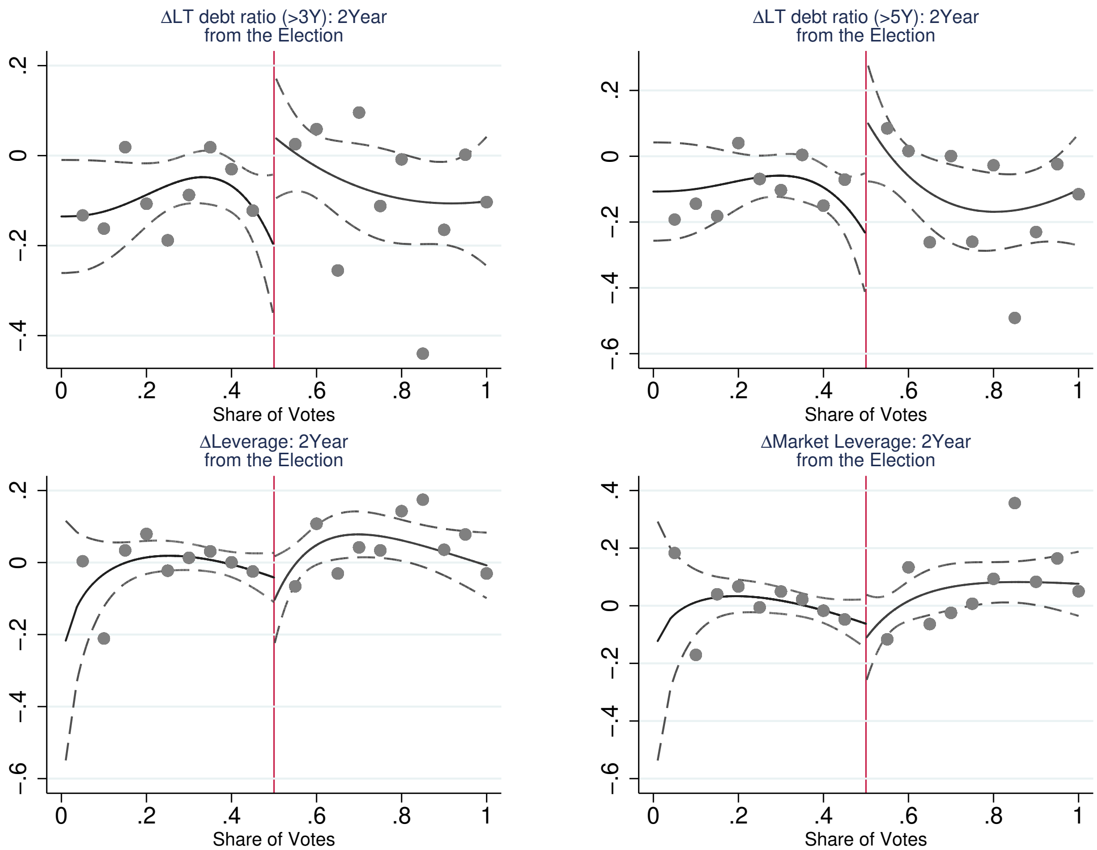


Table IA26. (Debt structure response to union elections) The table presents estimates using a Regression Discontinuity Design (RDD), as described by Equation (50), for debt maturity and leverage measures. The changes in these measures are calculated as the logarithmic differences between the averages of the two years after and three years before the event. Models (1) to (4) display the results for polynomials of order three, four, five, and six, respectively. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the firm level. $***$, $**$, and $*$ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
Polynomial	Three	Four	Five	Six
	Panel A. Maturity			
	Dep. var.: ΔLT debt ratio (>3Y)			
Win	0.185**	0.187**	0.282***	0.283***
	(0.0869)	(0.0867)	(0.101)	(0.101)
Obs.	797	797	797	797
	Dep. var.: ΔLT debt ratio (>5Y)			
Win	0.251**	0.252**	0.332***	0.340***
	(0.107)	(0.108)	(0.126)	(0.128)
Obs.	743	743	743	743
	Panel B. Leverage			
	Dep. var: ΔBook leverage			
Win	0.003	-0.001	0.009	0.006
	(0.062)	(0.062)	(0.071)	(0.071)
Obs.	1,143	1,143	1,143	1,143
	Dep. var: ΔMarket Leverage			
Win	0.003	-0.001	0.011	0.006
	(0.078)	(0.077)	(0.088)	(0.088)
Obs.	1,012	1,012	1,012	1,012

Table IA27. (RDD – First time elections) The table presents Regression Discontinuity Design (RDD) estimates using global polynomials. The sample consists of observations for the first occurrence of an election at each firm. For firms with multiple elections within the sample period, the official closing date (year and month) is used to identify the first election. Models (1) to (4) estimate global polynomials of order three, four, five, and six, respectively. Panel A displays the results for the debt maturity variable, while Panel B presents the results for the leverage regressions. Standard errors are robust, accounting for heteroskedasticity, and clustered at the firm level. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% level, respectively.

Global Polynomial	(1) Three	(2) Four	(3) Five	(4) Six
	Panel A. Dep. var: ΔLT debt ratio (>5Y)			
Win	0.305**	0.316**	0.348**	0.354**
	(0.124)	(0.125)	(0.146)	(0.148)
Obs.	608	608	608	608
	Panel B. Dep. var: ΔBook leverage			
Win	-0.0419	-0.0479	-0.0476	-0.0524
	(0.0663)	(0.0666)	(0.0760)	(0.0755)
Obs.	945	945	945	945

Table IA28. (RDD – Local linear regressions using several bandwidths) This table presents the results of local linear regression estimations, examining the impact of unionization on maturity and leverage. In Panel A, all specifications focus on the dependent variable ΔLT debt ratio (>5), while in Panel B, the dependent variable in all specifications is ΔBook leverage. The primary explanatory variable is Win, which takes a value of one when an election is won by a representative union and zero otherwise. Columns (1) and (2) use optimal bandwidths calculated following the procedures outlined in Calonico et al. (2014) and Imbens and Kalyanaraman (2012), respectively. Columns (3) to (6) estimate linear regressions using different bandwidths on samples with varying widths to the left and right of the critical 50% cutoff. The specific bandwidths used are specified at the top of each specification. Standard errors, shown in parentheses, are robust to heteroskedasticity and clustered at the firm level. $***$, $**$, and $*$ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Bandwidth:	[0.32,0.68]	[0.34,0.66]	[0.45,0.55]	[0.35,0.65]	[0.25,0.75]	[0.15,0.85]
	Panel A. Dep. var.: ΔLT debt ratio (>5Y)					
Win	0.286**	0.365**	0.0173	0.325**	0.247**	0.243**
	(0.129)	(0.148)	(0.207)	(0.139)	(0.111)	(0.0977)
Obs.	418	366	119	342	551	643
	Panel B. Dep. var.: ΔBook leverage					
Win	-0.00924	-0.0184	-0.121	-0.0386	0.00705	-0.00668
	(0.0713)	(0.0775)	(0.139)	(0.0805)	(0.0598)	(0.0561)
Obs.	648	574	189	536	842	1,002

Table IA29. (RDD – Placebo test with arbitrary winning threshold) The table presents estimates from the main model described in Equation (50), utilizing various arbitrary critical threshold points. We only display results for the six-order polynomial specification but findings are similar across different polynomial orders. The placebo winning threshold for each specification is indicated above the estimates, representing the percentage of valid votes required for unions to win an election. The model labeled as "True" corresponds to the specification using the actual endogenously given threshold of 50% that determines the outcome of elections. Standard errors are robust and clustered at the firm level. * * *, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	Union elections' arbitrary winning thresholds						
	(1)	(2)	(3)	True	(5)	(6)	(7)
	5%	20%	35%	50%	65%	80%	95%
	Panel A. Dep. var.: ΔLT debt ratio (>5Y)						
Win	0.118	-0.0494	-0.109	0.251**	-0.0427	-0.217	0.0583
	(0.268)	(0.158)	(0.0933)	(0.107)	(0.157)	(0.280)	(0.243)
Obs.	743	743	743	743	743	743	743
	Panel B. Dep. var.: ΔBook leverage						
Win	0.0611	-0.0199	-0.0764	0.00292	0.0606	-0.0290	-0.222*
	(0.209)	(0.102)	(0.0529)	(0.0620)	(0.0843)	(0.168)	(0.132)
Obs.	1,143	1,143	1,143	1,143	1,143	1,143	1,143

Table IA30. (RDD – Continuity of firms' observable characteristics at the cutoff threshold) This table presents the results of validity tests for the Regression Discontinuity Design (RDD) analysis, specifically examining the continuity assumption of observable characteristics among firms in the year preceding a unionization election. The null hypothesis being tested is that there are no systematic observable differences between firms that win or lose a unionization election. The coefficients of the explanatory variable, Win, are reported in the columns for different winning/losing margins relative to the 50% threshold. Model (1) considers elections across all margins, while Model (2) focuses on winners and losers within a 20% margin from the 50% threshold. Model (3) examines winners and losers within a 10% margin, and Model (4) analyzes winners and losers within a 5% margin from the 50% threshold. The dependent variables tested are listed in the rows of the table. Standard errors, shown in parentheses, are robust and clustered at the firm level. $***$, $**$, and $*$ indicate significance at the 1%, 5%, and 10% level, respectively.

	Explanatory variable: Win			
	Election's Winning/Losing Margin			
	(1)	(2)	(3)	(4)
Dependent Variables	[0, 1]	[0.30, 0.70]	[0.40, 0.60]	[0.45, 0.55]
Size_{t-1}	0.248	0.057	-0.161	0.628
	(0.284)	(0.441)	(0.581)	(0.940)
Cash_{t-1}	0.003	0.005	0.017	-0.017
	(0.012)	(0.020)	(0.024)	(0.039)
M/B_{t-1}	0.064	0.232	0.373*	0.505
	(0.142)	(0.185)	(0.226)	(0.440)
Oper. Leverage_{t-1}	-0.006	-0.282	-0.157	-0.623**
	(0.161)	(0.227)	(0.253)	(0.293)
Roa_{t-1}	-0.000	-0.002	0.004	0.007
	(0.015)	(0.018)	(0.022)	(0.032)
Z-Score_{t-1}	0.530	-0.039	0.636	-0.173
	(0.406)	(0.471)	(0.528)	(0.903)

F Financial Resilience and Labor Vulnerability during Economic Downturns

Insufficient financial resilience is not costly only to the firm but also to workers. When firms become more financially resilient as a consequence of increased labor bargaining power, they become more adept to deal with outside economic shocks, and that in turn should decrease employment risk to workers.

We test for this using the 2007–2009 financial crisis as shock to firms' cash flow through declines in consumer demand by households (Mian, Rao, and Sufi 2013). As documented by Giroud and Mueller (2017), local consumer demand shocks during the financial crisis led to sharper declines in employment for firms that were highly levered. Importantly, they show the relationship between leverage, consumer demand, and employment is not driven by differences in productivity, or sensitivity to fluctuations in employment or home prices. In this subsection, we extend their analysis to show that firm financial resilience plays a key role in sustaining firm employment. And, as a consequence, policies that reduce the bargaining power of workers will increase employment vulnerability during downturns.

We estimate:

$$\begin{aligned} Log(employment)_{ijt} = \beta_0 + \beta_1 Maturity_{2006,i} \times Post_{2009,t} + \beta_2 Leverage_{2006,i} \times Post_{2009,t} \\ + \gamma X_{it} + a_i + a_{jt} + \epsilon_{ijt} \end{aligned} \tag{52}$$

where $Maturity_{2006,i}$ is firm i's debt maturity ratio measured in 2006, computed using the proportion of long-term debt with maturity longer than five years, $Leverage_{2006,i}$ is firm i's leverage as of 2006, $Post_{2009,t}$ is an indicator variable that turns one in 2009, and X_{it} are firm controls that might be time-varying. As before, a_i and a_{jt} are firm and industry-year fixed effects, respectively. Notice that single-order terms are absorbed by fixed effects. Our coefficient of interest is β_1.

Table IA31 reports our results. Column (1) presents estimates without controls. Column (2) controls for size, cash, and profitability. Column (3) controls for cash reserves prior to the recession. Column (4) presents results excluding interim recession years. In all our results, higher maturity is associated with more resilient employment: a 10% increase in long-term debt is associated with a 1.2 to 3.6% higher levels of employment, with our preferred estimates at 2% (column 1). Increases in leverage, the other component of financial resilience, are associated with sharp declines in employment, consistent with Giroud and Mueller (2017)'s findings. These results are also consistent with Benmelech et al. (2019), whose findings showed that for firms during the Great Depression, greater need to refinance maturing bonds was linked to larger reductions in firms' workforce.

F.1 Additional Robustness Employment Vulnerability

F.1.1 Firm Profitability During the Great Recession

Table IA31 showed that, consistent with findings in the literature, leverage and maturity are associated to firm unemployment following the Great Recession. Table IA32 shows that those effects are not a mechanical implication of reductions in profits. While firms do exhibit a drop in profitability during the Great Recession, differences in leverage or maturity show no association with ROA, EBIT, Pretax income, or net income for the firm.

F.1.2 Firm Exit During the Great Recession

Table IA31 showed that, consistent with findings in the literature, leverage and maturity are associated to firm unemployment following the Great Recession. Table IA33 shows that longer maturities are also associated with a decline in the probability of firm exit from Compustat.

F.2 Tables

Table IA31. (Employment Vulnerability) The table presents results from a difference-in-differences analysis that utilizes the 2007–2009 financial crisis as a shock to firms' cash flow. The dependent variable is the natural logarithm of the number of employees. The variable "Post2009" is an indicator that takes a value of one in 2009 and zero before. "Maturity2006" represents the firm's debt maturity ratio measured in 2006 (using the LT debt ratio(>5Y) variable), while "Leverage2006" corresponds to the firm's book leverage measured in 2006. Additionally, "Cash2006" indicates the firm's cash holding measured in 2006. All specifications include firm and industry-year fixed effects, with industry fixed effects at the two-digit Standard Industrial Classification level. If specified, the analysis incorporates the following financial controls: size, cash, and profitability. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the firm level. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
	Dependent var.: Log(Employees)			
	2006-2009			2006 and 2009
$Post_{2009} \times Maturity_{2006}$	0.204**	0.122*	0.151*	0.362**
	(0.092)	(0.072)	(0.090)	(0.163)
$Post_{2009} \times Leverage_{2006}$	-0.233***	-0.162***	-0.102	-0.369***
	(0.076)	(0.063)	(0.077)	(0.112)
$Post_{2009} \times Cash_{2006}$			0.250***	
			(0.042)	
Firm controls	No	Yes	No	No
Firm FE	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes
Adj. R2	0.9882	0.9921	0.9884	0.9761
Obs.	6,478	6,452	6,474	2,938
Cluster	1,696	1,693	1,695	1,469

Table IA32. (Firm profitability during the Great Recession) The table presents results from a difference-in-differences analysis that utilizes the 2007–2009 financial crisis as a shock to firms' cash flow. The dependent variables in this analysis are measures of firm profitability. The variable "Post2009" is an indicator that takes a value of one in 2009 and zero before. "Maturity2006" represents the firm's debt maturity ratio measured in 2006 (using the LT debt ratio(>5Y) variable), while "Leverage2006" corresponds to the firm's book leverage measured in 2006. Additionally, "Cash2006" indicates the firm's cash holding measured in 2006. All specifications include firm and industry-year fixed effects, with industry fixed effects at the two-digit Standard Industrial Classification level. If specified, the analysis incorporates the following financial controls: size and cash. Refer to the Variable List and Description table for more details about variables' definition and computation. Standard errors in parenthesis are robust and clustered at the firm level. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	ROA				ROA (Ebit)				Pre-tax income				Net income			
$Post_{2009} \times Maturity_{2006}$	0.009	-0.011	-0.020	-0.018	-0.002	-0.022	-0.032	-0.023	0.022	0.002	0.013	0.068	0.018	0.000	0.014	0.062
	(0.031)	(0.027)	(0.027)	(0.054)	(0.033)	(0.029)	(0.029)	(0.056)	(0.053)	(0.052)	(0.052)	(0.072)	(0.050)	(0.048)	(0.048)	(0.069)
$Post_{2009} \times Leverage_{2006}$	0.001	0.015	0.036	0.036	0.011	0.024	0.047*	0.047	0.051	0.061	0.034	0.066	0.058	0.066	0.031	0.066
	(0.026)	(0.022)	(0.023)	(0.046)	(0.028)	(0.024)	(0.025)	(0.047)	(0.051)	(0.049)	(0.050)	(0.053)	(0.047)	(0.045)	(0.047)	(0.048)
$Post_{2009} \times Cash_{2006}$			0.041*				0.045**				-0.052				-0.068*	
			(0.021)				(0.022)				(0.036)				(0.036)	
Firm controls	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.6856	0.7411	0.7415	0.4985	0.6617	0.7200	0.7205	0.4846	0.4894	0.5232	0.5234	0.3596	0.4295	0.4575	0.4580	0.2598
Obs.	6,466	6,452	6,449	2,916	6,466	6,452	6,449	2,916	6,477	6,463	6,460	2,936	6,477	6,463	6,460	2,936
Cluster	1,696	1,693	1,692	1,458	1,696	1,693	1,692	1,458	1,696	1,693	1,692	1,468	1,696	1,693	1,692	1,468

Table IA33. (Predicting firm exit after financial crisis) The table presents estimates from a linear regression model examining the relationship between firm exit and firm maturity, as well as book leverage. The dependent variable, Firm exit, takes a value of one if a firm is present in the Compustat dataset in 2006 but not in 2009, and zero if a firm is included in the sample for both 2006 and 2009. The model includes controls for firm size, profitability, and cash, with all firm characteristics measured based on their 2006 values. Standard errors, shown in parentheses, are robust to heteroskedasticity. * * *, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Dependent var.: Firm exit									
LT debt ratio(>1Y)	-0.322***	-0.132								
	(0.115)	(0.111)								
LT debt ratio(>2Y)			-0.464***	-0.259**						
			(0.110)	(0.109)						
LT debt ratio(>3Y)					-0.323***	-0.194*				
					(0.109)	(0.107)				
LT debt ratio(>4Y)							-0.212*	-0.155		
							(0.108)	(0.104)		
LT debt ratio(>5Y)									-0.103	-0.102
									(0.116)	(0.109)
Book leverage	0.460***	0.312***	0.540***	0.404***	0.411***	0.355***	0.279***	0.307***	0.145*	0.230***
	(0.107)	(0.106)	(0.100)	(0.102)	(0.096)	(0.098)	(0.088)	(0.090)	(0.082)	(0.084)
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Adj. R2	0.0117	0.0647	0.0142	0.0694	0.0111	0.0619	0.0068	0.0629	0.0017	0.0562
Obs.	2,764	2,732	2,611	2,581	2,358	2,332	2,112	2,093	1,835	1,819