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Capital Structure as a Strategic Variable: Evidence from Collective Bargaining

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ABSTRACT

I analyze the strategic use of debt financing to improve a firm's bargaining position with an important supplier—organized labor. Because maintaining high levels of corporate liquidity can encourage workers to raise their wage demands, a firm with external finance constraints has an incentive to use the cash flow demands of debt service to improve its bargaining position with workers. Using both firm-level collective bargaining coverage and state changes in labor laws to identify changes in union bargaining power, I show that strategic incentives from union bargaining appear to have a substantial impact on corporate financing decisions.

More debt for Eastern meant greater pressure to cut costs.... [The company] is embarked on a confrontation between labor and interest costs. It's not labor and management. It's labor and interest cost.

Farrell Kupersmith
Pilots' Union Representative[1]

THE STANDARD CORPORATE finance paradigm posits that a firm determines its optimal capital structure by making tradeoffs between the tax advantages of debt, the expected costs of financial distress, the impact of asymmetric information, and the implications for managerial incentives. But interactions with the firm's real activities may play an important role as well. When financial policy affects a firm's competitive position in product or input markets, the firm has an incentive to set its capital structure strategically to influence the behavior of competitors, customers, or suppliers.[2] Although this argument is well understood in theory, its empirical relevance is much less clear.

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[1]*Frontline*, "The Battle for Eastern Airlines," January 31, 1989.

[2]For surveys of the theoretical literature, see Harris and Raviv (1991) and Franck and Huyghebaert (2004).

The product market and input market effects of capital structure link the financial and real activities of a firm. Considerable evidence shows that changes in firm capital structure affect product-market behavior, including entry, exit, and pricing (Chevalier (1995a, 1995b), Phillips (1995), Chevalier and Scharfstein (1996), Kovenock and Phillips (1997), Zingales (1998)).[3] But how do firms respond to such incentives? This paper fills an important gap by showing that strategic incentives from labor markets have a substantial impact on financing decisions.

Labor unions are widely associated with raising wages and imposing other costs on employers (Lewis (1986)). Although U.S. firms are required by law to bargain with employee collectives in good faith, firms can also attempt to reduce the impact of bargaining on profits. Just as some firms seek to prevent unions from organizing in the first place (Freeman (1986)), they may also try to improve their negotiating position by reducing their financial flexibility in bargaining situations. By taking on additional debt and thereby increasing the demands on their cash flow, firms can credibly take a tougher stand when negotiating with workers.

Delta Air Lines' recent experience exemplifies how too much flexibility can hurt a firm's bargaining position with workers. With a strong market position and a history of fiscally conservative management, Delta weathered the airline industry downturn after September 11, 2001 by building up cash and liquidity. But greater liquidity also reduced the need to cut costs and hurt Delta's bargaining position with workers.[4] By 2004, Delta found itself far behind the other big carriers in restructuring, and in severe financial distress.

Another recent example comes from the public sector. Just before the Metropolitan Transit Authority (MTA) and the New York City Transport Workers Union entered into contract negotiations in December 2005, the MTA realized an unexpected $1 billion surplus. The source of much of the surplus was unrelated to the MTA's operations: A real estate boom had increased tax revenue to the MTA. Yet in negotiations, the union claimed rights to the surplus, demanding a 24% pay raise over 3 years. The union membership argued, "What about us? Somebody had to come to work so the MTA could acquire that surplus" (bus driver Anthony Hayes).[5]

A common feature of both examples is a cash flow shock that affected the bargaining environment with organized labor. In general, unions may try to claim a portion of a firm's realized excess liquidity—its operating cash flow net of any required debt payments. Thus, in the face of a strong union, a firm with a high level of expected excess liquidity has an incentive to improve its future bargaining position. One strategy is to reduce expected future liquidity by using more debt in the firm's capital structure. Just as leverage can be used to remove

[3]Other related empirical papers include Opler and Titman (1994), Campello (2003), Campello and Fluck (2004), and Brown, Fee, and Thomas (2009). The Franck and Huyghebaert (2004) survey article also summarizes this literature.

[4]Perz, Evan, "Cross Winds: How Delta's Cash Cushion Pushed It onto Wrong Course," *The Wall Street Journal*, October 29, 2004, p. A1.

[5]Chan, Sewell, "Transit Strike Deadline: The Surplus; How Extra Money Complicates Transit Pay Negotiations," *The New York Times*, December 15, 2005, p. B9.

excess liquidity that managers might otherwise spend unprofitably (such as on poor projects, unwarranted diversification, or wasteful perks; Jensen (1986)), leverage can be used to influence labor negotiations. In both cases, debt reduces managerial flexibility and discretion.

In Section I of this paper I present a theoretical framework that illustrates how collective bargaining affects a firm's optimal debt policy. This framework shows that collective bargaining interacts with variability in a firm's profits to give the firm a strategic incentive to increase its debt. The firm must consider the tradeoff between gains from improved bargaining power when the cash flow shock is positive and losses from increased costs of financial distress when the shock is negative. Greater profit variability has an asymmetric impact on this tradeoff, because the union earns rents only on inframarginal realizations of the shock. While greater variability exposes unionized and nonunionized firms to similar costs in periods of financial distress, it increases liquidity and hence a unionized firm's exposure to union rent seeking when a cash flow shock is positive.[6] Thus, a unionized firm with high profit variability has greater strategic incentive to use debt to shield liquidity from workers in bargaining and thus a higher optimal debt ratio than an otherwise similar nonunionized firm.

I provide evidence for the strategic use of debt using two estimation strategies, which use different proxies for union bargaining power. Both approaches regress measures of financial debt on proxies for union bargaining power and find that firms with greater exposure to union bargaining power use more debt. Consistent with the theory, the effect of collective bargaining on leverage is greatest at firms with a high degree of profit variability, which reflects characteristics of the specific product market in which a firm competes.

In the first approach, presented in Section II, I analyze cross-sectional correlations between debt and the percentage of employees covered by collective bargaining (a direct measure of union power) for a sample of mostly manufacturing firms from the 1970s, 1980s, and 1990s. The results suggest that union bargaining power leads firms to increase financial leverage: On average, the ratio of debt to firm value is 80 to 110 basis points higher when an additional 10% of employees bargain collectively. According to these estimates, a firm with a 50% unionized workforce is associated with 15% to 20% greater financial leverage than a typical nonunionized firm. Furthermore, these differences are larger at firms with more variable profits. These results are consistent with Bronars and Deere (1991), who show that unionization rates are correlated with financial leverage at the industry level. However, as in Bronars and Deere (1991), this result may be affected by omitted variable bias: Unions are more likely to organize in established, profitable firms and industries, which may also have a greater capacity for debt.[7]

[6]A union's claim on excess liquidity can be thought of as a real option. Greater underlying variability increases the value of the option.

[7]Other cross-sectional analyses also find complementary results: Hirsch (1991) finds that the ratio of debt to equity is higher in unionized companies; Cavanaugh and Garen (1997) show that the correlation increases with rough proxies for the specificity of a firm's assets; Sarig (1998) finds

To overcome this problem, I employ a second empirical approach, which uses states' adoption of right-to-work laws in the 1950s and states' repeal of unemployment insurance work stoppage provisions in the 1960s and early 1970s as sources of exogenous variation in union power. Analyses of the effects of these labor laws are presented in Section III. I find that after states adopt legislation to reduce union bargaining power, firms with concentrated labor markets reduce debt relative to otherwise similar firms in other states. In fact, the ratio of debt to firm value decreases by up to one-half after a right-to-work law is passed. These effects are again linked to variability in firm profits. While the ratio of debt to firm value decreases by up to one-fifth after a work stoppage provision is repealed for firms with profit variability that is one standard deviation above the mean, there is little effect among firms with low profit variability. As a falsification test, I show that these changes in labor laws do not seem to affect financial policy at firms in industries with low union presence. Various tests confirm the robustness of the profit variability interaction.

Although the impact of collective bargaining on the capital structures of U.S. firms likely decreased as private sector unionization declined after the 1950s (Dickens and Leonard (1985)), labor bargaining is still an important force at unionized firms in the United States (Hirsch (2004)). Indeed, while few U.S. CFOs admitted in a 1999 survey that "A high debt ratio helps us bargain for concessions from our employees" (Graham and Harvey (2001 p. 212)), the cross-section of actual firm capital structures in that year (presented in Section II) suggests that highly unionized firms use debt strategically to limit union wage gains. Furthermore, collective bargaining with labor remains prominent in much of the industrialized world: The share of private sector workers covered by collective bargaining agreements is 24% in Japan, 32% in Canada, 35% in the United Kingdom, 50% in Australia, and 63% to 99% in Continental Europe and Scandinavia (Visser (2006)). Consistent with the strategic use of financial leverage at non-U.S. firms, Gorton and Schmid (2004) show that German firms subject to codetermininiation laws (requiring partial employee corporate control) have greater leverage than other firms.

This paper provides empirical evidence that financial leverage can be an effective tool in determining how economic rents are divided between the stakeholders of a firm. This strategy has implications beyond the labor bargaining environment. For example, debt could be used strategically to prevent opportunistic hold-up by host nations, suppliers of critical inputs, or buyers of primary outputs in the context of project finance (Esty (2003)); to justify higher retail prices for a regulated utility (Spiegel and Spulber (1994)) or an unscheduled government subsidy to a private operator of public infrastructure (Ehrhardt and Irwin (2004)); or to affect the division of takeover gains between a corporate raider and target shareholders (Israel (1991), Müller and Panunzi (2004)).

that an estimate of labor's share of the firm's quasi-rent is positively correlated with financial leverage; and Hanka (1998) finds that debt is negatively correlated with employment, wages, and pension funding, and positively correlated with the use of part-time and seasonal employees.

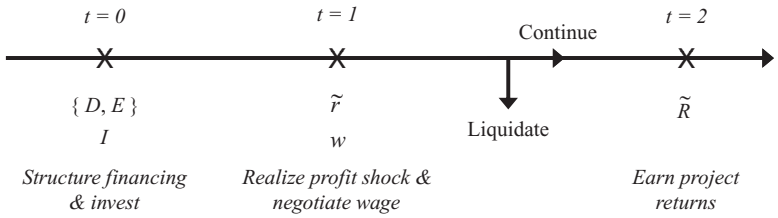


Figure 1. Timing of the model.

This paper also contributes to the broader industrial organization literature on strategic interactions between firms and other market participants. The idea that strategic considerations lead firms to act in ways that alter future competitive conditions is often modeled but rarely tested empirically. This literature studies firm strategies that require explicit financial expenditures, such as on production capacity (Spence (1979)) or advertising (Schmalensee (1983)), as well as strategies that incur implicit contracting costs, such as through financial leverage (Brander and Lewis (1986)) or by offering customers a guarantee against future price decreases (Cooper (1986)). But much of the empirical evidence is indirect, showing that various corporate actions affect competition and therefore that incentives exist for firms to use these actions strategically (e.g., Lieberman (1987), Scott Morton (2000)).[8]

In contrast, the empirical evidence presented here is part of a new literature that aims to provide more direct evidence that firms' actions respond to strategic incentives (Ellison and Ellison (2007), Goolsbee and Syverson (2008)). This paper is the first to provide direct empirical evidence of a causal relationship between strategic incentives and the use of financial leverage.

The paper proceeds as follows. Section I discusses the theoretical framework. Section II presents the cross-sectional empirical evidence, and Section III the labor law evidence. Section IV concludes.

I. Theoretical Framework

In this section, I show that a high degree of profit variability aggravates the bargaining problem faced by a unionized firm. I illustrate the connection between profit variability and strategic leverage using a simplified model of capital structure determination at a unionized firm, adapted from Holmström and Tirole (1996).[9] The timing of the model, depicted in Figure 1, includes three periods. At date 0, the firm faces an NPV-positive investment opportunity whereby a fixed initial investment I yields risky payoffs $\tilde{r} \geq 0$ at date 1 and $\tilde{R}$ at date 2, where $E[\tilde{r}] < I < E[\tilde{R}]$. In the initial period, the firm must structure

[8]Other approaches include structural tests (Kadiyali (1996)), survey evidence (Smiley (1988)), and laboratory experiments (Cooper, Garvin, and Kagel (1997)).

[9]Notions of the capacity to use debt as a means to partially control wage demands date back to Baldwin (1983), if not before, and formal models were developed by Bronars and Deere (1991), Dasgupta and Sengupta (1993), Perotti and Spier (1993), Sarig (1998), and Matsa (2006).

its financing of I by issuing unsecured debt that has face value D due at date 1 and equity.[10] At date 1, the firm must hire unionized workers to continue the project. The wage bill, $w(r)$, is the outcome of a bargaining process described below and is paid at date 1 from the firm's current cash flow. The workers' alternative wage is normalized to zero. If the firm satisfies its debt service and succeeds in hiring workers, then production takes place and a final payoff is realized at date 2. Assume that this continuation payoff, which can be thought of as including the net present value of any follow-on investments, cannot be pledged to investors. Any number of financial frictions can prevent these cash flows from being pledged; for example, in a prior version of this work, this constraint arose endogenously because of managerial moral hazard (Matsa (2006)). If the firm fails to repay its debt or to hire workers at date 1, then it is liquidated with value equal to zero. The financial markets are competitive with investors demanding a rate of return equal to zero, and both the labor union and investors are risk neutral.

By reducing the cash flows available at date 1, the level of debt D chosen by the firm at date 0 serves two functions. First, D determines the contingencies under which the firm will continue and under which it will liquidate. Because investment costs are sunk, the firm will continue whenever doing so is financially feasible, that is, for all r such that $r - w(r) \geq D$. Second, D affects labor negotiations. Going into these negotiations, it is common knowledge that the firm has $r - D$ in excess liquidity from which to pay workers, and that both parties' outside options—liquidation for the firm and alternative employment for the workers—are valued at zero. For simplicity, assume that D cannot be refinanced at date 1. For production to take place, the parties need to agree on how to divide the firm's excess liquidity.

Following Baldwin (1983) and Grout (1984), I adopt a generalized Nash bargaining solution where the firm maximizes the returns to shareholders, the labor union maximizes total income, and the respective bargaining powers for the union and management are $z \in [0, 1]$ and $1 - z$. This solution is a reduced form for any number of equivalent bargaining games, such as final offer arbitration (Blanchard and Tirole (2004)). Consequently, the workers are hired and paid a wage equal to

$$w(r) = z(r - D). \tag{1}$$

The negotiated wage is increasing in the workers' bargaining power, increasing in the intermediate cash flow, and decreasing in the level of debt. That is, if nonlabor costs overrun or if the firm faces a greater debt burden, then the union will be less able to secure a favorable wage. In fact, for a project at the continuation margin, where $r = D$, the union is left with zero surplus, $w = 0$.[11]

[10]Strictly speaking, "equity" here is the combination of equity and debt due at date 2. In this simplified framework without nonlabor financing frictions, the choice between these securities does not affect the value of the firm (Modigliani and Miller (1958)).

[11]In this model, the financing frictions prevent any of the date 2 payoff from being pledged to workers as additional compensation. In a richer framework where some of the date 2 payoff can

Given that the firm anticipates this wage bargain to be negotiated at date 1, how should the firm structure its financing at date 0? Because $I < E[\tilde{R}]$, shareholders will invest in the project even when the union has all of the bargaining power. For the ease of exposition, assume that r is uniformly distributed between $\bar{r} - \sigma$ and $\bar{r} + \sigma$, where $\bar{r} > \sigma$.[12] The firm will never choose to issue debt with face value less than $\underline{D} = \bar{r} - \sigma$, because debt with face value $\underline{D}$ is riskless and in every scenario achieves project continuation and lower wages than debt with lower face value. However, a firm may choose to issue additional (risky) debt, depending on the strength of the union's bargaining power. An optimizing firm sets its financial leverage to maximize the total return to shareholders:

$$\max_{D \geq \underline{D}} \left[\int_{\bar{r}-\sigma}^{D} r \frac{1}{2\sigma} dr + \int_{D}^{\bar{r}+\sigma} D \frac{1}{2\sigma} dr \right] + \int_{D}^{\bar{r}+\sigma} ((1-z)(r-D) + E[\tilde{R}]) \frac{1}{2\sigma} dr. \quad (2)$$

The first term of this expression equals the cash inflow from issuing debt at date 0, and the second term equals the expected total profits earned at dates 1 and 2 net of any negotiated wage payments. The solution to this problem is

$$D^* = \max \left\{ \bar{r} - \sigma, \bar{r} + \sigma - \frac{E[\tilde{R}]}{z} \right\}. \quad (3)$$

The firm's optimal debt policy trades off surplus created at the continuation margin, $E[\tilde{R}]$, and the size of labor's quasi-rent, $z(r - D)$, which accrues on inframarginal projects. If union bargaining power and profit variability are sufficiently low relative to the expected returns from continuation (i.e., $z \leq E[\tilde{R}]/2\sigma$), then the firm chooses the low debt level $\bar{r} - \sigma$, which decreases with profit variability. With the low debt level, the firm withstands any profit shock, but risks exposing a high level of excess liquidity to union capture at date 1. When union power is high (i.e., $z > E[\tilde{R}]/2\sigma$), then it is optimal for the firm to use more debt in its capital structure. With the additional debt in place, the union earns a lower rent, but the firm may be forced to forgo the benefits of continuation if the intermediate cash flow falls short.

Two notable comparative statics follow from the firm's optimal debt policy, described by equation (3). First, union bargaining power can lead a firm to increase debt. Greater union power makes the firm more likely to set debt above $\underline{D}$, and the optimal debt level increases with union power. When union bargaining power increases, the union's potential rent increases, giving the firm greater incentive to carry debt. Second, union bargaining power can lead

be pledged, workers can also bargain for a profit-sharing or equity arrangement whereby they receive some of the payoff at date 2. Even with an equity stake, the union still has an incentive to maximize the value of wages paid at date 1. The imposition of corporate income taxes would further reinforce this incentive. For every dollar reduction in wages, workers capture only $\alpha(1 - \tau)$ in the value of their equity, where α is workers' share of equity and τ is the corporate income tax rate. Therefore, even if workers hold an equity stake in the firm, financial leverage will be effective in reducing labor's wage demands.

[12]This assumption is not crucial; Matsa (2006) shows that the results related to the role of profit variability hold in an agency cost model of corporate finance that relaxes this assumption.

to greater increases in debt at firms with more variable profits. When union power is low and the variability of future cash flows increases, potential costs of financial distress give the firm an incentive to decrease leverage. If the realized cash flow is below the firm's promised debt payment, then the firm is forced to liquidate and forgo the profits from continuation. To avoid this cost of financial distress, a low union firm decreases its leverage when profit variability increases. When union power is high, in contrast, the firm will be less likely to decrease its leverage in the presence of more variable profits. This is because, for a given debt level, greater profit variability exposes more liquidity to union capture when cash flows are high. Thus, when unions are powerful, this consideration gives the firm an incentive to increase debt to reduce its inframarginal wage costs. Equation (3) therefore shows that the bargaining advantage associated with increased financial leverage is greater than the incremental costs of financial distress incurred, leading the optimal debt level to increase with profit variability.

It is thus the combination of union power and profit variability that provides scope for the strategic use of debt financing. In fact, the use of strategic debt—that is, the difference between the high and low debt levels in equation (3)—approaches zero at firms with little profit variability, no matter how high their average level of profits $\bar{r}$. Therefore, in the empirical analysis that follows, in addition to looking at the main effect of union bargaining power, I will examine this interaction of bargaining power and profit variability to test for the strategic use of debt.

II. Cross-sectional Evidence

A. *Cross-sectional Empirical Approach*

The degree of union bargaining power in negotiations with a given firm likely increases with the proportion of the firm's employees covered by collective bargaining. At firms with greater coverage, union-organized job actions are more costly, and firm-wide policies are more likely to be affected by bargaining. I use firm-level data on collective bargaining coverage as a proxy for union bargaining power and estimate its effect on the firm's choice of capital structure.

Firm-level estimates of collective bargaining coverage are not widely available. I obtain estimates from two different sources for cross-sections of firms in 1977, 1987, and 1999. Coverage estimates for 1977 and 1987 were derived from two surveys of manufacturing firms conducted in 1972 and 1987 (see Hirsch (1991) for details). The data for 1999 were compiled by Craig Eschuk (2001), mostly from company 10-K annual reports, and were provided to me by Richard Freeman. The companies that report collective bargaining coverage in their 10-K tend to be those companies for which union relations are material to the firm, leading all firms for which data were collected to have at least some collective bargaining coverage. To enable estimation using the extensive as well as the intensive margin, I add 200 other random Compustat firms to

Table I

Summary Statistics for Cross-sectional Analysis

The sample consists of 1,676 firm-year observations from 1977, 1987, and 1999. Estimates of union coverage are from Hirsch (1991) and Eschuk (2001), and the financial data are from Compustat. The sample includes all firms with nonmissing observations for the variables shown below. Union coverage is the proportion of a firm's workers covered by collective bargaining. Profit variability is the standard deviation of the change in earnings before depreciation and amortization, divided by lagged total assets. This variable is then divided by 0.058 (its sample standard deviation). Profit variability is calculated using data from the previous 10-year period, excluding firms with fewer than 5 years of data. Compustat variables are winsorized at 1% tails.

	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
		Panel A: Debt			
Total debt/Market value	0.317	0.221	0.141	0.287	0.467
Total debt/Book value	0.261	0.164	0.154	0.252	0.347
		Panel B: Key explanatory variables			
Union coverage	0.270	0.266	0.000	0.200	0.500
Profit variability	0.731	1.000	0.262	0.415	0.737
		Panel C: Financial control variables			
Fixed assets (%)	0.355	0.185	0.220	0.322	0.461
Market-to-book ratio	1.868	2.398	0.810	1.231	2.014
Log sales ($ Mil)	6.279	2.005	4.950	6.345	7.743
Modified z-score	2.149	1.633	1.688	2.391	2.957
Return on assets	0.099	0.101	0.070	0.109	0.149

the 1999 sample and assume that these firms have zero union coverage.[13] Each cross-section is supplemented with firm-level financial information from Compustat, and these variables are winsorized at 1% tails. The sample includes all firms with nonmissing observations for debt, total assets, market value, and the financial controls (listed below), which leaves me with 656 firms in 1977, 428 firms in 1987, and 592 firms in 1999. Summary statistics are presented in Table I. On average across the full sample, 27% of employees are covered by collective bargaining, which is similar to estimates derived from other sources (Hirsch and Macpherson (2003)).

I use regression analysis to examine the cross-sectional correlation between collective bargaining coverage, debt, and profit variability at the firm level. I estimate a typical leverage regression (Rajan and Zingales (1995)), and include union coverage as an additional regressor. Specifically, let $DEBT_{ijt}$ be a measure of financial debt at firm i in industry j and year t, and $VALUE_{ijt}$ represent the market value of the firm. I then regress

$$\frac{DEBT_{ijt}}{VALUE_{ijt}} = \alpha_1 UNION_{it} + \alpha_2 VARIABILITY_{it} + \alpha_3 UNION_{it} * VARIABILITY_{it} + X_{it}\beta + \omega_{jt} + \varepsilon_{ijt}, \tag{4}$$

[13]I thank the co-editor for suggesting this approach. The results are qualitatively similar when the additional firms are excluded from the analysis.

where the level of debt as a fraction of the firm's total value is modeled as a function of the proportion of employees covered by collective bargaining ($UNION_{it}$), a measure of profit variability ($VARIABILITY_{it}$), the interaction between $UNION_{it}$ and $VARIABILITY_{it}$, a set of financial controls X_{it}, and two-digit SIC industry-by-year fixed effects ω_{jt}. Profit variability is measured using the standard deviation of the change in earnings before depreciation and amortization, divided by lagged total assets.[14] Profit variability is demeaned (with respect to the mean for the entire sample) before it is interacted with union coverage, so α_1 represents the relation between debt and union coverage for a firm with average profit variability. The financial controls are those typically included in leverage regressions, namely the proportion of fixed assets (a proxy for potential collateral), the market-to-book ratio (investment opportunities), log sales (firm size), modified Altman's z-score (probability of bankruptcy), and return on assets (profitability).[15] Summary statistics for these variables are presented in Table I. For this sample, the average ratio of debt to firm value is about 32%. The estimated standard errors in all regressions are corrected for clustering at the firm level.

B. Cross-sectional Estimates

Cross-sectional evidence on the relation between unionization and total borrowing is presented in Table II. Univariate analysis, reported in column 1, suggests that firms with high rates of collective bargaining coverage use more financial leverage. On average, the ratio of debt to firm value is 102 basis points higher when an additional 10% of employees bargain collectively. Thus an average firm whose workforce is 50% unionized has 5.1 percentage points higher financial leverage than a nonunionized firm—a 21% increase over the mean leverage ratio of 26% for nonunionized firms.

The strength of the relation between unionization and debt is greater at firms with greater profit variability. Consider two firms—one with one standard deviation greater profit variability than the other. An increase in a firm's union

[14]This measure of profit variability dates back to Brealey, Hodges, and Capron (1976), if not before, and is common in the literature. For a discussion of its relative merits, see Chaplinsky (1984). The ratio is normalized by its standard deviation to ease the interpretation of the estimates. Measures of profit variability are meant to reflect the product market variability underlying each firm's business. Depreciation and amortization are added back to earnings, because they are noncash charges. Where available, data for up to the previous 10 years are included in the calculation of profit variability (e.g., 1967 through 1977 for 1977). Including more years of data does not change the results. An observation is dropped if fewer than 5 years of data are available for that firm.

[15]These variables reflect the literature on capital structure, surveyed in Harris and Raviv (1991). In particular, they are the variables included in cross-sectional analysis in Rajan and Zingales (1995) plus other variables the authors state they would have included but for lack of data availability across their broad set of countries. The modified Altman's z-score is

$$3.3\frac{EBIT}{total\ assets} + 1.0\frac{sales}{total\ assets} + 1.4\frac{retained\ earnings}{total\ assets} + 1.2\frac{working\ capital}{total\ assets}$$

(MacKie-Mason (1990)).

Table II

Cross-sectional Regression of Total Debt on Unionization

The table summarizes the results from regressions of total debt divided by the market value of the firm (divided by assets in column 4) on the fraction of a firm's workforce covered by collective bargaining, the variability of the firm's profits, the interaction between those variables, and a set of controls. Profit variability is measured in units of standard deviations of sd(Δearnings)/assets, where earnings is before depreciation and amortization. When uninteracted, the collective bargaining coverage coefficient measures the effect of the law at the mean of profit variability, and the profit variability coefficient measures the effect for nonunionized firms. Controls in all regressions include industry-by-year fixed effects at the two-digit SIC level. Where indicated, controls also include the following financial controls: the proportion of fixed assets, the market-to-book ratio, log sales, modified Altman's z-score, and return on assets. Standard errors, clustered at the firm level, are reported in parentheses. Compustat variables are winsorized at 1% tails. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Union coverage	0.102***	0.108***	0.070***	−0.011
	(0.025)	(0.026)	(0.023)	(0.017)
Union coverage		0.066*	0.130***	0.071**
∗ Profit variability		(0.038)	(0.038)	(0.029)
Profit variability		−0.003	−0.041***	−0.022**
		(0.007)	(0.012)	(0.010)
R^2 (overall)	0.21	0.21	0.37	0.33
R^2 (excluding FEs)	0.04	0.04	0.28	0.23
Industry-year fixed effects	X	X	X	X
Financial controls			X	X
Using book leverage				X

coverage by 10 percentage points is associated with approximately a 66 basis point greater increase in leverage for the more exposed firm (column 2). This estimate doubles after including the usual controls, such as asset tangibility, firm size, and return on assets (column 3). These differences are economically significant: for firms with profit variability one standard deviation above the mean, 50% union coverage is associated with about 35% to 40% higher leverage than a nonunionized firm.[16] In contrast, for firms with little profit variability, differences in union coverage rates seem to have little effect. This interaction effect is robust to using book (as opposed to market) leverage as the dependant variable, but note that the main effect in this specification is not significant (column 4). The interaction effect is also robust to including interactions between union coverage and all of the other financial variables as additional controls. These findings are consistent with theoretical considerations, discussed above, suggesting that the benefits of strategic leverage increase with profit variability.

Analyses of other measures of debt show similar patterns. Table III reports estimates of the relation between union coverage, profit variability, and near-term debt due within 1 to 5 years. Unionized firms have higher ratios of

[16]For these firms, the marginal effect is 8.7 to 10.0 percentage points, and the average leverage ratio is 26% for nonunionized firms.

Table III

Cross-sectional Regressions of Near-Term Debt on Unionization

The table summarizes the results from regressions of various measures of near-term debt divided by the market value of the firm on the fraction of a firm's workforce covered by collective bargaining, the variability of the firm's profits, the interaction between those variables, and a set of controls. The specifications are the same as that reported in Table II, column 3, but the dependent variable in each column is debt due within the number of years indicated, divided by the market value of the firm. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: Debt Due within X Years /Market Value				
	1 year	2 years	3 years	4 years	5 years
Union coverage	0.012	0.021*	0.033**	0.041**	0.039**
	(0.009)	(0.012)	(0.015)	(0.017)	(0.019)
Union coverage	0.050***	0.083***	0.095***	0.116***	0.119***
∗ Profit variability	(0.014)	(0.021)	(0.024)	(0.029)	(0.032)
Profit variability	−0.009*	−0.019***	−0.022***	−0.029***	−0.038***
	(0.005)	(0.006)	(0.007)	(0.007)	(0.008)
Observations	1,676	1,498	1,495	1,494	1,484
R^2 (overall)	0.17	0.21	0.22	0.27	0.29
R^2 (excluding FEs)	0.10	0.13	0.14	0.17	0.18
Mean of dependent variable	0.059	0.089	0.118	0.147	0.171
Industry-year fixed effects	X	X	X	X	X
Financial controls	X	X	X	X	X

near-term debt to firm value, and these differences are larger for firms with greater profit variability. The coefficient estimates are generally higher for the more inclusive measures of near-term debt, but mean debt levels are also higher. Relative to mean debt levels, the interaction coefficients are largest for debt due within 1 to 2 years. For example, the 1-year interaction coefficient is 85% of the mean (i.e., 0.050 divided by 0.059), whereas the 5-year interaction coefficient is 70% and the interaction coefficient for total debt is 41% (based on estimates from Table II). This pattern is consistent with near-term debt placing greater demand on current cash flow, and thus having greater influence on collective bargaining negotiations.

Boosting the cash flow demands of capital structure is not the only tactic available to firms seeking to improve their bargaining position with workers. As an additional test of the profit variability interaction, I examine the implementation of another corporate anti-union strategy—inventory stockpiling. Ultimately, much of workers' bargaining power in collective bargaining negotiations derives from credible threats to withhold labor services. To mitigate these threats, manufacturing firms may strategically maintain costly "buffer" inventories, which increase the costs of a strike borne by workers relative to those borne by the firm (Christenson (1953)). Thus, compared to materials and goods in earlier stages of the production process, inventories of finished or near-finished goods are likely to provide the most effective insurance and deterrence against employee job actions. Indeed, it would be surprising if inventories of raw materials had any correlation with worker-firm bargaining power.

Table IV

Cross-sectional Regressions of Inventories on Unionization

The table summarizes the results from regressions of various measures of inventories divided by sales on the fraction of a firm's workforce covered by collective bargaining, the variability of the firm's profits, the interaction between those variables, and a set of controls. The specifications are the same as that reported in Table II, column 3, but with different dependent variables. * and *** denote statistical significance at the 10% and 1% levels, respectively.

	Total Inventories	Raw Materials	Work-in-Progress	Finished Goods
Union coverage	0.017*	0.004	−0.004	0.006
	(0.010)	(0.005)	(0.007)	(0.007)
Union coverage	0.017	0.002	0.013***	0.013*
∗ Profit variability	(0.013)	(0.006)	(0.005)	(0.007)
Profit variability	−0.021***	−0.002	−0.010***	−0.006*
	(0.006)	(0.004)	(0.003)	(0.003)
Observations	1,669	1,103	934	1,030
R^2 (overall)	0.48	0.35	0.33	0.24
R^2 (excluding FEs)	0.24	0.10	0.08	0.08
Mean of dependent variable	0.158	0.058	0.048	0.071
Industry-year fixed effects	X	X	X	X
Financial controls	X	X	X	X

Analyses of these inventory hypotheses are presented in Table IV. I find that, indeed, firms appear to use inventories of finished goods strategically in the context of collective bargaining negotiations. Unionized firms maintain 10% higher levels of total inventories than otherwise similar nonunionized firms. The effect of the interaction between union coverage and profit variability also suggests there is a strategic component in inventory policy, similar to financial leverage. Whereas profit variability is negatively correlated with inventories, perhaps because these firms are more liquidity constrained (Gertler and Gilchrist (1994)), the relation is weaker at unionized firms. Consistent with strategic explanations, the interaction effect appears to reflect a build-up of finished goods and work-in-progress inventories at unionized firms with high profit variability. The differences are economically significant: For firms with profit variability that is one standard deviation above the mean, the ratio of finished goods inventories to sales is, on average, 15% higher for a firm with 50% union coverage as compared to a nonunionized firm.[17] In contrast, differences in union coverage rates seem to have little effect either on inventories of raw materials or for firms with little profit variability. Note, however, that while these results are persuasive, corroboratory evidence from the labor law analysis would be ideal. Unfortunately, data breaking down inventories by stage of production is not readily available for the period of the labor law analysis, and evidence based on total inventories is imprecise.

[17]For these firms, the marginal effect is 1.0 percentage points, and the average ratio of finished goods to sales is 6.4% for nonunionized firms.

III. Exploiting State Changes in Labor Laws

The cross-sectional analysis above provides important evidence, but it is limited. In particular, when measuring the effect of collective bargaining using comparisons across firms, there will always be a suspicion that the controls included in the analysis are not exhaustive. Such concerns are mitigated when identification comes from the interaction with profit variability. Nevertheless, if an omitted firm characteristic differentially affects both the degree of unionization and capital structure determination at firms with greater profit variability, then the estimates would not have a causal interpretation. I address this concern here with a second empirical approach that uses state-specific changes in labor laws to identify changes in union bargaining power. Over time, state policymakers have used legislation and public subsidies to influence the costs of union organizing and activism, altering workers' relative bargaining positions. I examine the impact of two important policies in this context: RTW laws and unemployment insurance work stoppage provisions.

A. Right-to-Work Laws

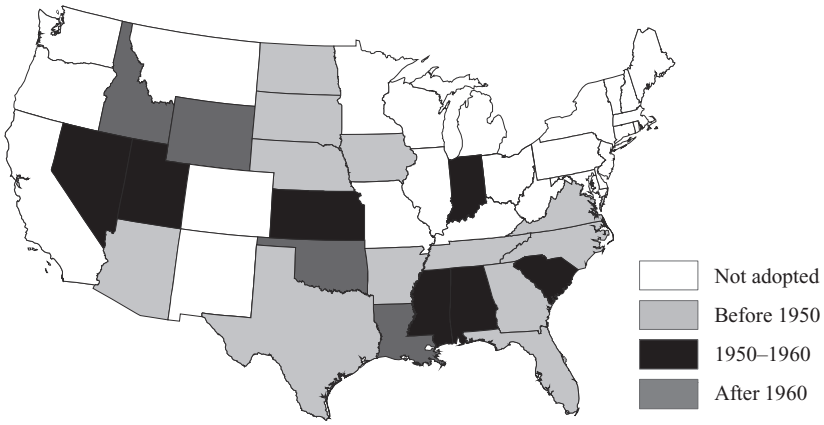
Federal collective bargaining law was established by the National Labor Relations Act (the Wagner Act) in 1935. This Act established the National Labor Relations Board (NLRB), an independent federal agency, which administers union elections and ensures that a union represents its constituent employees. Once a union is certified by the NLRB, the employer is required to bargain with the union in good faith. By preventing employers from discriminating against workers who join unions or participate in a strike, labor law confers significant market power to certified unions. The Wagner Act also allowed the parties to agree to require empolyees to join and financially support the union.

However, Republican Party gains in the 1946 mid-term Congressional elections and strong antilabor sentiment following World War II resulted in the Labor-Management Relations Act (the Taft-Hartley Act), which was passed over President Truman's veto in 1947. Among other provisions, which were broadly construed as anti-union, the Taft-Hartley Act granted states the power to pass so-called "right-to-work" (RTW) laws. RTW laws outlaw employment contract provisions that require employees to join or financially support a union. As such, the laws expose unions to a free rider problem whereby nonunion employees benefit from collective bargaining without paying dues. Figure 2, Panel A shows the history of state RTW legislation.

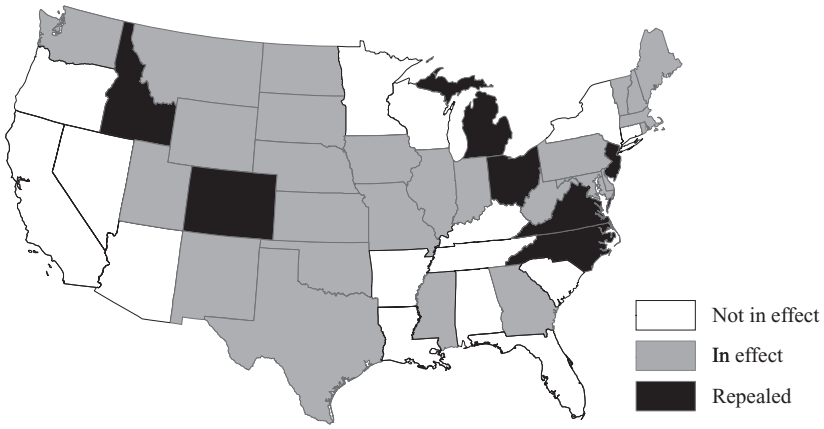
I use state adoption of RTW laws in the 1950s as a source of geographic changes in union bargaining power.[18] Empirical evidence indicates that RTW laws have a significant impact on union organizing activity and industrial development (see Moore (1998) for a complete survey). For example, Ellwood and Fine (1987) show that RTW laws have a sizeable impact on union organizing and conclude that the laws ultimately reduce union membership by 5% to 10%. These reductions are in addition to the losses that might occur if any

[18]Limitations in the availability of Compustat data necessitate that my analysis begins in 1950.

Panel A: Adoption of right-to-work (RTW) laws, 1947–2005



Panel B: Unemployment insurance work stoppage provisions (WSP), 1960–1973



Source: Ellwood and Fine (1987), Hutchens, Lipsky, and Stern (1989).

Figure 2. Legislative history of selected state labor laws. Panel A shows the pattern of adoption of RTW laws, and Panel B shows the pattern of repeal of WSPs. The Indiana RTW law was later repealed, and the New Jersey WSP was readopted soon after it was abolished.

members of existing bargaining units choose to discontinue their membership when union shop rules are eliminated. Using comparisons across state borders, Holmes (1998) shows that manufacturing employment is about one-third greater in states with RTW laws than in other states, suggesting the laws may also encourage industrial development.

In addition to reducing the threat of new union organizing, RTW laws likely directly affect collective bargaining at firms with existing unions. As Ellwood and Fine (1987, p. 270) argue,

> The most obvious explanation is simply that passage of an RTW law makes union membership less economically attractive to workers. Without the ability to enforce payment of dues or to fine those who cross the picket line, unions may prove less powerful. Their strike threats are diminished both by reduced financial resources and by less certain participation.

As a symbol of union defeat, the passage of RTW laws may also have a psychological effect on a union's appeal to workers (Ellwood and Fine (1987)). Both economic and psychological channels weaken the union's bargaining position, thereby reducing the expected benefits of union membership, the marginal benefit of organization, and the supply of union jobs (Farber (1984)).

Consistent with their impact on union bargaining power, RTW laws increase a firm's market value. In a study of daily stock returns and 35 events related to the passage of a RTW law in Louisiana in 1976 and Idaho in 1986, Abraham and Voos (2000) find that passage of these laws is associated with a 2% to 4% increase in equity values. The boost in firm value associated with RTW laws also increases with the variability of firm profits. Using annual data, I regress the ratio of the firm's market value to its book value on a RTW indicator, the interaction of the indicator and firm profit variability, and firm and industry-by-year fixed effects. While estimates of the main effect are similar in magnitude to Abraham and Voos (but extremely noisy), estimates of the interaction effect are sizeable and statistically significant. RTW laws are associated with about a seven percentage point greater increase in the market-to-book ratio for a firm with one standard deviation greater profit variability (see the Internet Appendix).[19]

These results suggest that firms with highly variable profits are more exposed to union rent seeking and derive greater benefit from the adoption of a RTW law. Analysis that follows shows that these firms also respond to RTW laws with greater reductions in debt.

B. Unemployment Insurance Work Stoppage Provisions

Another plausibly exogenous source of variation in union bargaining power comes from changes in the unemployment insurance system. The United States unemployment insurance system grants states considerable autonomy to establish rules governing claimant eligibility for benefits. State autonomy results in considerable variation across states and over time in the conditions under which workers unemployed because of a labor dispute qualify for unemployment compensation. While eligibility rules generally exclude striking workers, a majority of states allow those unemployed because of a labor dispute to collect unemployment insurance benefits under specific (but not usual) conditions.

[19]This result is robust to including a set of financial control variables and to including additional indicator variables for the 2 years preceding a law's adoption. The estimated pre-adoption coefficients are small and not statistically significant, suggesting that the effect is attributable to the law rather than a pre-existing trend. The Internet Appendix is available on the *Journal of Finance* website at http://www.afajof.org/supplements.asp.

I focus on one such eligibility rule that has been shown to be of particular importance: the work stoppage provision (WSP). In 1960, 35 states permitted strikers to collect unemployment benefits during a labor dispute if their employer continued to operate at or near normal levels. In these states, an eligible striker can collect benefits after the normal waiting period (generally 1 week after filing for benefits). In a sense, a WSP provides strikers with insurance for a failed strike, because it allows striking workers to collect benefits only if employers succeed in weathering the strike and continuing to operate at or near normal levels.

WSPs have been shown to affect collective bargaining. Unions maintain bargaining power in negotiations from an implicit, if not explicit, threat to withhold labor services. While a variety of theories explain strike activity, it is generally agreed that workers' bargaining position is improved when striking is less costly (Kennan (1986)). One theory of strike activity predicts that strikes are a decreasing function of the combined cost borne by workers and management (Reder and Neumann (1987)). Because unemployment insurance premiums are only imperfectly experience-rated, joint cost theory predicts that paying benefits to strikers not only improves their bargaining position, but also increases strike activity. In an analysis of the influence of various government transfer programs on strikes, Hutchens, Lipsky, Stern (1989) find that the repeal of unemployment insurance WSPs is associated with less frequent strike activity in states with relatively generous unemployment insurance programs. Figure 2, Panel B depicts the history of state WSPs. Seven states repealed WSPs between 1960 and 1973.[20] I use this legal variation to identify changes in union bargaining power.

The impact of WSPs on union bargaining power is also reflected in the market value of firms in repealing states. Similar to the analysis for RTW laws, I use annual data and regress firms' market-to-book ratio on a no-WSP indicator, the interaction of the indicator and firm profit variability, and firm and industry-by-year fixed effects. The repeal of a WSP is associated with a 5 to 10 percentage point average increase in the market-to-book ratio (not statistically significant), and the boost increases with a firm's profit variability. The increase is up to 14 percentage points greater at a firm with one standard deviation greater profit variability (see the Internet Appendix).[21] Similar to the results for the adoption of RTW laws, evidence from equity values suggests that firms with more variable profits find union bargaining more costly and derive greater benefit from the repeal of WSPs.

C. Labor Law Empirical Approach

The analysis of the impacts of the labor laws on capital structure mirrors the analysis on market values. I estimate the reduced-form effect of RTW laws

[20]The empirical estimates are robust to excluding New Jersey, which readopted a WSP shortly after repealing it in 1967.

[21]This result is robust to including financial control variables and appears to reflect the impact of the law rather than a pre-existing trend. The Internet Appendix is available at http://www.afajof.org/supplements.asp.

and WSPs on firms located in the affected states, and interpret the results as an indication of the effects of changes in union bargaining power. To focus on sectors where these laws are most relevant, I restrict the sample to industries known to have relatively high union coverage (see Table AI in the Appendix at the end of the main text).[22] I also separately analyze firms in scarcely unionized industries as a falsification test. Let LAW_{st} indicate the presence of a RTW law or absence of a WSP in state s at time t. I regress

$$\frac{DEBT_{ijst}}{VALUE_{ijst}} = \alpha_1' \, LAW_{st} + \alpha_2' \, LAW_{st} * VARIABILITY_i + \eta_i + \tau_{jt} + \xi_{ijst}, \quad (5)$$

where the specification includes firm fixed effects η_i, as well as industry-by-year fixed effects τ_{jt}.[23] The main profit variability effect is absorbed by the firm fixed effects. In this framework, α_1' and α_2' are difference-in-difference estimators that measure the average within-firm changes in capital structure for firms located in states adopting a law, after controlling for any concomitant systematic changes in the capital structure of firms in the same industry but located in nonadopting states. Standard errors are clustered at the state level, allowing for unspecified within-state correlation over time.

Firms set capital structure based on a number of factors, many of which are at least partially unobservable. For example, firms expecting better future investment opportunities likely use less leverage. As long as these and any other unobservables that comprise ξ_{ijst} are not correlated with legislative changes to RTW laws or WSPs, the estimates of α_1' and α_2' in equation (5) have causal interpretations. This assumption of uncorrelation is the principal identification assumption of this approach.

Labor laws almost certainly respond to economic conditions and trends in industrial relations, some of which may be correlated with the use of debt. It is possible that some of these factors induce omitted variable bias in estimates of the effect of RTW laws and WSPs, but a number of factors support a causal interpretation.[24] The states changing RTW laws in the 1950s and WSPs in

[22]The sample includes two-digit SIC industries with greater than 25% union coverage in 1983 as measured by the Current Population Survey.

[23]The firm fixed effects ensure that the effects of the labor laws are estimated from consistent samples of firms. Because Compustat data are not available before 1950 and the sample size grows rapidly in the early 1960s, measures of profit variability are computed over each contemporaneous period, from 1950 through 1960 and from 1960 through 1973, and do not vary over time for a given firm. Firms are assigned to a state and an industry based on Compustat header information relating to the company's last reported location and industry of primary operation. To the extent that firms may have moved locations or changed industries since the 1950s, these may represent noisy measures of the historical variables. There is also a concern that if some of a firm's plants are located in a different state from the firm's headquarters, then those plants would be subject to a different legal regime. While point estimates may be less precise, there is no obvious reason why this mismeasurement would bias the results. Furthermore, manual checks against historical 10-Ks also suggest the location and industry information is generally accurate.

[24]If anything, states are more likely to repeal a WSP following a protracted, high-profile labor dispute. As firms affected by a work stoppage are more likely to be in financial distress, this proposed relationship works against finding that the repeal of WSPs is associated with *decreases* in leverage.

the 1960s are not restricted to any particular geographic region (Figure 2). Furthermore, analyses of pre-existing trends show that decreases in union organizing do not precede the passage of RTW laws (Ellwood and Fine (1987)), and debt levels decrease only after the changes to RTW laws and WSPs are enacted (see Section III.D).

I use both the adoption of RTW laws from 1950 through 1960 and the repeal of WSPs from 1960 through 1973 to identify decreases in union bargaining power. Using each set of events has its strengths and weaknesses. As compared to WSPs, RTW laws likely have greater impact on union power and industrial relations. Both laws likely reduce strike threats: WSPs increase the expected costs of a strike, and RTW laws render unions less able to discipline those who cross a picket line. But RTW laws also weaken unions financially and organizationally by reducing the financial resources available to unions and significantly reducing the threat of new unionization at both partially unionized and nonunionized firms.

At the same time, the sample of firms in the WSP analysis is much larger than the RTW sample on two dimensions, enabling more precise estimation. Key features of each sample are presented in Table V, Panel B. First, Compustat has far greater firm coverage in the later period.[25] The WSP analysis is based on almost four times as many firms (1,274) as the RTW analysis (326). Second, while seven states changed laws in each period, the states that changed WSPs happened to be larger than those that changed RTW laws during the respective sample periods: Whereas only 2.3% of observations in the 1950 through 1960 sample are in states adopting RTW laws, 21.4% of observations in the 1960 through 1973 sample are in states repealing WSPs. For these reasons, I rely on both sources of variation in union bargaining power to present evidence on the strategic use of debt.

Table V also presents summary statistics for key firm financial variables. The sample of firms in the WSP analysis (1960 through 1973) has similar average debt levels to the cross-sections of firms analyzed in Section 2 (1977, 1987, and 1999), while the RTW firms (1950 through 1960) have lower levels of average total debt. While average total assets is similar across the two periods in real terms, a greater percentage of assets is fixed in the later period and these firms' assets earn a lower average return.

[25] Unlike in more recent years, the Compustat database does not include all firms with SIC filings in the period of these analyses. Screening for nonmissing total assets, Compustat includes 626 firms in 1950, 1,000 in 1959, 1,619 in 1960, and 4,522 in 1973. According to information provided by Standard & Poor's (the product's vendor), the 1950s sample primarily includes companies in the S&P 425, and the 1960s sample also includes firms listed in the NYSE and ASE. The sample for the RTW analysis includes firms in 30 states, 3 of which adopted RTW laws in the 1950s (Indiana, Kansas, and Utah). The sample for the WSP analysis includes firms in all 50 states, 7 of which repealed WSPs during the sample period (see Figure 2, Panel B). The samples are restricted to observations with nonmissing information on debt, total assets, and market value. The proportion of fixed assets, log sales, and return on assets is available for most, but not all, of the sample.

Table V

Summary Statistics for Labor Law Analysis

This table describes two samples of firms over different time periods: (i) 1950 through 1960, and (ii) 1960 through 1972. The samples consist of all firms in Compustat that have nonmissing observations for debt, total assets, and market value; have at least 5 years of data to calculate profit variability; and are in industries with high union coverage (listed in Table AI). Means are presented with standard deviations in parentheses. Median total assets are in brackets. The number of observations listed is for the debt variables; the financial controls are available for fewer observations.

	Right-to-Work Laws, 1950–1960	Unemployment Insurance Work Stoppage Provisions, 1960–1973
Panel A: Debt		
Total debt/Market value	0.195	0.306
	(0.181)	(0.215)
Total debt/Book value	0.157	0.288
	(0.137)	(0.183)
Current debt/Market value	0.048	0.061
	(0.089)	(0.086)
Current debt/Book value	0.036	0.055
	(0.064)	(0.070)
Panel B: Key explanatory and other variables		
States adopting/repealing law	7	7
% sample in adopting states	2.3	21.4
Profit variability	1.574	1.004
	(1.000)	(1.000)
Assets ($ Mil 1999)	2,003	1,936
	(6,879)	(7,578)
	[487]	[397]
Panel C: Financial control variables		
Fixed assets (%)	0.373	0.477
	(0.184)	(0.268)
Log sales ($ Mil)	4.815	4.493
	(1.422)	(1.554)
ROA	0.123	0.107
	(0.055)	(0.060)
Observations	3,277	14,157
Firms	326	1,274

D. Labor Law Estimates

Using state changes in RTW laws and unemployment insurance work stoppage provisions to identify changes in bargaining power yields results that confirm that incentives from union bargaining have a substantial impact on capital structure determination. Figures 3 and 4 present a graphical overview of these results. Focusing on firms located in states adopting RTW laws from 1950 through 1960 (Figure 3) or repealing WSPs from 1960 through 1973

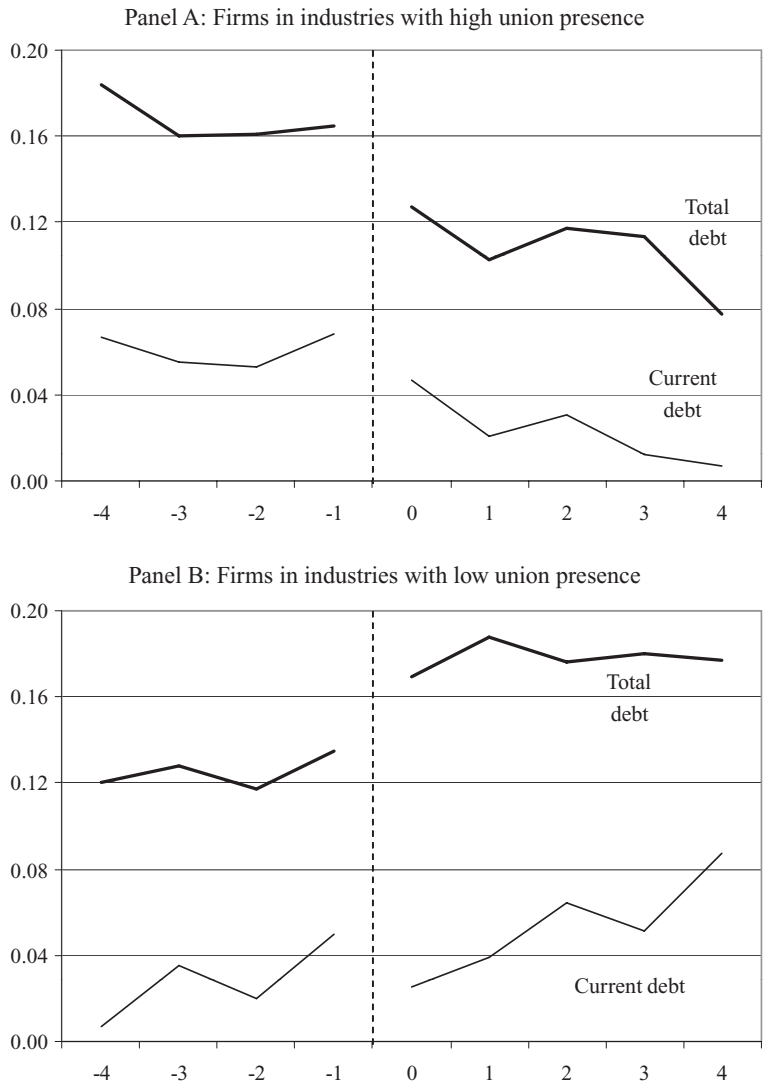


Figure 3. Debt around right-to-work (RTW) law adoption, 1950–1960. This figure depicts average debt divided by total assets in the 4 years before and after the adoption of RTW laws. Panel A includes firms in densely unionized industries (listed in Table AI), and Panel B includes firms in industries with low union presence.

(Figure 4), I graph both current and total debt divided by total assets in the 4 years before and after the law was changed in these states. Each panel presents the graph for a different sample of firms. Figure 3, Panel A shows that while there is apparently no pre-existing trend, average debt levels at firms in densely unionized industries decrease after a RTW law is adopted. In contrast,

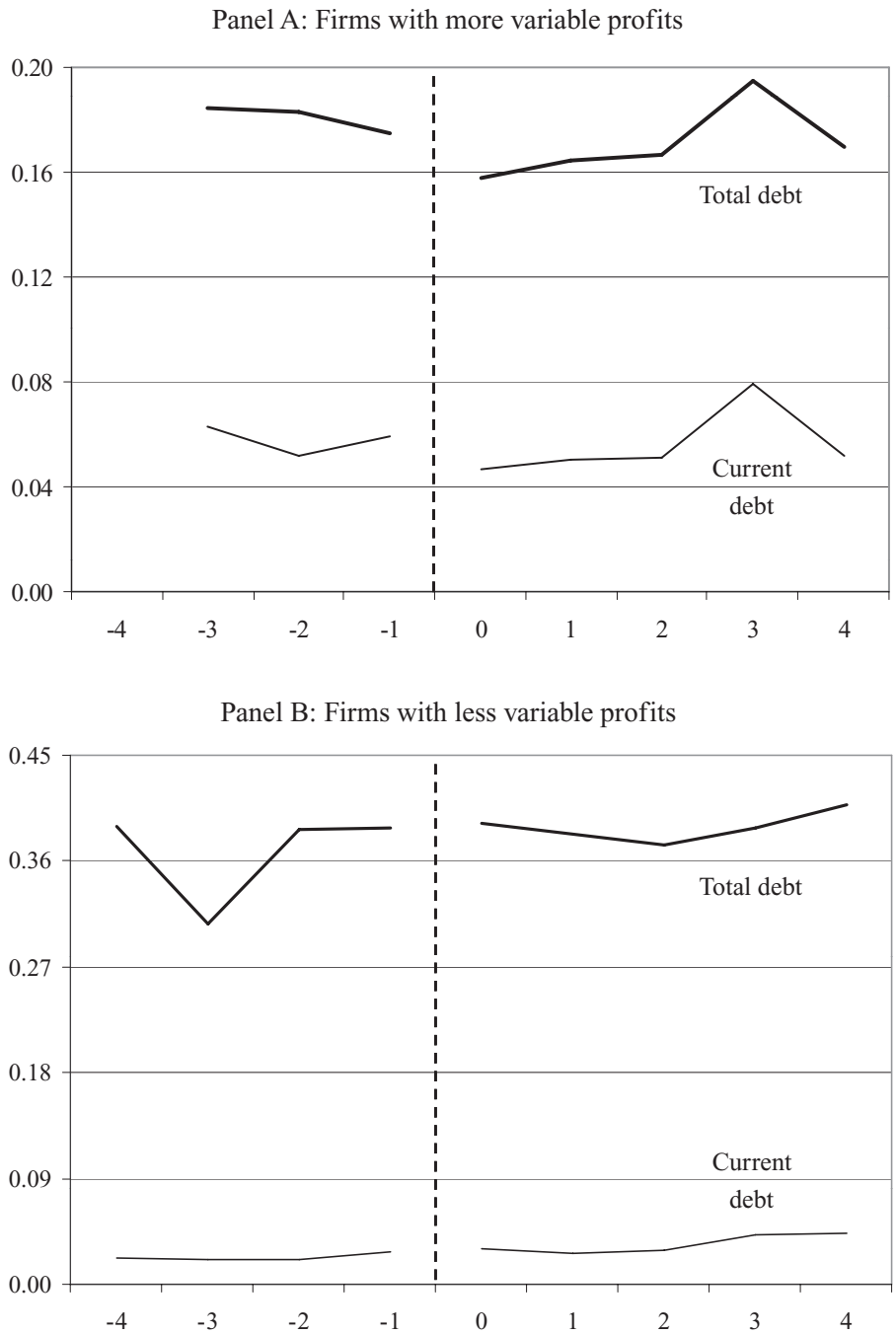


Figure 4. Debt around unemployment insurance work stoppage provision (WSP) repeal, 1960–1973. This figure depicts average debt divided by total assets in the 4 years before and after the repeal of WSPs. Both panels include only firms in densely unionized industries (listed in Table AI). Panel A includes firms with profit variability in the top quartile, and Panel B includes firms with profit variability in the bottom quartile.

Figure 3, Panel B shows that debt levels do not decrease in less unionized industries.

Both panels in Figure 4 focus on firms in densely unionized industries, but Panel A includes firms with profit variability in the top quartile, whereas Panel B includes firms in the bottom quartile. While there is no apparent pre-existing trend, average debt levels decrease at firms with relatively variable profits after a WSP is repealed (Panel A). Yet the repeal of a WSP does not seem to affect the capital structure of firms with little profit variability (Panel B). The differential impact at firms with greater profit variability suggests that these changes in labor laws, which erode union bargaining power, apparently reduce a firm's strategic incentive to carry debt. Comparing magnitudes across figures, the effect appears to be greater in magnitude for RTW laws than WSPs (as expected). Note that these figures present unconditional means; for tests that control for macroeconomic year effects and industry-wide trends, I turn to multivariate regression analysis.

Table VI presents regression analysis of the impact of collective bargaining on total financial leverage. Evidence from changes in RTW laws is presented in Panel A, and WSP evidence is in Panel B. While the direction of the effects of the two laws is the same, the magnitude of RTW law effects is greater. RTW estimates suggest that collective bargaining increases total leverage employed by affected firms. On average, firms in states adopting RTW laws decrease their ratio of debt to firm value by 11 percentage points—over half of the sample mean. Given the inclusion of both firm and industry-by-year fixed effects, this estimate compares within-firm changes in debt at firms in affected states to within-firm changes at other firms in the same industry and year but located in states with different legislative patterns. The estimated effects are robust to also including financial controls (the proportion of fixed assets, log sales, and the return on assets; column 2) and to measuring debt as a proportion of total assets (rather than the market value of the firm; column 3).[26]

While the main effect of repealing a WSP is much smaller in magnitude, there is a significant differential effect for firms with more variable profits. Because the benefits of strategic leverage increase with profit variability, these firms have the greatest incentive to increase leverage. When a WSP is repealed, a firm with one standard deviation greater profit variability decreases leverage by approximately three percentage points more than an otherwise similar firm. For firms with profit variability one standard deviation above the mean, the ratio of debt to total firm value decreases by up to one-fifth after a WSP is repealed.[27] In contrast, there is little effect on firms with little profit

[26]The results are slightly larger when using net debt (debt minus cash and marketable securities) as the dependent variable. The coefficient on the RTW law indicator is −0.149 (standard error 0.072) and the coefficient on the RTW-variability interaction is −0.087 (standard error 0.041). These estimates are both statistically significant at the 5% level. Because these estimates are greater than those for gross debt, they suggest that union bargaining power may lead firms not only to use more debt but also to hold less cash.

[27]For these firms, the marginal effect of WSP repeal is 4.3 percentage points (column 1), and the average ratio of debt to firm value is about 23%.

Table VI

Panel Regression Estimates of the Effect of Changes in Labor Law on Total Debt

The table summarizes the results from panel regressions of total debt divided by the market value of the firm (divided by assets in column 3) on a right-to-work (RTW) law or a work stoppage provision (WSP) indicator variable, the interaction between that indicator and the variability of the firm's profits, and a set of controls. A profit variability main effect is not reported, because it is absorbed by firm fixed effects. Profit variability is measured in units of standard deviations of sd(Δearnings)/assets, where earnings is before depreciation and amortization. When uninteracted, the law indicator measures the effect of the law for a firm with mean profit variability. Controls in all regressions include firm and industy-by-year fixed effects. Where indicated, controls also include the following financial controls: the proportion of fixed assets, log sales, and return on assets. In column 4, controls also include the firm's average (pre-period) operating profits, which is before interest expense, taxes, depreciation, and amortization; is divided by assets; and is normalized by its sample standard deviation. Industry fixed effects are at the two-digit SIC level. The sample includes firms in industries with high union coverage (listed in Table AI). Standard errors, clustered at the state level, are reported in parentheses. Compustat variables are winsorized at 1% tails. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Panel A: Right-to-work laws, 1950–1960				
RTW law in effect	−0.107**	−0.108**	−0.077***	−0.109**
	(0.053)	(0.052)	(0.024)	(0.044)
RTW law in effect	−0.030	−0.037	−0.013	−0.037**
∗ Profit variability	(0.026)	(0.024)	(0.009)	(0.019)
RTW law in effect				0.007
∗ Average profits				(0.025)
Observations	3,277	2,976	2,976	2,494
R^2 (overall)	0.78	0.82	0.83	0.82
R^2 (excluding FEs)	0.01	0.21	0.14	0.23
Panel B: Work stoppage provisions, 1960–1973				
No WSP in effect	−0.013*	−0.006	−0.004	−0.008
	(0.007)	(0.008)	(0.007)	(0.010)
No WSP in effect	−0.030***	−0.026***	−0.013**	−0.026***
∗ Profit variability	(0.007)	(0.008)	(0.006)	(0.006)
No WSP in effect				−0.020***
∗ Average profits				(0.005)
Observations	14,157	13,711	13,711	8,087
R^2 (overall)	0.80	0.84	0.86	0.85
R^2 (excluding FEs)	0.01	0.39	0.39	0.41
Firm fixed effects	X	X	X	X
Industry-year fixed effects	X	X	X	X
Financial controls		X	X	X
Using book leverage			X	

variability. The estimates are robust to including financial controls (column 2) and to normalizing debt using total assets, rather than the market value of the firm (column 3). The theoretical discussion above points specifically to the variability of profits (σ)—distinct from its average level ($\bar{r}$)—as providing an

incentive to use leverage strategically, and the data support this relation. As an additional robustness check, I also include the interaction of the law indicator and the firm's average operating profits (calculated over the period before the law was changed).[28] Including the additional control has no effect on the profit variability interaction coefficient (column 4). The robust differential response to the law by firms with more variable profits suggests that firms use debt strategically to influence collective bargaining negotiations.

The RTW interaction coefficients are greater in magnitude (relative to average debt levels), but the estimates are not as precise. In the RTW sample, the estimated three percentage point differential effect between firms with different profit variabilities (by one standard deviation) corresponds to approximately 15% of the sample mean. While the point estimates are comparable to the WSP estimates, the standard errors of the RTW estimates are much greater due to both the limited number of overall observations and the size of the states adopting RTW laws during the sample period. As before, including the control for the interaction of the law indicator and average firm profits has no effect on the profit variability point estimate and reduces its standard error (column 4). In this specification, the estimated coefficient for the interaction of the law and profit variability is statistically significant ($t = -1.96$).

Although it seems that additional precision would reveal an effect, there may be suspicion that the observed effect of RTW laws on leverage represents only a cash flow effect of unionization and *not* a strategic effect. After all, cash flow is a well-known predictor of debt levels in that firms tend to pay down debt when cash flow increases. Unionization, therefore, may "mechanically" increase debt by reducing profits. However, additional analysis is inconsistent with a pure cash flow effect. The RTW main effect is robust to adding financial controls (column 2), including return on assets—a proxy for profitability.[29] Although the controls are imperfect, the fact that point estimates are unaffected suggests that strategic motivations explain most of the observed increases in total debt.

Analysis of shorter-term debt displays similar patterns. Estimates of the relation between changes in labor laws, profit variability, and debt due within 1 year (current debt) are reported in Table VII. (Measures of debt due in 2 to 5 years are not available from Compustat in this period.) While statistically significant only in column 4, the point estimates measuring the main effect of

[28]Operating profits is before interest expense, taxes, depreciation, and amortization; is divided by lagged assets; and is normalized by its standard deviation to ease the interpretation of the estimates. This measure would ideally also include the union rent (the portion of wages paid in excess of the workers' alternative wages). Unfortunately, such data are not available. The results are robust to including total labor-related expenses, which reduces the sample almost by half. Although neither measure is perfect, they provide similar results.

[29]Coefficient estimates for the controls are not reported to conserve space. The financial controls—the proportion of fixed assets, log sales, and return on assets—are statistically significant with the expected signs ($p < 0.01$). Data for the other financial variables included in the cross-sectional analysis are not widely available in this earlier period.

Table VII

Panel Regression Estimates of the Effect of Changes in Labor Law on Current Debt

The table summarizes the results from panel regressions of current debt divided by the market value of the firm (divided by assets in column 4) on a right-to-work (RTW) law or a work stoppage provision (WSP) indicator variable, the interaction between that indicator and the variability of the firm's profits, and a set of controls. The specifications are the same as those reported in Table VI, but for the different dependent variable. * and *** denote statistical significance at the 10% and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Panel A: Right-to-work laws, 1950–1960				
RTW law in effect	−0.045	−0.050	−0.041	−0.047*
	(0.036)	(0.041)	(0.030)	(0.027)
RTW law in effect	−0.048***	−0.056***	−0.034***	−0.053***
∗ Profit variability	(0.010)	(0.011)	(0.006)	(0.009)
RTW law in effect				−0.006
∗ Average profits				(0.041)
Observations	3,277	2,976	2,976	2,494
R^2 (overall)	0.66	0.69	0.73	0.70
R^2 (excluding FEs)	0.00	0.14	0.12	0.15
Panel B: Work stoppage provisions, 1960–1973				
No WSP in effect	−0.006	−0.003	−0.003	−0.002
	(0.005)	(0.007)	(0.005)	(0.007)
No WSP in effect	−0.013***	−0.011	−0.009*	−0.010
∗ Profit variability	(0.005)	(0.008)	(0.005)	(0.007)
No WSP in effect				−0.002
∗ Average profits				(0.006)
Observations	14,157	13,711	13,711	8,087
R^2 (overall)	0.63	0.66	0.66	0.63
R^2 (excluding FEs)	0.01	0.20	0.15	0.19
Firm fixed effects	X	X	X	X
Industry-year fixed effects	X	X	X	X
Financial controls		X	X	X
Using book leverage			X	

RTW laws on current debt are sizeable—approximately equal to the sample mean. The WSP main effect is much smaller in magnitude; while the estimates are close to zero, modest effects (on the order of 20% of the sample mean) cannot be ruled out. While the econometric tests likely have insufficient power to identify the main effect (with only a handful of states modifying each law during the sample periods), tests examining the differential impact of the laws on firms with more variable profits have greater power and find statistically significant results.

The changes in collective bargaining law lead to greater reductions in current debt at firms with greater profit variability. Consider two firms—one with profit variability one standard deviation greater than the other. As compared to the firm with less profit variability, the more exposed firm decreases the ratio of

current debt to firm value by approximately five more percentage points after an RTW law is passed and by approximately one more percentage point after a WSP is repealed. Including financial controls (column 2), normalizing debt using total assets rather than the market values (column 3), and controlling for the interaction of the law indicator and average firm profits (column 4) have little effect on the estimates. The differential effect of the laws on firms with more variable profits suggests firms also use shorter-term debt strategically to influence collective bargaining negotiations.

One potential concern with the strategic interpretation of the results is that collective bargaining itself may affect the variability of a firm's profits.[30] For example, labor unions may influence technological adoption (Dowrick and Spencer (1994)) or impose rigidities that increase operating leverage (Rosett (2001), Chen, Kacperczyk, and Ortiz-Molina (2008)). In this case, the interaction of the laws with profit variability may be open to a nonstrategic interpretation. To investigate the plausibility of this interpretation, I repeat the analysis above using various alternative measures of profit variability that attempt to exclude the direct impact of collective bargaining. The results are presented in Table VIII. Columns 1 and 5 report specifications where profit variability is measured over the period before the law is changed. The number of observations is reduced in these specifications, because the measure is not defined for states that already changed their law prior to the sample period and because the calculation requires at least 5 years of nonmissing preperiod data for affected states. For the RTW analysis, this requirement restricts identification of the law coefficients to be based on firms located in Indiana and Kansas. Despite the limited sample size, the interaction effect generally remains statistically and economically significant.

To further remove the direct impact of labor bargaining on profit variability, the amount that workers are paid in salary and benefits above their alternative wage would ideally be added back to operating profits before calculating variability. While this quantity is impossible to compute, particularly in a large-scale sample, the results are robust to reasonable alternatives. Columns 2 and 6 of Table VIII report specifications using sales variability instead of profit variability, and columns 3 and 7 report specifications that exclude total labor, pension, retirement, and related expenses from profits before calculating variability. For the RTW analysis, only total labor and related expenses are excluded due to the limited availability of information on these expenses in the earlier period. The general paucity of data on all of these expenses significantly reduces the number of observations in these specifications. The general robustness of the results to using either measure supports the interpretation that firms are using their capital structures strategically.

The results are also robust to alternative methods for calculating variability. For example, columns 4 and 8 report specifications that measure profit variablility using the standard deviation of the level of earnings before depreciation

[30]I thank the referee for this suggestion.

Table VIII

Robustness Tests: Estimates Using Alternative Measures of Profit Variability

Reported coefficients are estimated from regressions similar to those reported in Tables VI and VII, column 2, but the law indicator variable is interacted with alternative measures of variability. Except in columns 4 and 8, each variability measure is in units of standard deviations of sd(Δx)/assets for different financial variables x. Columns 1 and 5 calculate profit variability only using observations from before the the law was changed. Columns 2 and 6 use the variability of sales. Columns 3 and 7 use the variability of profits excluding total labor and related expenses in Panel A, and also excluding pension and retirement expenses in Panel B. In columns 4 and 8, profit variability is measured in units of standard deviations of sd(earnings$_t$/assets$_{t-1}$), where earnings is before depreciation and amortization. In all cases, each variability observation is calculated based on at least 5 years of data. ** and *** denote statistical significance at the 5% and 1% levels, respectively.

	Total Debt/Market Value				Current Debt/Market Value			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Right-to-work (RTW) laws, 1950–1960								
RTW law in effect	−0.089	−0.099**	0.000	−0.113**	−0.062	−0.041	0.047	−0.057
	(0.064)	(0.047)	(0.041)	(0.051)	(0.068)	(0.041)	(0.030)	(0.037)
RTW law in effect	−0.036**				−0.031**			
∗ Profit variability before law	(0.017)				(0.015)			
RTW law in effect		−0.028***				−0.035***		
∗ Sales variability		(0.010)				(0.006)		
RTW law in effect			−0.071***				−0.068***	
∗ Profit variability (excl. labor cost)			(0.006)				(0.003)	
RTW law in effect				−0.065				−0.100***
∗ Profit level variability				(0.051)				(0.034)
Observations	2,474	2,973	1,286	2,956	2,474	2,973	1,286	2,956
R^2 (overall)	0.82	0.82	0.83	0.82	0.70	0.69	0.75	0.69
R^2 (excluding FEs)	0.23	0.21	0.25	0.21	0.15	0.14	0.14	0.14

(continued)

Table VIII—*Continued*

	Total Debt/Market Value				Current Debt/Market Value			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel B: Work stoppage provisions (WSP), 1960–1973								
No WSP in effect	0.006	−0.004	0.021	−0.004	0.004	−0.003	0.015	−0.002
	(0.017)	(0.007)	(0.016)	(0.007)	(0.008)	(0.007)	(0.009)	(0.006)
No WSP in effect	−0.029***				−0.006			
∗ Profit variability before law	(0.009)				(0.005)			
No WSP in effect		−0.021				−0.018***		
∗ Sales variability		(0.017)				(0.006)		
No WSP in effect			−0.023***				0.001	
∗ Profit variability (excl. labor cost)			(0.009)				(0.006)	
No WSP in effect				−0.017***				−0.012***
∗ Profit level variability				(0.004)				(0.004)
Observations	6,425	13,711	2,807	13,711	6,425	13,711	2,807	13,711
R^2 (overall)	0.85	0.84	0.85	0.84	0.65	0.66	0.62	0.66
R^2 (excluding FEs)	0.42	0.39	0.41	0.39	0.20	0.20	0.20	0.20
Firm fixed effects	X	X	X	X	X	X	X	X
Industry-year fixed effects	X	X	X	X	X	X	X	X
Financial controls	X	X	X	X	X	X	X	X

and amortization divided by lagged total assets, rather than the standard deviation of the first difference. The results using this alternative measure of variability are very similar to the results reported in Tables VI and VII.

The theoretical framework presented above implies that the strategic use of debt comes at the cost of reduced financial flexibility. Unionized firms choose to be constrained in some states of the world in order to gain a strategic advantage in collective bargaining. To examine liquidity constraints empirically, I estimate the impact of the labor law changes on firms' quick ratios. The quick ratio (ratio of current assets excluding inventory to current liabilities) measures a firm's ability to meet its obligations without selling off inventory. I exclude inventory both because it is often illiquid and because firms may build up strategic inventory reserves when facing a strong union (see Section II.B above). The results show that state adoption of the labor laws that reduce union power is associated with greater financial flexibility (as measured by the quick ratio) at firms with greater profit variability (see the Internet Appendix).[31] The interaction of the law indicators with profit variability suggests that union bargaining power is associated with greater financial constraints for firms that are more likely to adopt the leverage strategy.

A final robustness test is also possible. The preceding analyses show that RTW laws and WSPs affect the financial policy of firms in unionized industries. In contrast, estimating the effect of the laws on firms in industries with *low* union presence provides a falsification test, because these firms are unlikely to be directly affected by the laws. These estimates, which are presented in Table IX, are from regression specifications similar to those reported in column 2 of Tables VI and VII but show a starkly different pattern. Results from both the RTW laws and the WSPs suggest that firms in industries with little unionization do not reduce leverage in response to the legal changes. While the RTW results for total debt are unstable, perhaps due to the small sample size, the other point estimates are generally positive and close to zero.[32] On the whole, the results suggest there is little relationship between the labor laws and capital structure in industries with low union presence.

Considering the impact of union power on financial leverage, it is natural to ask whether union power also affects payout policy. While in theory dividends may be used strategically to commit managers to be tough in union negotiations, such a role is naturally limited by the degree to which dividends can be affected by labor through bargaining. Reducing dividends may anger shareholders, but the consequences *for the union* of the firm missing a debt payment are likely much more severe. While the cross-sectional relation

[31]The results are robust to winsorizing the quick ratio at the 10% tails to limit the influence of outliers. The Internet Appendix is available on the *Journal of Finance* website at http://www.afajof.org/supplements.asp.

[32]The reported RTW estimates for total debt show that the main effect and interaction term have different signs, and the point estimates for the profit variability interaction are implausibly large. Regression using debt divided by total assets (rather than firm market values) finds no effect: The estimated coefficient (standard error) for the main effect is 0.016 (0.023) and for the interaction effect is −0.006 (0.057).

Table IX

Falsification Test: Estimates from Industries with Low Union Presence

The estimates in this table present a falsification test. The regression specifications are the same as the ones reported in column 2 of Tables VI and VII, but the sample includes observations of firms in industries with low rates of union coverage (less than 25% of the workforce covered by collective bargaining). Firms in these industries are unlikely to be directly affected by changes in labor law. ** and *** denote statistical significance at the 5% and 1% levels, respectively.

	Total Debt/ Market Value	Current Debt/ Market Value
Panel A: Right-to-work (RTW) Laws, 1950–1960		
RTW law in effect	0.052**	−0.009
	(0.024)	(0.024)
RTW law in effect	−0.185***	0.051
∗ Profit variability	(0.054)	(0.067)
Observations	2,154	2,154
R^2 (overall)	0.85	0.79
R^2 (excluding FEs)	0.34	0.29
Panel B: Work stoppage provisions (WSP), 1960–1973		
No WSP in effect	0.008	0.002
	(0.011)	(0.004)
No WSP in effect	0.017**	0.011***
∗ Profit variability	(0.007)	(0.003)
Observations	11,512	11,512
R^2 (overall)	0.83	0.79
R^2 (excluding FEs)	0.34	0.28
Firm fixed effects	X	X
Industry-year fixed effects	X	X
Financial controls	X	X

between collective bargaining and dividends suggests that unions target their organizing efforts on the most profitable firms, analysis of the changes in labor laws presented elsewhere suggests that collective bargaining moderately reduces dividend payouts (Matsa (2006)). Dividends may decrease either because collective bargaining directly influences dividend payments (DeAngelo and DeAngelo (1991), Ramirez-Verdugo (2005)) or simply because the dividend changes reflect the adjusted financial position of the firm (Lintner (1956)). Either way, in contrast to the results for financial leverage, firms do not seem to use dividends as a commitment device vis-à-vis workers.

IV. Conclusion

Corporate financing decisions are not made in a vacuum. In addition to considering tax, distress, and other (direct) financial impacts of debt financing, a firm setting its optimal capital structure may also attempt to influence its competitive position in product and input markets. In this sense, debt financing

can be thought of as a strategic variable in product and input market competition. Models of strategic interactions are fundamental to modern industrial organization and have been widely adopted in theories of corporate finance. Nevertheless, as with the broader literature on strategic interactions, there is little empirical evidence of firms using leverage strategically. This paper analyzes the strategic use of debt financing to improve a firm's bargaining power with workers. The results provide direct evidence of firms using capital structure as a strategic variable and suggest that strategic motivations have a substantial impact on financing decisions.

In the past 20 years, many large unionized firms have filed for bankruptcy. Examples include at least eight major airlines and, most recently, autoparts maker Delphi. A natural question is whether collective bargaining led these firms to adopt a capital structure that made them more vulnerable to negative cash flow shocks. The results in this paper suggest that the answer to this question may be yes. As a supplier with market power, a union can demand a share of a firm's liquidity, which the firm maintains primarily to insure against negative shocks. To reduce the impact of collective bargaining on profits, the firm has an incentive to undertake costly actions that reduce its expropriable liquidity. Consequently, even efficient bargaining in the labor market yields outcomes that are not Pareto optimal.

While it is in the interest of both management and labor to produce institutional arrangements that lead to efficient contracts, this paper demonstrates a dimension in which they come up short. If collective bargaining leads firms to distort their capital structure, then labor market outcomes will be inefficient even if employment levels are set optimally. Greater than efficient levels of debt are also likely to distort product market competition (Brander and Lewis (1986)) and investment (Myers (1974)). For example, debt overhang may explain part of the negative effect of collective bargaining on investment documented by Connolly, Hirsch, and Hirschey (1986) and Fallick and Hassett (1999).

While previous studies have suggested that firms use debt to counter union power, they have not made a strong empirical case for causality. Using RTW laws and unemployment insurance work stoppage provisions as sources of exogenous variation in union bargaining power, I find that collective bargaining increases financial leverage. Furthermore, firms with relatively variable profits, and in turn greater exposure to union rent seeking, respond with greater increases in debt. These findings complement previous studies that demonstrate the real effects of apparently exogenous changes in capital structure (Chevalier (1995a, 1995b), Phillips (1995), Chevalier and Scharfstein (1996), Kovenock and Phillips (1997), Zingales (1998)). The evidence presented in this paper suggests that these sorts of real-side strategic incentives have a substantial impact on financing decisions.

Appendix

Table AI

Industries Included in the Labor Law Analyses

This table lists the industries that are included in the labor law analyses (except for the falsification test in Table IX) and the number of associated firm-year observations in each analytic sample. These industries comprise all industries that had at least 25% of their workforce covered by collective bargaining agreements in 1983 and at least one firm with Compustat data during the sample periods. Data on union coverage is from Hirsch and Macpherson (2003), based on a sample of employed wage and salary workers, ages 16 and over, from the Current Population Survey Outgoing Rotation Group Earnings Files for 1983, and are matched to SIC industry classifications using U.S. Bureau of Census (1989). Two-digit SIC codes are reported in parentheses.

	Observations		
Industry	RTW Analysis	WSP Analysis	Union Coverage Rate, 1983
Mineral industries			
Metal mining (10)	33	150	0.42
Coal mining (12)	21	62	0.63
Nonmetallic minerals, except fuels (14)	33	92	0.35
Construction industries			
General building contractors (15)	11	122	0.30
Heavy construction contractors (16)	43	126	0.30
Special trade contractors (17)	0	29	0.30
Manufacturing			
Food and kindred products (20)	519	1,423	0.37
Tobacco products (21)	66	84	0.40
Apparel and other textile products (23)	78	553	0.29
Paper and allied products (26)	213	596	0.51
Petroleum and coal products (29)	191	365	0.35
Rubber and miscellaneous plastics products (30)	137	525	0.30
Leather and leather products (31)	34	181	0.26
Stone, clay, glass, and concrete products (32)	179	509	0.40
Primary metal industries (33)	303	902	0.56
Fabricated metal products (34)	181	982	0.35
Electrical and electronic equipment (36)	315	1,590	0.26
Transportation equipment (37)	403	1,183	0.50
Transportation, communication, and utilities			
Railroad transportation (40)	0	132	0.85
Local and interurban highway passenger transit (41)	0	12	0.48
Motor freight transportation and warehousing (42)	37	298	0.39
Water transportation (44)	0	50	0.42
Transportation by air (45)	153	337	0.46
Communications (48)	119	528	0.52
Electric, gas, and sanitary services (49)	28	2,681	0.44
Retail trade			
Food stores (54)	138	500	0.30
Service industries			
Motion pictures (78)	42	121	0.26
Educational services (82)	0	24	0.44

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