Bankruptcy and the Cost of Organized Labor: Evidence from Union Elections*

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Abstract

Unionized workers are entitled to special treatment in bankruptcy court. This is detrimental to other corporate stakeholders in default states, with senior, unsecured creditors ("impaired claim holders") standing to lose the most. We gather data on union elections covering several decades and employ a regression discontinuity design to identify the effect of worker unionization on bondholders' wealth. Closely-won union elections lead to significant losses to bond values. Unionization is associated with longer, more convoluted bankruptcy proceedings and higher fees and expenses paid in court. All of these costs diminish corporate asset values, aggravating bondholders' losses.

Key words: Unionization, Bond Values, Regression Discontinuity Design, Bankruptcy Costs.

JEL classification: J51, G33, G32.

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> The purpose of Chapter 11 is to prevent a debtor from going into liquidation with an attendant loss of jobs and possible misuse of economic resources.
>
> — *Supreme Court, N.L.R.B. v. Bildisco & Bildisco (1984)*

1 Introduction

Despite their declining prominence, labor unions still shape human capital participation in corporate activity. Over eight million private-sector workers in the U.S. today are represented by unions and of the largest 100 industrial firms, 33 have a unionized work force. Unionization is commonly thought of as a means to increase workers' bargaining power in negotiations over benefits such as wages, overtime pay, health care, and pension funding. Arguably, however, these pecuniary benefits are less important than concerns such as career development and job security. Those non-contractual interests are most endangered when firms default on their obligations, as courts are unable to assess and protect workers' (intangible) human capital investment. The U.S. Bankruptcy Code, for example, only safeguards workers' accumulated wages and benefits for work already performed.[1] To protect their members' long-term interests, unions must become active parties in legal proceedings under Chapter 11. Not surprisingly, their overriding goal in those proceedings has been that of seeking job preservation (see Haggard (1983) and Stone (1988)).

Unions are able to protect members' interests in several ways in bankruptcy and this paper shows that worker unionization bears significant wealth consequences for other corporate stakeholders. As recognized unsecured corporate creditors, unions are eligible to gain seats in creditors' committees in Chapter 11.[2] Section 1102(a) of the Bankruptcy Code charges the United States Trustee with the duty of organizing a committee that includes the largest unsecured creditors. The committee has powers to (1) investigate

[1] The Chapter 11 Bankruptcy Code (U.S. Code § 507 (a)(4)) only gives "automatic priority" for wages and benefits earned in the 180 days before bankruptcy.

[2] Dawson (2014) reports that a union was a member of the court-appointed unsecured creditors' committee in over one third of the bankruptcy cases in which the debtor was unionized. Unions' claims against companies include (1) withheld union dues, (2) unpaid contributions to union pension and welfare plans, (3) unpaid wages and accrued benefits to workers, and (4) damages following from the rejection of collective bargaining agreements. Firms in financial distress often accumulate debts on all those accounts.

the debtor for fraud or incompetence, (2) participate in the formulation of reorganization plans, (3) request the replacement of managers, (4) block asset sales, and (5) ask the court to dismiss the case or convert it into Chapter 7 liquidation. Debtors are obligated to disclose all information requested by creditors' committees and pay — from estate assets — for their expenses. Non-unionized workers, in contrast, are not eligible to gain seats on creditors' committees. They are only entitled to limited statutory priorities.[3]

Beyond receiving debtor-like recognition under Chapter 11, unions resort to several tactics to empower workers in bankruptcy. They organize strikes, boycotts, and public denouncements with the goal of forcing managers to acquiesce to their demands so as to avoid disruptions that invite creditor control (see Atanassov and Kim (2009)). When convenient, unions use their leverage in court so that bankruptcy proceedings allow for disruption of absolute priority rules (APR), whereby unsecured creditors' claims lose seniority (Adler (2010)). Unions can also make bankruptcies last longer, using the courts to force parties into repeated, costly negotiations over workers' demands. In securing continued employment for their members, unions may favor inefficient reorganizations in lieu of liquidation (Korobin (1996)). This is a key concern since firms that emerge from reorganization often re-enter bankruptcy, as unions resist asset sales and worker layoffs.

We study the effect of unionization on corporate creditors by examining the price reactions of publicly-traded bonds to labor union elections. Publicly-traded bond prices represent a unique value metric with which to gauge the effects of worker unionization on to other stakeholders of the firm. Unlike other creditors (e.g., banks and syndicated lenders), it is difficult for investors of diffusely-held bonds to renegotiate with borrowers. Bond investors, instead, dispose of their securities in the market in response to innovations to the expected value of their claims. Given the concave structure of bond payoffs (capped at issue face values in non-bankruptcy states), bond prices are sensitive to expected income in bankruptcy states. In particular, as their claims are senior, yet unsecured, bondholders' wealth declines sharply in the face of high bankruptcy costs.[4]

[3]Employee benefit and wages priority privileges are currently capped at only $10,000 per worker.

[4]The Bankruptcy Code treats holders of senior, unsecured claims as the "most impaired" set of

Deviations from an orderly bankruptcy process will increase expected bankruptcy costs and lead to declines in the secondary market price of corporate bonds.

Union elections in the U.S. are conducted through secret ballot voting. Once a union wins over 50% of the workers' votes, it attains legal recognition. Union rights are protected by the National Labor Relations Act and a successful election increases the bargaining power of workers. Naturally, both the occurrence and the results of union elections are influenced by a number of factors. As such, the average union-win firm might differ from the average union-loss counterpart on several dimensions (both observable and unobservable). To identify our tests, we resort to a regression discontinuity design (RDD) that uses local variation in the vote share of elections that lead to discrete changes in union legal status. In short, our tests contrast bond price reactions to closely-won union elections with bond price reactions to closely-lost union elections. Workers in close-win elections gain union representation status while those in close-loss elections do not; yet firm characteristics and workers' support for unions are ex-ante similar across the two groups. Given the nature of the voting process, it is unlikely for individuals or firms to precisely anticipate or manipulate the outcome of close union elections. Under these regularity conditions (which we verify in the data), relative differences in bond price reactions to close union election outcomes can be plausibly attributed to the effect of unionization.

We conduct our analysis on a sample of 721 bond issuers observing worker unionization attempts between 1977 and 2010 according to records from the National Labor Relations Bureau (NLRB). Our tests show that worker unionization negatively affects the wealth of senior, unsecured creditors. Results from RDD estimations show that closely-won union elections are associated with a negative 200 (400)-basis-point average cumulative abnormal return (CAR) over the 3-month (12-month) window following election events. Closely-lost elections are associated with a statistically insignificant CARs over the same

claimants against corporate assets in default states. This stands in contrast to secured creditors and to equity holders, who are often treated as "unimpaired." Consistent with this legal treatment, a Moody's (2007) report shows that the median recovery rate of bank loans in default is 100%, while that of senior, unsecured bonds is only 30%.

windows.[5] Our estimates are economically significant. To put them in perspective, we note that studies looking at other events that affect bondholders, such as leveraged buyouts (Warga and Welch (1993)) or asset fire sales driven by ratings downgrades (Ellul et al. (2011)), report CARs of the order of 800 basis points over 4- to 6-month windows.

From a pricing perspective, the decline in bond values could be associated with increases in default risk or in-court bankruptcy costs. We look for evidence of those effects in our data. DiNardo and Lee (2004) find little economic impact of unionization on firms' wages, profitability, or survival, suggesting negligible changes in firms' default risk following unionization. Consistent with their findings, we find no evidence that close union winners perform worse or become more likely to enter distress or go bankrupt than close union losers for several years after the vote.

We then set out to investigate the effects of unionization on in-court bankruptcy costs. Naturally, this examination necessitates the use of data from actual bankruptcy events. To conduct an in-court costs examination, we expand our data to include information from the UCLA-LoPucki bankruptcy database. In this investigation, we use non-parametric and probabilistic approaches to compare the duration, costs, and outcomes of court proceedings across bankrupt firms with unionized workers and those without. We find that unionized firms experience more prolonged bankruptcy proceedings and are also more likely to go through inefficient reorganizations, as evidenced by a higher likelihood of emerging from bankruptcy and refiling for bankruptcy shortly thereafter. Unionized firms are also more likely to reorganize under debtor-in-possession (DIP) financing.[6] In addition, firms with labor unions incur significantly higher expenses and fees in bankruptcy court, including fees paid to attorneys and creditors' committees. While our examination of in-court bankruptcy costs are not informed by election-based RDD tests, the results we observe are consistent with the notion that unionization increases firms' bankruptcy costs.

[5] The horizons considered follow prior literature on the effects of unionization (e.g., DiNardo and Lee (2004) and Lee and Mas (2012)) and event studies on bond returns (e.g., Warga and Welch (1993), Eberhart and Siddique (2002), and Ellul et al. (2011)).

[6] These financing arrangements force pre-existing senior creditors into more junior claimant categories; yet they allow firms to continue operating and workers to keep their employment.

We exploit firm heterogeneity in our RDD framework to verify that unionization affects bond values through costs incurred in bankruptcy court. First, we compare subsamples of financially-distressed and financially-healthy firms. One would expect the bond prices of distressed firms to react more negatively to unionization since these firms are closer to realizing higher in-court bankruptcy costs associated with unions. We consider several measures of financial distress, including Altman's Z-Score, Ohlson's O-Score, Merton's distance to default, as well as Moody's credit ratings. Notably, these distress measures are similarly distributed across firms where union elections are closely won and lost. Yet, consistently across all measures, RDD results show that unionization has a much greater impact on the bond values of distressed firms.

Next, look at the funding status of firms' pension plans to assess variation in bondholders' expected costs in bankruptcy. Pension benefits are protected by the Employee Retirement Income Security Act (ERISA) and guaranteed by Pension Benefit Guaranty Corporation (PBGC). Employees working under an underfunded pension plan are entitled to interests in the firm's estate in bankruptcy. Those interests are treated with the same (high) priority of wages in bankruptcy court.[7] An underfunded pension plan aggravates bondholders' expected costs in bankruptcy states. We partition our sample based on pension funding status and find the effect of unionization on bond value to be significantly stronger for firms with underfunded pension plans than for firms with well-funded pensions.

Finally, we examine the argument that the value impact of unions is related to increases in the bargaining position of the workers they represent. The adoption of right-to-work (RTW) laws by some state-level legislatures has allowed non-union members to enjoy the benefits of collective bargaining without having to join a union or pay union dues. These laws weaken union powers, as they constrain unions' financial resources and reduce their organizing activity, ultimately impairing their effectiveness (see, e,g., Ellwood

[7]In cases when portions of unfunded pension benefits accrued 180 days prior to bankruptcy, the PBGC has claimed that such liabilities equate to "administrative expenses," which receive a strictly higher priority status than unsecured claims.

and Fine (1987) and Holmes (1998)). Partitioning our sample according to whether a union election is held in a state with RTW laws, we find that the effect of unionization on bond values is far stronger in states without those laws.

It is hard to assess the ultimate wealth effects of organized labor on firms and investors. While some studies report negative impacts of organized labor on share values (Ruback and Zimmerman (1984) and Lee and Mas (2012)), others find little or no value effects arising from contract negotiations with organized labor (Liberty and Zimmerman (1986) and Abowd (1989)). Studies such as Faleye et al. (2006) and Chen et al. (2012) argue that workers and creditors share a common interest in reducing firm risk in good states, since both parties hold fixed claims on firm values in those states. Accordingly, Faleye et al. show that firms with strong labor representation invest less in long-term assets, taking fewer risks. Chen et al. report regressions suggesting that bonds issued by firms in more unionized industries are highly valued by investors because those firms are less likely to be the targets of acquisitions. These papers do not study conflicts between workers and creditors when dividing assets and sharing residual wealth in bankruptcy court. We contribute to the literature by characterizing this latter dynamic, showing that unionized firms incur higher costs in bankruptcy, reducing the value of other creditors' claims.

Lastly, our paper builds on a growing line of research on how human capital and organized labor influence firm financing (e.g., Berk et al. (2010), Agrawal and Matsa (2013), and Simintzi et al. (2014)). Our study contributes to this literature by showing that unions are ultimately costly to holders of unsecured debt. The analysis furthers the understanding of the impact of worker organization on investors' wealth, an important facet of firm–labor relations.

2 Data Description and Sample Selection

We combine a number of databases to study the effect of unionization on bond values and bankruptcy costs. This section describes our data collection process, sampling, and

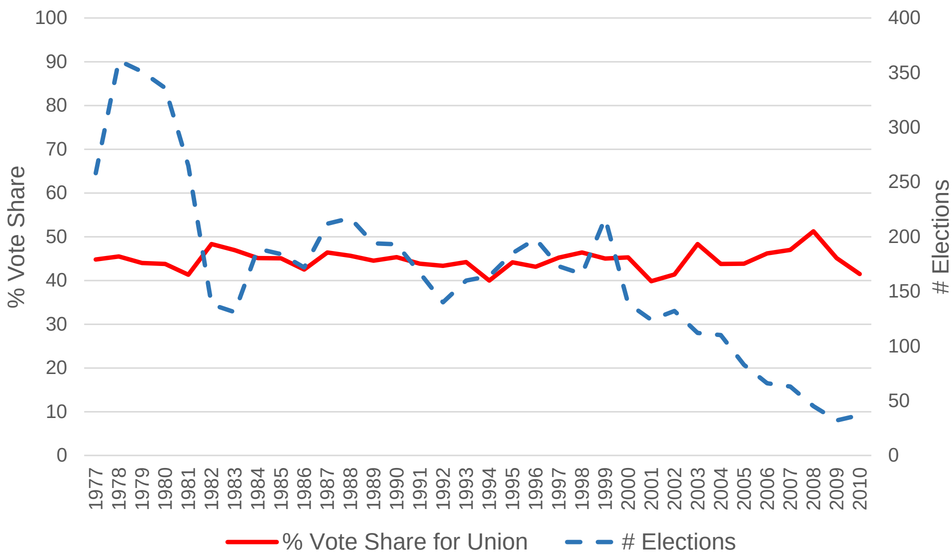


Figure 1. Occurrence and results of union elections
This figure describes the time series variation in the occurrence and results of union elections in our sample period. The solid line represents the median percentage votes in support of a union (% Vote Share for Union) in the elections in a given year; the dashed line represents the total number of elections (# Elections) held.

variable construction methods.

2.1 Union Election Data

The NLRB provides detailed data on the results of elections to certify a representative union for a collective bargaining unit for the 1977–2010 period.[8] We gather information related to the time and location of each union election in the United States, the number of participating and eligible voters, the number of votes "for" and "against" unionization, and the company in which the election took place. Starting from the universe of elections recorded in the NLRB database, we follow the algorithm used in Lee and Mas (2012) for matching company names in the NLRB to their identifier in the Center for Research in Security Prices (CRSP) database. We inspect every match manually and exclude incorrect matches. Our base union election sample contains 5,714 elections.

There is a well-documented decline in the unionization movement in the U.S. (see,

[8]The 1977–1999 period data are used in Holmes (2006) and are available from Thomas Holmes's website (`http://www.econ.umn.edu/~holmes/data/geo_spill/index.html`). The 2000–2010 data are posted by the NLRB (`http://www.data.gov/`).

e.g., Western and Rosenfeld (2011) and DiNardo and Lee (2004)). Our sample spans 33 years and Figure 1 shows that it captures a declining trend in establishment-level union elections. In the 2000s, in particular, the number of elections dropped sharply. The patterns present in our sample seem consistent with claims that union activity has declined due to factors such as changes in the political climate and public policy, managerial opposition to unions, development of labor-saving technologies, and increased competition from international trade (DiNardo and Lee (2004)). Despite the decline in the number of union elections, key statistics of election results remain constant over time. For example, as shown in Figure 1, the average vote share in support of union is close to 45% over the entire time horizon covered by our sample. Although not displayed, the percentage of successful union elections has also remained constant over time, hovering around 25%.

2.2 Bond Data

We collect information on publicly-traded corporate bonds from multiple data sources. Bond information for the 1977–1997 period is taken from the University of Houston Fixed Income Database (formerly Lehman Brothers Database). The University of Houston Database provides month-end bid prices for each bond issue, as well as issue-level characteristics such as accrued interest, yield to maturity, and credit ratings (see Warga (1998) and Collin-Dufresne et al. (2001)). For information after 1997, we use transaction-level data from the Mergent Fixed Income Securities Database (FISD) covering the 1997–2004 period and from Trade Reporting and Compliance Engine (TRACE) for the 2005–2010 period. We eliminate all canceled, corrected, and commission trades, following standard procedure in the literature (Bessembinder et al. (2006, 2009)). We also follow existing studies in limiting our sample to U.S. dollar-denominated, fixed-coupon corporate debt issues that are senior, not puttable, and unsecured. Senior, unsecured bonds account for around 95% of all corporate bonds issued.[9]

[9]Unsecured means that the bond is not backed by assets, not based on secured lease obligation, nor a private placement exempt from registration under SEC Rule 144a.

2.3 Bond Return Computation

We compute cumulative abnormal returns (CARs) of corporate bonds over several time windows to gauge creditors' reactions to union elections. We use monthly frequencies in calculating bond returns since NLRB election dates are sometimes only reported with monthly precision. Using monthly data also helps alleviate concerns about the impact of market illiquidity on bond prices, as many bonds are infrequently traded. Following Bessembinder et al. (2009), we compute trade size-weighted bond prices for each trading day and use the price on the last trading day of the month as the month-end price. We then calculate the observed return (OR) for bond b in month t as:

$$OR_{b,t} = \frac{((P_{b,t} - P_{b,t-1}) + AI_{b,t})}{P_{b,t-1}}, \tag{1}$$

where P_t is the bond price at the end of month t, AI_t is the accrued interest that month, and P_{t-1} is the bond price at the end of month $t-1$.

We calculate abnormal bond returns in three steps. First, we find a benchmark portfolio for each bond based on its risk. Specifically, we classify all senior, unsecured bonds into three-by-three portfolios according to their credit ratings and time-to-maturity.[10] We then calculate the value-weighted average return for each portfolio using the returns of every bond in that portfolio. For a given bond b, we find a portfolio with the closest credit rating and time-to-maturity as its benchmark portfolio.

Next, we calculate the abnormal return of bond b using its benchmark portfolio return as the bond's expected return (ER). The abnormal return (AR) for bond b is thus defined as the difference between the observed bond return (OR) and expected return:

$$AR_{b,t} = OR_{b,t} - ER_{b,t}. \tag{2}$$

[10]Bessembinder et al. (2009) show that default risk (proxied by credit ratings) and time-to-maturity are the two primary risk factors driving bond returns. Bonds are classified into 9 benchmark portfolios according to whether their credit rating is high grade (Aaa+ to Aa3), medium grade (A1 to Baa3), or speculative grade (Ba1 and below), and whether the remaining time to maturity is less than 10 years, between 10 and 20 years, or more than 20 years.

The firm-level abnormal bond return is computed using the weighted average abnormal returns of all bonds issued by the firm, weighting each bond with its market value.[11] Formally, the abnormal bond return AR for firm k at time t is calculated as follows:

$$AR_{k,t} = \sum_{b=1}^{J} w_{b,t} AR_{b,t}, \tag{3}$$

where J is the number of bonds outstanding for firm k; w is the market value of bond b scaled by the total bond market value of firm k. Finally, we compute the cumulative abnormal return (CAR) following union election i for firm k from month $T_{i,1}$ to month $T_{i,2}$ as:

$$CAR(k, T_{i,1}, T_{i,2}) = \sum_{t=T_{i,1}}^{T_{i,2}} AR_{k,t}. \tag{4}$$

An election event is defined as the month in which a union election vote takes place.[12] Observing the process through which unionization unfolds, we examine bond returns accumulated from the month prior to the vote to every 3 months up to one year following the event; i.e., $CAR(-1,3)$, $CAR(-1,6)$, $CAR(-1,9)$, and $CAR(-1,12)$.[13] To be included in the sample, firms are required to have available monthly bond prices from one month prior to the union election to 12 months after the election. This allows us to examine time horizons similar to previous work on the effects of unionization (DiNardo and Lee (2004) and Lee and Mas (2012)) and event studies for bond returns (Warga and Welch (1993), Eberhart and Siddique (2002), and Ellul et al. (2011)). After matching bond CARs to the union election data, we are able to study a total of 721 election events.

[11] In later robustness checks, we also use the CARs of individual bonds (as opposed to those of firm-portfolio bonds) to estimate reactions to union elections.

[12] We use the union election date instead of the case closure date by the NLRB as the former date is available for all election events and it is rare that the NLRB later overrules union election outcomes. Regardless of this choice, the NLRB closing date is around 10 days after the election in most cases, and using NLRB closing date does not affect our results.

[13] Our inferences are similar if we start the event window from the election month or two months prior to the election month; i.e., $CAR(0,3), ..., CAR(0,12)$ or $CAR(-2,3), ..., CAR(-2,12)$.

2.4 Other Covariates

We extract firm fundamental information from Compustat and equity data from CRSP. We construct several measures of firm risk, including Altman's Z-Score (*Z-Score*), Ohlson's O-Score (*O-Score*), and Merton's distance to default (*Distance-Default)*. We construct additional measures that describe firm characteristics: return on assets (*ROA*), asset size (*Size*), book-to-market ratio (*B/M*), liabilities-to-asset ratio (*Liability Ratio*), cash-to-asset ratio (*Cash*), and property, plant, and equipment-to-asset ratio (*Tangibility*). We also construct a bond liquidity measure, *Bond Liquidity*, following Batta et al. (2015). *Bond Liquidity* is defined as the ratio of bond price uncertainty to trading volume. Higher values of this measure indicate lower trading liquidity. We winsorize variables at the 1^{st} and 99^{th} percentiles. Detailed definitions of all variables are in Appendix A.

2.5 Summary Statistics

Table 1 reports summary statistics for firm and bond characteristics. These statistics are based on election-year data. Perhaps unsurprisingly, our bond–union matched sample of firms are large with high liability-to-asset ratios. Those firms are also financially healthy and liquid, with an average Z-Score of 3.6 and tangibility ratio of 41%. Firms in our sample typically have multiple bonds outstanding (average of 4), mostly with investment-grade credit ratings according to Moody's.

<u>TABLE 1 ABOUT HERE</u>

3 The Impact of Unionization on Bond Prices

3.1 Test Strategy

There can be several ways for a union to gain legal representation for workers in a business establishment. The most common path is through the following process. Union proponents must first file a petition supported by at least 30% of workers in the bargaining unit to obtain permission from the NLRB to conduct an election. The NLRB checks the petition's vote support and investigates employers' claims regarding the legitimacy of the petition. The NLRB then schedules the election. The time lag between an initial petition and the vote is usually around six weeks. Once the election is conducted, a union is formed if over 50% of eligible workers vote in favor. Within seven days following the election, parties can file objections to the NLRB regarding election procedures. If the Board rules the election invalid, it will carry out a rerun (this rarely happens). If valid, the union is certified to represent the bargaining unit, and the firm is legally obligated to negotiate with union representatives with exclusivity and in good faith, revealing all relevant firm information.[14]

We examine the impact of unionization on corporate bonds using a regression discontinuity design (RDD). The RDD approach gauges effects from a "treatment" by identifying a cutoff above or below which a treatment is assigned. The underlying assumption is that for subjects in the vicinity of the cutoff, the treatment assignment is plausibly random. In our setting, union representation status (the treatment) is determined by whether the vote share for union exceeds 50%. Due to the secret-ballot election mechanism required by law, there is a substantial level of ex-ante uncertainty about election outcomes. For close elections, it is unlikely that voters and other agents exactly anticipate the election result. The nature of the secret ballot mechanism also makes it difficult for agents to manipulate the vote share around the cutoff (more on this shortly). As such, close winners and close losers in union elections are likely to be ex-ante similar. By calculating the differential bond return reactions from close union winners and losers, one should be able to infer the impact of workers' union status on bondholders' wealth.

[14]DiNardo and Lee (2004) document that once elections are won, unions maintain their legal status over a long period of time. In our data, fewer than 3% of the elected unions were ever decertified.

3.2 Methodology

A simple RDD implementation consists of estimating two separate regressions on each side of the relevant assignment cutoff. One can use those two regression intercepts to compute the change in the outcome variable of interest at the cutoff. Formally, one estimates a polynomial regression model of order p on each side (*left* and *right*) of the cutoff c as follows:

$$Y = \alpha_l + (X-c) \times \beta_{l,1} + (X-c)^2 \times \beta_{l,2} + ... + (X-c)^p \times \beta_{l,p} + \epsilon, \; where \; X \leq c, \quad (5)$$

and

$$Y = \alpha_r + (X-c) \times \beta_{r,1} + (X-c)^2 \times \beta_{r,2} + ... + (X-c)^p \times \beta_{r,p} + \epsilon, \; where \; X > c. \quad (6)$$

In our setting, c is 50% (the cutoff for a union win). Y is bond CAR, X is the union vote share in the election, and ϵ is an error term. Combining the two equations above, we can estimate the following pooled regression:

$$Y = \alpha_l + D \times \tau + \sum_{n=1}^{p} (X-0.5)^n \times \beta_{l,n} + \sum_{n=1}^{p} (X-0.5)^n \times D \times (\beta_{r,n} - \beta_{l,n}) + \epsilon, \quad (7)$$

where D is an indicator for union victory that equals 1 if the vote share surpasses 50% and the union wins, and equals 0 if the union loses. The term τ equals $\alpha_r - \alpha_l$ (from Eqs. (5) and (6)), capturing the jump in Y as the vote share just passes 50%. In other words, τ provides an estimate of the effect of unionization on corporate bonds' CARs.

Because the polynomial regression approach uses all available data in the estimation, it can achieve greater precision. The tradeoff, however, is that it imposes a particular functional form onto the relation between bond values and vote shares over a wide range of data, including data far away from the cutoff. Notably, strong functional form assumptions admit biases. Thus, we also consider a local linear regression approach, which is a non-parametric estimation using data within a small window h around the assignment cutoff. This approach reduces the potential for biases arising from global functional form assumptions at the cost of reducing statistical power due to the limit imposed on the sample size. Balancing the issues of bias and precision, we use both methods for estimation to ensure the reliability of our inferences.

Our local linear regressions can be represented similarly to the polynomial regressions discussed above, where one conveniently estimates the following model:

$$Y = \alpha_l + D \times \tau + (X - 0.5) \times \beta_l + D \times (X - 0.5) \times (\beta_r - \beta_l) + \epsilon, \quad (8)$$

where $0.5 - h \leq X \leq 0.5 + h$, and τ captures the effect of unionization on bond CARs.[15] In our local linear regression tests, we estimate models using both rectangular and triangular kernels. Each kernel method has advantages. Imbens and Lemieux (2008) and Lee and Lemieux (2010) recommend using rectangular kernels because they achieve higher efficiency. Fan and Gijbels (1996) and Cheng et al. (1997) show that the triangular kernel is boundary-optimal, which is a desirable feature for sharp RDD applications.

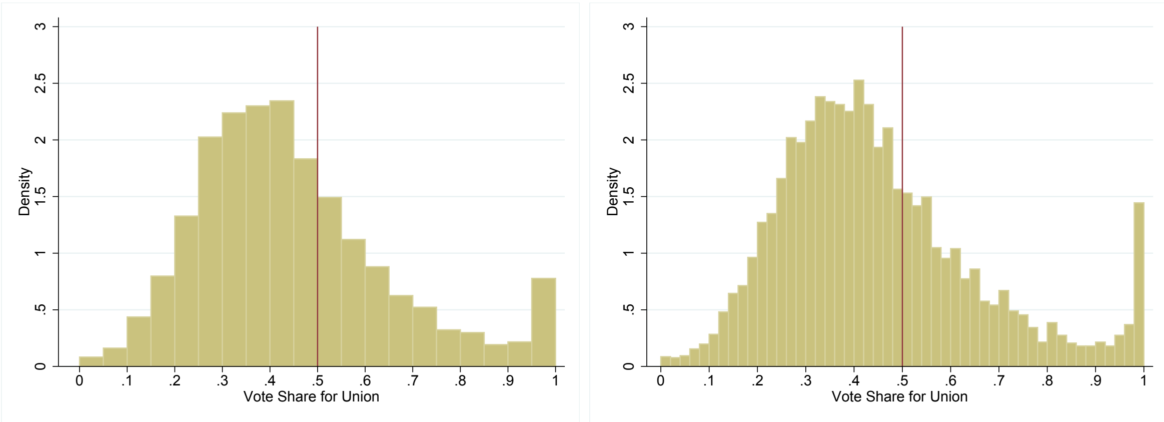
3.3 Validity

We examine two necessary conditions to test the validity of our RDD approach: (1) continuity of the distribution of the forcing variable (union vote share) around the assignment cutoff and (2) continuity of other covariates around the cutoff. These two conditions help verify whether union voting serves as a locally randomized assignment.

3.3.1 Continuity of the Forcing Variable

We first examine whether the distribution of vote share is continuous around the 50% mark. If workers or firms could systematically manipulate vote shares around the 50% cutoff, we should expect to see markedly different vote share densities just above or just below that point. Alternatively, one could be concerned that workers only call for a vote when they anticipate a union win (even if marginal). In that case, we could see an upward

[15]The local linear regression is estimated by solving the following kernel-weighted least square problem on each side of the cutoff: $min_{\alpha,\beta} \sum_i (Y_i - \alpha - \beta(X_i - c))^2 K(\frac{X_i - c}{h})$, where K is a kernel and h is the bandwidth.



(A) (B)

Figure 2. Histograms of the vote share distribution
This figure shows the histograms of the vote share distribution following Frandsen (2014a). The horizontal axis represents the percentage of votes in favor of unionization and the vertical axis the associated distribution density. Panel A shows the histogram with 20 bins. Panel B shows the historgram with 50 bins.

jump in the union vote share distribution density after the 50% mark.

In a study comprising data from private and public firms of all sizes, Frandsen (2014a) finds that union elections are less likely to be narrowly won than narrowly lost. Using our sample of large, public firms, we first examine such discontinuity using histograms that are similar to those proposed by Frandsen. Panel A of Figure 2 depicts the relevant histogram when we divide possible realizations of vote share for union into 20 bins (bandwidth of 0.05); panel B shows the histogram with 50 bins (bandwidth of 0.02). The patterns observed in the data suggest that elections are not manipulated at the 50% cutoff. To formally test the continuity of the vote distribution, we follow the methodology proposed by McCrary (2008). It consists of a local linear regression combined with a Wald test to detect jumps in the marginal density of the forcing variable around the treatment assignment cutoff.[16]

[16]McCrary (2008) shows that the log difference between the density on the left and right sides of the cutoff $ln\hat{f}^r - ln\hat{f}^l$ follows a normal distribution. The density $\hat{f}(p)$ at each point p is estimated as $\hat{\phi}_1$, where $\{\hat{\phi}_1, \hat{\phi}_2\}$ minimize the average distance to the observed density through a smoothing function: $L(\phi_1, \phi_2, p) = \sum_{j=1}^{J} \{Y_j - \phi_1 - \phi_2(X_j - p)\}^2 K((X_j - p)/h)\{1(X_j > c)1(p \geq c) + 1(X_j < c)1(p < c)\}$, where $K(\cdot)$ is a triangle kernel function, X_j is the midpoint of bin j, and Y_j is the observed density of bin j.

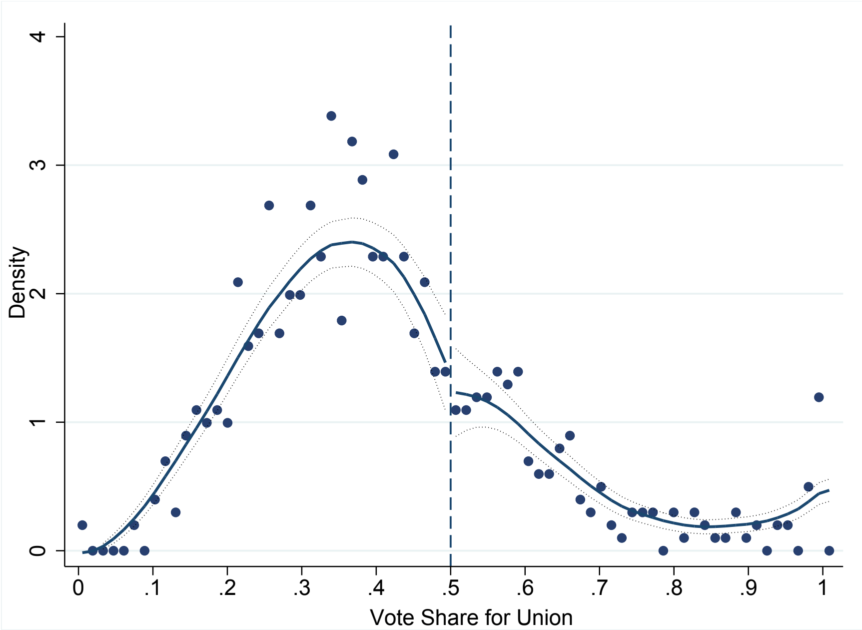


Figure 3. Density distribution of the vote share for union
This figure shows the density distribution of vote shares for union following McCrary (2008). The horizontal axis represents the percentage of votes in favor of unionization and the vertical axis the associated distribution density. The dots correspond to the observed density. The solid lines show the local linear density estimate of the vote share for union (90% confidence intervals are displayed).

Figure 3 plots the distribution of the vote share for union under the McCrary (2008) method. The dots represent the average observed distribution density for each bin for union vote share. The solid lines represent the fitted distribution density functions from local linear regressions on either side of the cutoff (90% confidence intervals are also shown). The graph displays continuity in the vote share distribution around the 50% cutoff, with a large overlap between the confidence intervals of density function on both sides of the cutoff. Consistent with the visual evidence, the Wald test shows that the distribution density of vote shares on each side of the cutoff has a log difference of –0.09, with a standard error of 0.26. This estimate implies that in our sample of 721 elections, we can expect 15 closely-lost elections with vote share between 48.4% and 50%, and 14 close wins with vote share between 50% and 51.6%.[17] This difference is economically small and statistically insignificant.

[17]The bin size is 1.6%. Within the interval of (48.4%, 51.6%] around the cutoff, there is a 2.1% (= 15/721) probability that an election is a close loss, and a probability of 1.9% that it is a close win. The reported estimate of –0.09 represents the change in these probabilities $2.1\% \times (1 - 0.09) = 1.9\%$.

3.3.2 Continuity of Covariates

We next examine whether predetermined firm-level covariates are continuous around the 50% vote share cutoff. If there is an abrupt change in observable covariates around the cutoff, one cannot safely attribute the difference in bond values around the cutoff to unionization, as it might result from the changes in those covariates. Importantly, discontinuity of firm characteristics around the 50% cutoff may indicate that firms on the left side of the cutoff are systematically different from those on the right side of the cutoff, and should not be used as controls.

We test the assumption of continuity in firm-level covariates using local linear regressions under the RDD framework around the 50% vote share cutoff. We focus on firm characteristics that are relevant to bond valuation, including firm fundamental information given by *ROA*, *Size*, *B/M*, *Liability Ratio*, *Cash*, and *Tangibility.* We also consider measures of credit risk such as *Z-Score*, *O-Score*, and *Distance-Default.* Finally, we also account for the liquidity of the treated bonds, *Bond Liquidity.* Figure 4 illustrates the distribution of firm characteristics along the spectrum of vote share in support of union. We place nine firm characteristics in panels A through I, including *ROA*, *Size*, *B/M*, *Liability Ratio*, *Cash*, *Tangibility*, *Z-Score*, *O-Score*, and *Distance-Default.*[18] In each panel, the dots represent the average level of firm characteristics in each 5% interval of vote shares. The solid blue lines represent a fitted polynomial function of these characteristics over each vote share bin.[19] The grey lines further show a 90% confidence interval around the fitted polynomial functions. The patterns in Figure 4 indicate no discontinuity around the 50% vote share cutoff for any of the represented firm characteristics.

[18]Figures for all other characteristics (readily available) also show continuity of firm chracteristics.

[19]Consistent with our baseline RDD test for bond CARs, we use a bin width of 0.15. The patterns are robust to changes in bin width.

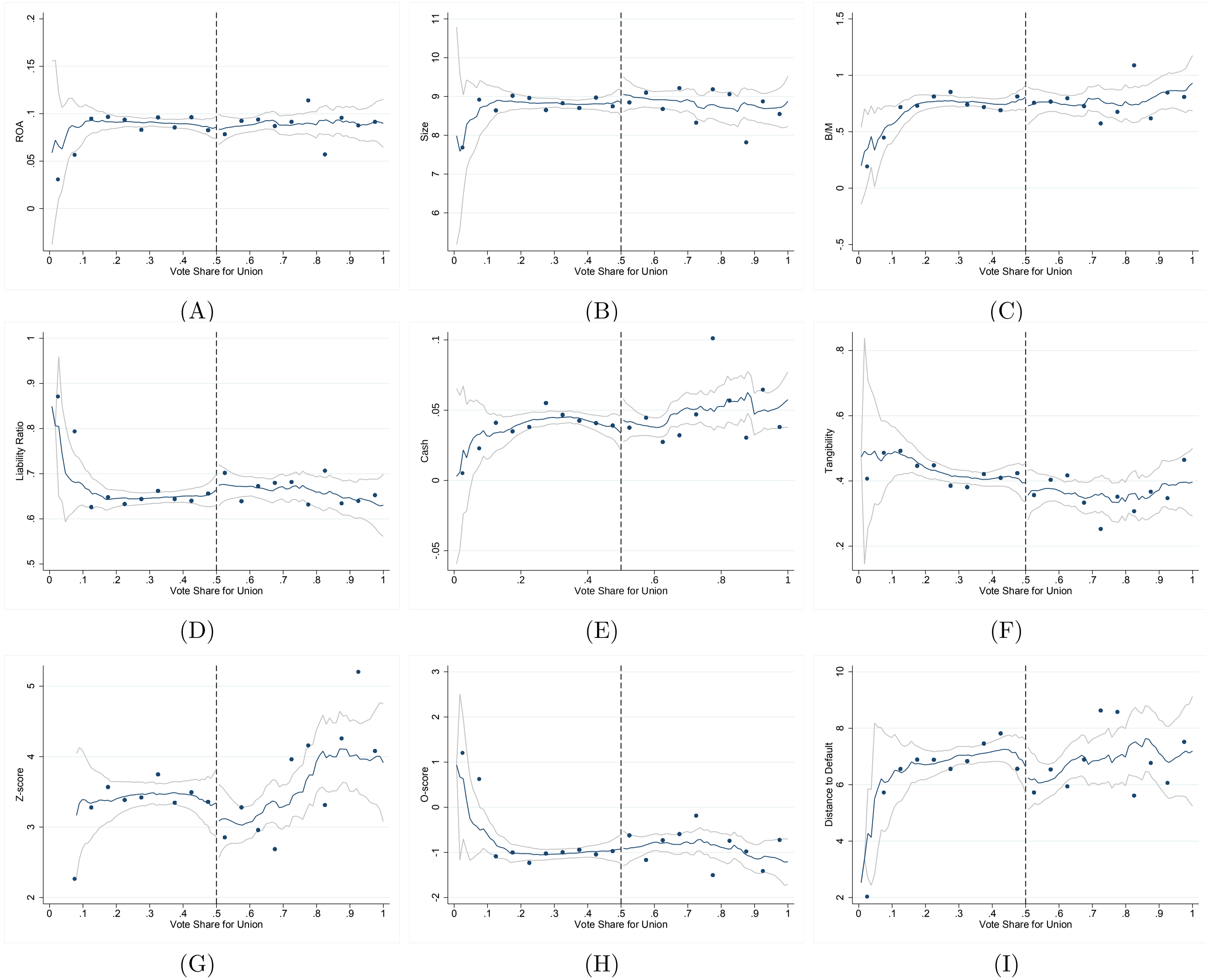


Figure 4. Continuity of firm characteristics

This figure shows the continuity of firm characteristics given vote shares for union in an election. The horizontal axis represents the vote share in support of union and the vertical axis represents firm characteristics given the vote share. Panels (A) through (I) show the distribution for *ROA*, *Size*, *B/M*, *Liability Ratio*, *Cash*, *Tangibility*, *Z-Score*, *O-Score* and *Distance-Default*, respectively. The dots represent average firm characteristics in each 5% interval of vote shares. The blue lines represent fitted polynomial functions of these characteristics, fitted over each vote share bin. Bin width is 0.156. The grey lines represent the 90% confidence intervals of the fitted polynomials.

We go a step further and examine pre-election trends in firm covariates. Different trends in these covariates before closely-won and closely-lost elections could suggest that election outcomes may be correlated to latent conditions of the firm. We track these characteristics of our sample firms during the five years prior to their union elections and compare them to their levels during the election year. For benchmarking, we subtract industry medians from each of these variables (3-digit SIC categorization) and use local linear regressions to detect any significant differences in the evolution of these variables between close winners and losers.

The results are presented in Table 2. There are no significant trend patterns in the five-year pre-election period for any of the covariates that we consider.

TABLE 2 ABOUT HERE

In all, we do not find evidence showing that close winners and close losers in union elections are different in relevant observable characteristics during the election year. We also do not find evidence suggesting that they have experienced difference changes in these characteristics prior to union elections. The outcomes of close elections are likely to be plausibly randomly distributed among firms.

3.4 Graphical Analysis of the Outcome

We first use graphical analysis to identify the relation between vote shares for union and bond value changes following union elections. We divide the vote share into bins, calculating the conditional mean of the bond CAR corresponding to each bin. We then fit bond CARs on each side of the cutoff as separate quadratic functions of vote shares. We plot the average bond CAR against the midpoint of each bin. Figure 5 graphs the relation between bond $CAR(-1, 3)$ and vote share for union. The solid lines depict bond CARs as fitted functions of vote shares; the dotted lines show 90% confidence intervals for those functions.

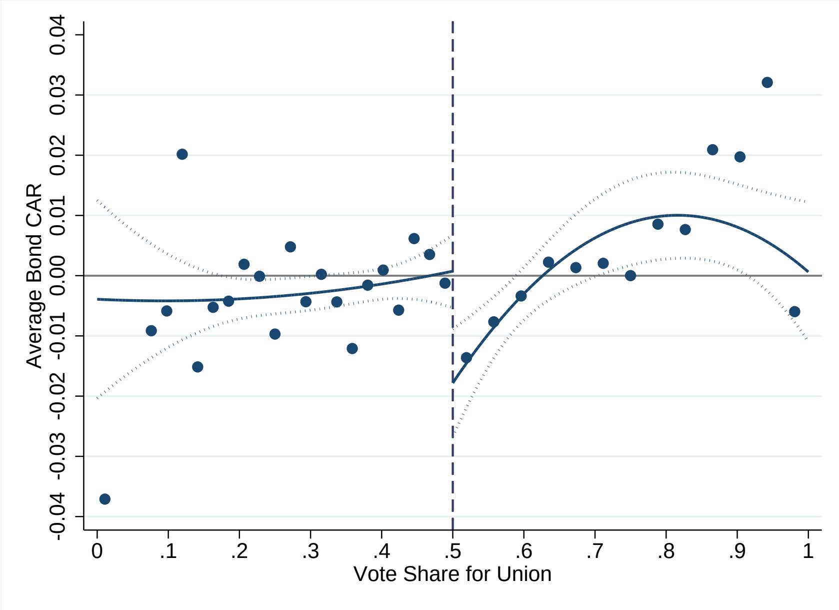


Figure 5. Bond CARs following election
This figure shows the bond CARs over 3 months following elections against the vote share for union. The horizontal axis represents the vote share for union, and the vertical axis represents the bond CAR. The dots are CAR conditional means for each bin for union vote share. Bin width is 0.156. The solid lines represent the fitted quadratic polynomial function, estimated separately for union loss and union victory cases (below and above the 50% vote share). The dotted lines represent the 90% confidence intervals of the polynomial estimation.

Figure 5 shows a distinct drop in bond CARs from the left side to the right side of the 50% cutoff, with non-overlapping confidence intervals. Bond CARs for close union winners decline over 180 basis points during the 3-month window following the election, while close losers' CARs are nearly zero during the same event window.

3.5 Estimation Results

3.5.1 Polynomial Regressions

Table 3 shows the results from polynomial regressions. For every return window, we report results in stages. We first regress bond CARs on a union victory dummy (*Union Victory*), which equals one if the union wins the election, and zero otherwise. We then add to the specification the vote share for the union (*Vote Share for Union*), thus controlling for a linear relation between bond values and the level of support for union. Finally, we allow for nonlinear functional relations by adding higher order terms of vote share. Specifically, we add up to 3^{rd}-order terms of vote share as well as the interaction between the union victory dummy and these higher-order terms, allowing for different polynomial relations for victory and losing elections.[20] In all regressions, we control for year-fixed effects to account for time-specific economic conditions that can affect both election outcomes and corporate bond returns. We also allow bondholders to have different rates of reactions to election outcomes for firms that host only one election and firms that conduct multiple elections in our sample period. To do so, we include an indicator for multiple elections and its interactions with the 3^{rd}-order polynomial of election vote shares.[21]

Column (1) reports regression results for bond $CAR(-1, 3)$ on a dummy variable indicating whether the union wins the election. The coefficient on the union victory dummy is insignificantly different from zero, indicating that the average abnormal bond returns that follow union victories are not different from the returns following union losses. Results from column (2) account for a linear effect of vote shares on bond returns. The coefficient on the union victory dummy gains in magnitude and significance. Column (3) reports results when we allow for nonlinear relations between bond returns and vote shares. The union victory dummy attracts an economically and statistically significant coefficient. The estimate indicates that, following union elections, the bond prices of near-winner firms decrease 240 basis points *more* than the bond prices of near-losers.

TABLE 3 ABOUT HERE

Columns (4) through (12) repeat the analyses in columns (1) through (3), examining the bond abnormal returns accumulated over longer event windows. Columns (6) and (9) show that unionization is associated with a 230 (460)-basis-point decline in bond prices over the 6 (9) months following a union's victory. Column (12) shows that, over the 12-month post-election window, the bond prices for near-win elections drop 560 basis points

[20] Our inferences are insensitive to the choices of the order of the polynomial function.
[21] Coefficients of these additional interaction terms are omitted to cut clutter.

more than those associated with near-loss elections.

We note that the union-led declines in bond values that we identify are statistically and economically significant. The estimates imply that our sample bond investors lose, on average, \$7 million over merely 90 days following union elections. The magnitude of those losses increases with the increase of the event window, reaching \$16 million one year after the election.[22]

3.5.2 Local Linear Regressions

We employ local linear regressions to verify the results returned from polynomial models. We use both rectangular and triangular kernels for estimation. We also consider several data bandwidths in our tests. In particular, we follow Imbens and Kalyanaraman (2012) and use the optimal bandwidth that minimizes the estimation errors over the entire data range. For robustness, we also report results based on 75% and 125% of their optimal bandwidth.[23]

Table 4 shows the results from local linear estimations using several different combinations of data bandwidths and kernel methods. Panel A (Panel B) shows the results from rectangular (triangular) kernel estimations. The test yields statistically and economically similar results across all specifications. The estimates suggest that unionization leads to significant declines in bond values over all event windows. Bondholders of close union winners suffer, on average, a 210-basis-points larger decline in bond values over the 3 months following elections than the bondholders of close losers. The effect is magnified as we increase the event window. Over the 12-month post-election window, bondholders of close union winners observe their bonds drop by 470–500 basis points more than bondholders of close losers. The magnitudes of these estimates are economically similar

[22]Given that our sample firms have, on average, \$288 million in bonds outstanding, one can estimate that close winners incur a $\$288 \times 0.025 = \$6.9$ million greater loss in bond value during the 3-month window following union elections. Similarly, they are expected to observe a \$16 million greater loss during the 12-month window ($= \$288 \times 0.056$).

[23]The choice of bandwidth involves the standard tradeoff between precision and bias. A wider bandwidth improves precision by using more observations but may admit biases as the function form may change over a larger interval. A narrower bandwidth yields less bias but reduces estimation precision.

to those from polynomial regressions.

TABLE 4 ABOUT HERE

3.5.3 Result Characterization

Our results point to significant economic effects stemming from unionization and it is important that we provide tight characterization of their meaning. We do so describing in granular detail the impact of unionization on the bond prices of firms in the transportation equipment industry (SIC 37) and in the electric, gas, and sanitary industry (SIC 49).

Our sample has a total of 74 union elections taking place in the transportation industry. Nine of them represent close union victories. These close-win cases include the election of International Association of Machinists and Aerospace Workers to represent workers of Lockheed Martin Services Inc. The election took place in March 2009 in Ashburn, Virginia, where Lockheed Martin stations its "Automated Flight Services" unit. The union vote share was 56%.[24] Lockheed is a large defense contractor with products and services that vitally depend on automated flight capabilities. Close-win cases in transportation also include the election of United Auto Workers to represent the workers of Ford Motor Co. in August, 2004, in Allen Park, Michigan. This is where Ford's "Pilot Plant" is located. The plant is tasked with testing equipment and manufacturing vehicles before mass assembly, crucial to Ford's production process. The average bond CARs in SIC 37 are –50, –250, –308, and –520 basis points during the 3, 6, 9, and 12 months following closely-won elections, respectively.

Likewise, our sample has 58 elections taking place in SIC 49. Six of them are close union wins. These include International Brotherhood of Teamsters' election to represent workers of Waste Management Inc., which took place in Plymouth Massachusetts in September, 2004. Another example is the election of Teamsters for Republic Services in October 2009 in Anaheim, California. Each of these locations run the core business

[24]The 3-, 6-, 9-, and 12-month bond CARs for the Lockheed Martin election are –403, –843, –980, and –987 basis points, respectively.

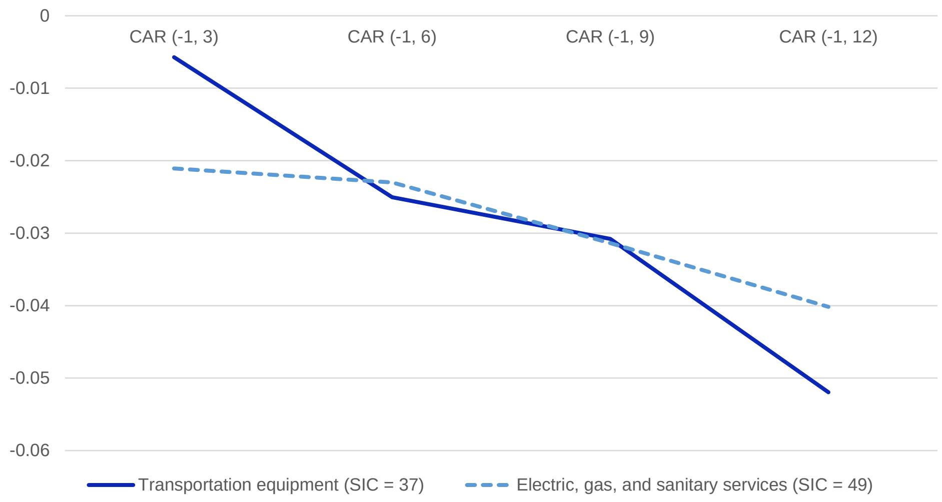


Figure 6. Bond CARs for SIC 37 and SIC 49
This figure shows the bond CARs following union elections for sample firms in the transportation equipment industry (SIC 37) and in the electric, gas, and sanitary industry (SIC 49). The solid line represents CARs for firms in the transportation equipment industry, while the dotted line represents CARs for firms in the electric, gas, and sanitary services industry.

of their respective parent companies (waste and recycling for large geographical regions). The average bond CARs following these closely-won union elections were –211, –230, –313, and –402 basis points over the 3-, 6-, 9-, and 12-month windows, respectively.

Figure 6 plots the bond price reactions towards unionization for the transportation equipment industry and the electric, gas, and sanitary services industry over various horizons. The figure depicts in granular detail the argument that unionization bears detrimental, lasting effects to unsecured creditors' wealth.

4 Bankruptcy Likelihood and Bankruptcy Costs

Our results show that unionization affects bond values, an outcome that may arise from an increase in the likelihood of bankruptcy or higher bankruptcy costs. We set out to investigate these two explanations. To gauge the effect of unionization on bankruptcy likelihood, we use our bond–union matched dataset and track the evolution of firm performance and financial health for several years after union elections take place, comparing close winners and close losers over time. To gauge the effect of unionization on bankruptcy costs, we gather additional data on bankruptcy proceedings and examine whether unionized firms experience longer, costlier bankruptcies. The test approaches used across these sets of investigations naturally accommodate the characteristics of the datasets we employ.

4.1 Unionization and Bankruptcy Likelihood

For every firm in which an election takes place, we compute performance measures such as return on assets, book-to-market ratio, firm size, liability ratio, cash holdings, tangibility, Z-Score, O-Score, and distance to default. For benchmarking, we subtract industry medians from each of these variables. We then track the evolution in these industry-adjusted measures for the five years following the election year, comparing the difference of these measures to their own level in the year prior to the election. Finally, we use local linear regressions to test whether the changes in business performance measures differ for close union election winners and losers. To ensure that the power of our results is not limited by the bond–union matched sample, we repeat the test in a larger sample that includes all firms with a union election (regardless of the availability of bond data).

Table 5 reports RDD estimates associated with close union victories on each of the industry-adjusted metrics we consider. Panel A displays the results from our main sample, which admits firms with both union elections and sufficient information to calculate bond returns. Panel B shows results from a broader sample that includes all publicly-traded firms with union elections. From both panels, the coefficient for union victory is rarely significant, indicating that close union winners and losers experience similar post-election performance. Notably, similar to findings in Schmalz (2015), firms' debt levels and cash holdings do not differ significantly at the vote share cutoff. If anything, close union winners show slightly better profitability and lower financial distress than close union losers following elections. This is a relevant observation since in our 33-year long sample only one close-union winner filed for bankruptcy.

TABLE 5 ABOUT HERE

The lack of performance deterioration for the close union-winning firms within five years following the election could indicate that the effect of unionization may only materialize in the longer term (more than five years). If this is the case, bonds that mature within five years following the election should not be affected by unionization. We investigate this possibility by examining whether bonds with less than five years to maturity at the election year experience any difference in returns across close winners and close losers. Table 6 repeats the RDD analyses of Table 4 for the subsample of bonds with less than five years to maturity; these bonds are associated with 416 election events. Even for this subsample, we find that close union winners experience declines in bond prices. In other words, shorter-term bond values decline in the aftermath of unionization even though there is no evidence that unionization will affect the odds the firm will go bankrupt in the short term. The value estimates are statistically significant, yet sensibly smaller in magnitude compared to those from the full sample analyses.

TABLE 6 ABOUT HERE

The results from Table 6 seem to rule out the argument that unionization only affects bond prices in the long term (more than five years after the union election). At the same time, the results from Table 5 suggest that unionization has no measurable influence over a firm's probability of default in the foreseeable future. The results are consistent with findings in DiNardo and Lee (2004), who argue that such an insignificant impact could be due to the fact that close-winning unions need a long period of time (a decade) to gain substantial bargaining power. In the long term, unions could impose costs to the firm that are not captured in our data, such as the use of seniority rules, work rules, grievance procedures, and other improvement in working conditions.

From the declining prices of soon-to-mature bonds (within five years of union election), one potential inference is that the decline in bond value following elections is caused by higher in-court bankruptcy costs, conditional on that event. We consider this argument in turn.

4.2 Unionization and Bankruptcy Costs

The examination of in-court bankruptcy costs necessitates data from actual bankruptcy events. Since we lack observations on those events in our original bond–union matched sample, we expand our analysis to include information on Chapter 11 bankruptcy cases from the UCLA-LoPucki Bankruptcy Research Database. The LoPucki database contains detailed records of petitions filed in U.S. bankruptcy courts, allowing us to contrast the judicial court processes experienced by unionized and non-unionized firms. We examine in-court costs incurred during bankruptcy from several margins. For this purpose, we use two datasets from the LoPucki library. The first contains information about Chapter 11 duration and outcomes. It also reports whether the workers of the bankrupt firm were unionized before bankruptcy. We collect data from 1980 through 2010, for a total of 546 bankruptcy cases. The second dataset contains in-depth information about fees and expenses paid in court for a smaller sample of 102 bankruptcy cases. This dataset covers bankruptcies of large corporations and provides detailed information regarding the fees paid to various professionals in bankruptcy court cases. The data also reveal whether the firm was unionized prior to entering bankruptcy. We combine these data libraries to study and contrast differences in bankruptcy costs and procedures for unionized vis-à-vis non-unionized firms. Given the characteristics of these data, we resort to probabilistic and nonparametric test approaches.

4.2.1 Bankruptcy Duration, Refinancing, Emergence, and Refiling

We first examine whether unionization is associated with more prolonged, convoluted bankruptcy proceedings. LoPucki and Doherty (2011) show that the duration of bankruptcy cases is one of the most important determinants of fees and expenses incurred during litigation in the U.S. To study whether unions prolong the bankruptcy process, we compute the log of the number of days between the Chapter 11 filing date and the legal ending date of the case (*Duration*).[25] We contrast *Duration* across unionized and non-unionized firms by regressing bankruptcy duration on *Union*, an indicator for whether a firm has unionized workers when filing for bankruptcy, and controlling for firms' pre-bankruptcy characteristics such as profitability (*ROA*), firm size, liability ratio, cash, and asset tangibility, as well as bankruptcy year-fixed effects. Column (1) of Table 7 shows the results. Unionized firms experience a significant longer period in bankruptcy court; around 21% (or 110 days) longer than for non-unionized firms with similar characteristics that filed for bankruptcy in the same year.

TABLE 7 ABOUT HERE

Next, we examine whether unionization is associated with a higher likelihood of the firm obtaining debtor-in-possession (DIP) financing during the bankruptcy process. DIP financing refers to the loans extended to firms under Chapter 11 protection. These loans have priority over all other debt issued by a company prior to bankruptcy, side-stepping absolute priority rules (see Dahiya et al. (2003) and Chatterjee et al. (2004)). Labor unions are likely to be in favor of DIP financing as it enables firms to continue operating during bankruptcy, and even emerge from bankruptcy. DIP-financed firms often face very high debt levels when they emerge, and pre-existing bondholders are wary of DIP financing since, in the emerged entity, DIP financiers receive a higher seniority.[26]

To examine the relation between unionization and DIP financing, we define an indicator variable *DIP* that equals one if the firm receives DIP financing in bankruptcy and zero otherwise. We use a logistic estimator to regress *DIP* on *Union*, with the same set of controls as in the analysis for *Duration*. Column (2) of Table 7 reports the results from this test. The estimated marginal effect suggests that, compared to non-unionized counterparts, unionized firms are 19% more likely to obtain DIP financing during bankruptcy.

[25]The end of a Chapter 11 case can be the confirmation of a reorganization plan by the judge, the conversion to Chapter 7 liquidation, or dismissal by the court, whichever is applicable.

[26]Bondholders customarily argue in court that DIP financing undercut the value of their bonds (see, e.g., "Brookstone in Deal with Vendors as Bondholders Clash," *Wall Street Journal*, April 25, 2014).

This result is both statistically and economically significant, indicating that firms with unionized labor are more likely to pursue refinancing maneuvers that reduce bondholders' senior claims over corporate assets in bankruptcy court.

Finally, we examine whether unionization is associated with a higher likelihood of the firm emerging from bankruptcy and refiling for bankruptcy again. A total of 390 firms in our sample emerge from bankruptcy, 73 of which refile afterward. If unionization leads to inefficient reorganization processes, we may observe more occurrences of firms emerging from Chapter 11, yet falling back into bankruptcy afterward. To test this conjecture, we construct an indicator for a firm emerging from Chapter 11 bankruptcy (*Emergence*) and an indicator for the firm refiling for bankruptcy after emergence (*Refiling*). We repeat the analysis for DIP financing, regressing the indicators *Emergence* and *Refiling* on the unionization dummy *Union* in a logistic model. Columns (3) and (4) of Table 7 report the results. The marginal effects indicate that unionized firms are 14% more likely to emerge from Chapter 11 than non-unionized firms. After emergence, however, unionized firms are 6% more likely to refile for bankruptcy.

4.2.2 Bankruptcy Fees and Expenses

We also examine how unions affect the costs incurred during bankruptcy across the following dimensions: (1) total fees and expenses paid in court, (2) the number of professional firms hired during the bankruptcy process, (3) fees paid to all attorneys, and (4) fees paid to creditors committees' attorneys. We do so using a nearest-neighbor matching approach, pairing each unionized firm in bankruptcy court with four non-unionized firms that file for bankruptcy in the same year according to pre-bankruptcy firm characteristics, including *ROA*, *Size*, *Liability Ratio*, *Cash*, and *Tangibility*. With the matched sample, we compare the log amount of bankruptcy court costs between the unionized and non-unionized firms. The results are shown in Table 8.

The results from our matching procedure point to a consistent pattern across all dimensions of in-court bankruptcy costs. Unionized firms pay, on average, $16 million

(53%) more overall expenses and hire 4 (27%) more professionals during the bankruptcy process. These firms are also likely to pay \$26 million (68%) more to attorneys than non-unionized firms. When unions sit on the creditors' committee, firms pay \$3 million (54%) more to the attorneys hired by the creditors' committee.

Table 8 About Here

The analyses in this section show that unionization does not lead to deterioration in firm performance or an increase in default risk. Notably, however, unionization is associated with prolonged bankruptcy procedures, repeated bankruptcy filings, and significantly higher costs incurred in bankruptcy court, all of which adversely impact unsecured creditors' claims.

4.3 Heterogeneous Effects

4.3.1 Firm Financial Distress

We exploit variations along firm financial distress metrics to verify the argument that unionization affects bondholders through bankruptcy costs. Bond values reflect the product of default likelihood and bankruptcy costs. If unionization reduces bond values by increasing bankruptcy costs, this impact should be stronger when firms are more likely to go bankrupt in the first place. As the threat of bankruptcy looms, bondholders should become increasingly concerned about the in-court cost induced by unionization.

We partition our sample into financially-distressed and financially-healthy firms, conducting our RDD analyses of bond CARs on each subsample. We expect the marginal impact of unionization on bond values to be stronger for distressed firms than for healthy firms. We use several measures of financial distress to perform this comparison. First, we partition the sample according to Altman's Z-Score, identifying a subsample of distressed (healthy) firms whose Z-Scores are below 1.8 (above 3). Using Ohlson's O-Score, we assign firms with O-Scores above (below) 0.5 to the distressed (healthy) subsample.

Based on Merton's distance to default, we assign firms in the bottom (top) quintile of our *Distance-Default* proxy to the distressed (healthy) subsample. Finally, we partition the sample firms according to credit ratings provided by Moody's and classify as distressed (healthy) those firms with speculative (investment) grade ratings.

Table 9 reports RDD estimates for financially-distressed and financially-healthy firms. Across virtually all measures of distress, unionization has a large, highly-significant impact on the bonds of distressed firms, but only a small, insignificant impact on the bonds of healthy firms. Results in Panel A show that close union winners with low Z-Scores lose 780 basis points over the course of 3 months following the union election. In contrast, close winners with high Z-Scores only lose 80 basis points, which is insignificantly different from zero. Similarly, close winners with speculative ratings suffer a drop of 620 (1,520) basis points in bond values over 3 (12) months following the vote, while close winners with investment ratings observe only a 110 (180)-basis-point drop.

Table 9 About Here

4.3.2 Pension Funding Status

We also look at the funding status of firms' pension plans to identify variation in bondholders' expected costs in bankruptcy. The pension benefits of unionized workers are protected by ERISA and interests in underfunded plans are entitled to the firm's estate in bankruptcy.[27] In bankruptcy court, pension obligations are treated with the same priority as wages, salaries, and commissions (Soble et al. (1982)). In some cases, pension liabilities are granted "administrative expense" priority, a higher priority category than unsecured claims.[28] As the pension plans in unionized firms are often specified

[27]Under ERISA, the PBGC may obtain liens against the assets of the debtor for: (1) the amount of unfunded benefit liabilities to plan participants and beneficiaries from the date of plan termination; and (2) any delinquent minimum funding contributions (29 U.S. Code § 1362(b)(1)–(3)).

[28]The PBGC has claimed that pension liabilities attributed to services rendered post-petition dates, or within 180 days prior to bankruptcy, should be considered "administrative expenses." This relief has been granted in some court cases, including in the bankruptcy of Marcal Paper Mill, Inc. The company employed nearly 1,000 workers and was estimated to have a pension liability of $6 million when it filed for bankruptcy in 2006.

under collective bargaining agreement with unions. Firms can only propose to terminate pension liabilities in bankruptcy if the proposal is approved by the union (11 U.S. Code § 1113). As such, underfunded pension plans present an added obstacle for bondholders from recovering their claims in bankruptcy.

We partition our sample based on the funding status of firms' defined benefit pension plans and conduct our RDD tests across underfunded and well-funded plans. Following Rauh (2006), we define pension funding status as the difference between pension assets and liabilities, classifying a firm as having an underfunded pension when liabilities exceed assets. We expect unionization to have a more detrimental effect on bondholders' wealth in the subsample of firms with underfunded pension plans (208 election events). We check that the continuity conditions necessary to conduct our RDD tests hold across both subsamples.

Table 10 reports our test results. Unionization has a significantly negative effect on the value of bonds of firms with underfunded pension plans, but negligible effect on bonds of firms with well-funded plans. Close union winners with underfunded pensions experience 400 basis points more decline in bond values than close losers over the 3-month window following the election. The bond CAR difference across close union winners and losers of firms with well-funded pensions is, in contrast, only 70 basis points.

TABLE 10 ABOUT HERE

4.3.3 Union Representative Power

Our story suggests that unionization increases the bargaining power of workers, ultimately affecting bondholders. We explore regional variation in the power of the union movement to examine this claim. In particular, we take advantage of state-level right-to-work (RTW) laws that alter unions' bargaining position. RTW laws allow employees who are not union members to enjoy the benefits of unions without paying dues. This induces a "free-rider" problem, which labor advocates claim would weaken unions' bargaining position both in and out of bankruptcy.[29] Research also shows that RTW laws reduce unions' resources, limiting their powers and ability to litigate (see, e.g., Ellwood and Fine (1987), Holmes (1998), and Matsa (2010)).[30] We conjecture that in RTW-law states, unionization is likely to increase labor's bargaining ability to a lesser extent than in states without RTW laws. We exploit this wrinkle to test if unionization has differential effects on bond prices according to whether the state in which the union election takes place has passed a RTW law.

Table 11 shows our results. In states with no RTW laws (455 election events), unionization has a large and significant impact on bond values. Relative to near losers, bond prices of near winners drop 220 (670) basis points over the 3 (12)-month window following union elections. In states with RTW laws, in contrast, the impact of unionization on bond values is small and insignificantly different from zero. The impact of unionization on unsecured creditors' wealth is weakened in states where the legislature has passed laws that undermine the power of unions.

Table 11 About Here

5 Robustness and Further Discussion

We verify the robustness of our inferences providing additional insight on the setting in which our investigation takes place. We consider the use of alternative sample compositions, investigate the intra-firm dynamics of union elections, and show how bond liquidity affects the timing of market responses to election outcomes.

[29] Ross Eisenbrey, Vice President of Economic Policy Institute, argues that RTW laws make unions financially strapped, and end up "chasing after people to get their dues instead of researching, meeting with the employer, or organizing other units, doing all the things that the union would need to do to build strength." *Thinking Progress*, March 9, 2015.

[30] Eren and Ozbeklik (2011) report that union membership declined by nearly 15% after Oklahoma adopted RTW laws in 2001.

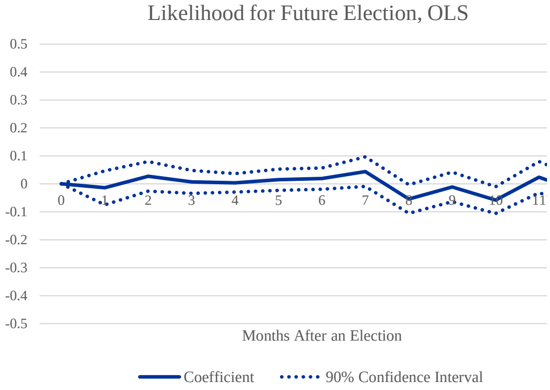
5.1 Robustness

We examine the robustness of our baseline RDD findings to potential concerns regarding sample composition. First, we restrict our sample to industrial firms. Specifically, we study a subsample of firms in the manufacturing sector or transportation, communications, and electric and gas services (1-digit SICs 2, 3, or 4). These sectors can be seen as more comparable, and where unions have a more significant presence. We further perform tests for individual bond CARs, where for each firm we use the largest bond, instead of using firm-level bond portfolios. We also examine whether our results are robust to concerns about political influence playing a role at the NLRB. Frandsen (2014b) suggests that when the Republican party holds majority at the NLRB, union election results are more likely in favor of employers, which may introduce non-randomness in the treatment of unionization. In light of this concern, we verify our results in a subsample of elections certified by a board not controlled by Republicans, when political manipulation is less likely to be observed (cf. Frandsen (2014b)).

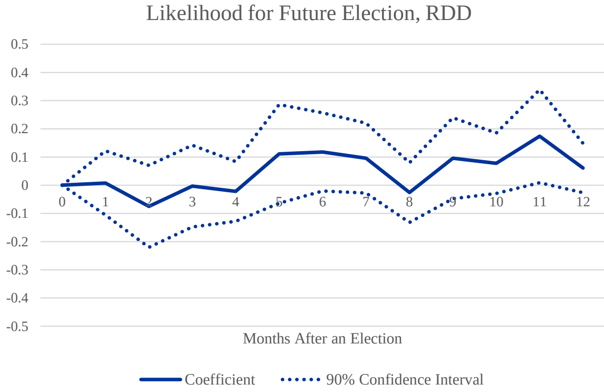
Table 12 shows the results from these robustness tests. For ease of comparison, column (1) redisplays our baseline estimates. Column (2) shows results from the sample of industrial firms. In this subsample, bondholders react negatively to closely-won union elections, with magnitudes similar to those in the full sample. Column (3) shows results for individual bonds. We continue to find a negative, significant reaction from bondholders to union victory elections, although the coefficients have a slightly lower significance.[31] Column (4) shows results from the subsample of elections certified by a board that is not controlled by Republicans. Our results persist in this subsample as well.

Table 12 About Here

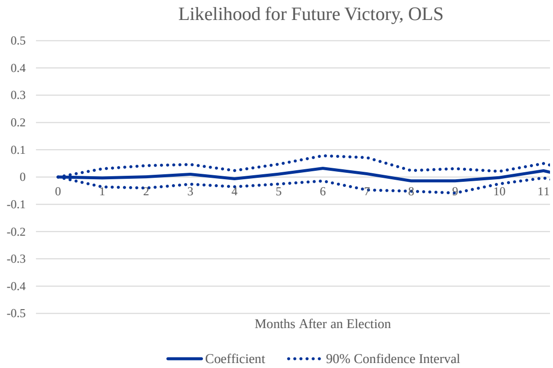
[31] Notably, the fact that we use individual bonds as opposed to portfolios lead to noisier estimates.



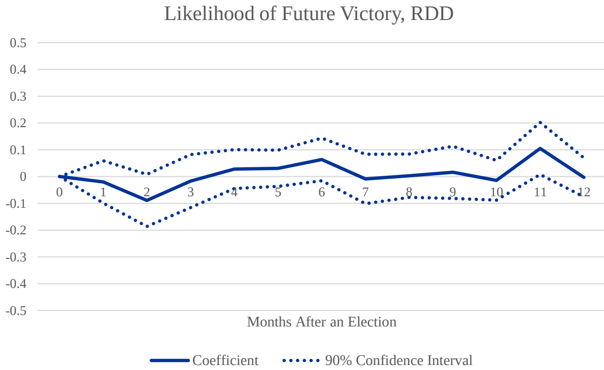
(A)



(B)



(C)



(D)

Figure 7. Current election outcome and the likelihood of future elections
This figure shows how the outcome of a current union election is related to another election occurring in the same firm within the following 12 months. Panel A shows the results from an OLS-based approach for the occurrence of future elections on the result of current elections. Panel B shows the RDD results for the occurrence of future elections. Panel C shows the results from an OLS-based approach for the outcome of future elections on the outcome *Union Victory* from current elections. Panel D shows the RDD results for the outcome of future elections. The solid lines indicate the estimated coefficients of winning a current election, and the dotted lines show 90% confidence interval around the coefficients.

5.2 The Dynamics of Union Elections

Our focus on firm-level outcomes and cumulative bond returns could allow for potential spillover effects among sequential elections (within the same firm) to affect our estimates. The existence of subsequent elections would not bias our estimates of unionization effect as long as the outcome of the current election is not correlated with the occurrence or outcome of future elections. It could, however, inflate our estimates in case there exists intra-firm correlation in election outcomes and events (see Cellini et al. (2010)).

To address concerns related to how sequential elections unfold inside a firm, we examine whether the outcome of a union election is related to future union elections in the same firm. We do this following Cellini et al. (2010) and Ferreira and Gyourko (2014). For every union election in our sample, we construct indicators *FutureElection(T)* that represent whether another election would occur in the same firm within the next T months; where $T \in \{1, ..., 12\}$. We then measure whether the result from a given election (*Union Victory*) predicts the occurrence of future elections in two ways. We first adopt an OLS-based approach, regressing *FutureElection(T)* on an indicator for current election outcome (*Union Victory*), controlling for firm- and year-fixed effects. We also employ a polynomial RDD analysis, including higher orders of vote share in support of union in the regression.

Panels A (OLS-based) and B (RDD-based) of Figure 7 report the coefficients of *Union Victory* from these dynamic analyses. The coefficients indicate the extent to which current union victory can affect the likelihood that another election will take place in the same firm within the following 12 months. The horizontal axes indicate the number of months following the current election, the solid lines indicate the estimated coefficients, and the dotted lines show 90% confidence interval around the coefficients. The patterns in both panels show statistically insignificant coefficients across all horizons, with 90% confidence intervals covering zero. These results indicate that the outcome from a current representation election does not seem to lead to future elections in our sample.

We next examine whether a union victory is likely to lead to future union victories. We adopt similar OLS-based and RDD-based approaches, regressing indicators for future union victories in the following T months on current *Union Victory*, where $T \in \{1, ..., 12\}$. Panels C and D of Figure 7 reports the coefficient of *Union Victory* from these analyses. All coefficients are statistically insignificant, indicating that a current union victory does not predict future victories within our horizon.

5.3 Bond Liquidity and Speed of Adjustment

Table 4 shows a gradual drift in bond CARs over a 12-month horizon following union elections, suggesting that bondholders are slow to respond to election outcomes — corporate bonds seem "overpriced" during the event window. A comparable pattern is also observed by Lee and Mas (2012), who show that equity holders take over one year to respond to union elections. Those authors argue that the slow price reaction is not driven by the lack of information transparency, but likely due to the high risk that is inherent to arbitrage trading. Similar inefficiencies can prevent prices from immediately reflecting union elections in the corporate bond market. The high degree of illiquidity in bond trading, in particular, has been shown to intensify under-reaction to various corporate events (see Bao et al. (2011), Helwege et al. (2014), and Batta et al. (2015)).

To assess the role of trading liquidity in delaying bondholders' reactions to union elections, we quantify the liquidity of our sample bonds following Batta et al. (2015). In particular, we measure liquidity as the ratio of price uncertainty to trading volume. Given that trading volume is not available in the University of Houston database, we can only measure bond liquidity for observations after 1997. With this measure, we first verify whether our baseline findings could be driven by differences in trading liquidity for bonds of close union winners and those of close losers. To do so, we examine the distribution of bond liquidity around the vote share cutoff. Figure 8 shows that the liquidity of our sample bonds is continuous around the cutoff, with a large overlap in the confidence intervals from both sides. It seems unlikely that trading conditions in the secondary market drives the post-election declines in bond prices.

We then conduct separate RDD tests for liquid and illiquid bonds. Partitioning our sample based on whether the liquidity of a firm's bonds is above or below our sample median, we conduct local linear regressions (as in Table 4) for each subsample over various time horizons. Figure 9 depicts the subsample results across time. The red line shows results for liquid bonds, while the blue dash line shows results for illiquid ones. Bondholders in both subsamples devalue their claims by around 9.5% over the

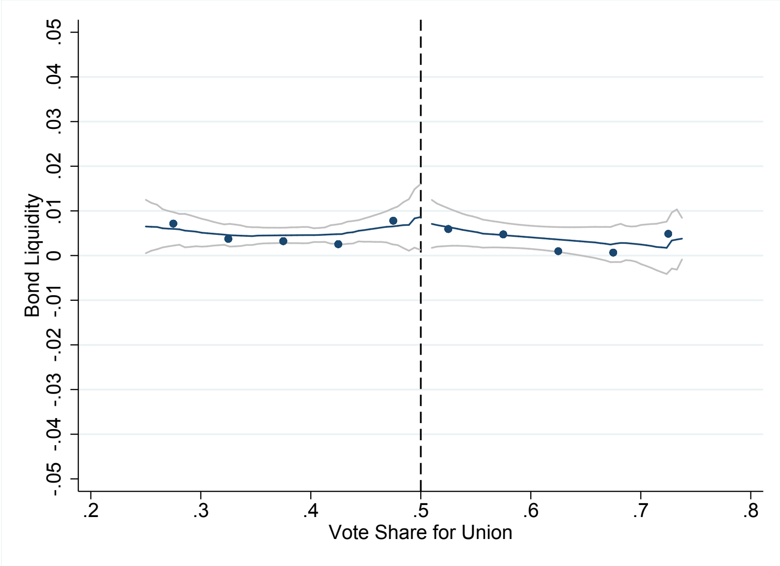


Figure 8. Bond liquidity and vote share in support of union
This figure shows the liquidity of our sample bonds around the vote share cutoff. We measure bond liquidity as the ratio of price uncertainty to trading volume (Batta et al. (2015)). The solid lines represent fitted polynomials of bond liquidity at each side of the cutoff. The dotted lines represent 90 percentile confidence intervals of the polynomials. The dots show the average bond liquidity at each 0.05 vote share interval.

12-month post-election window, yet the prices of liquid bonds show more than half of this devaluation (5.3%) in the first 3 months. By comparison, the prices of illiquid bonds experience a much greater delay, reflecting only around a quarter of the devaluation (2.4%) in the first 3 months. Put differently, the investors in illiquid bonds experience a drift of around 7% during the 3-month to 9-month window while those of liquid bonds only experience a 4% drift. Bond illiquidity seems to account for about half of bondholders' under-reaction to news about union election results.

6 Assessing Wealth Effects

We end our analysis with an assessment of the economic magnitudes implied in bondholders' reactions. We have shown that worker unionization brings losses to unsecured creditors. We have also shown that some of those losses are attributable to costs arising from in-court bankruptcy proceedings. It is important to put those costs (total bond losses and court costs) into perspective, fleshing out magnitudes and assessing the conse-

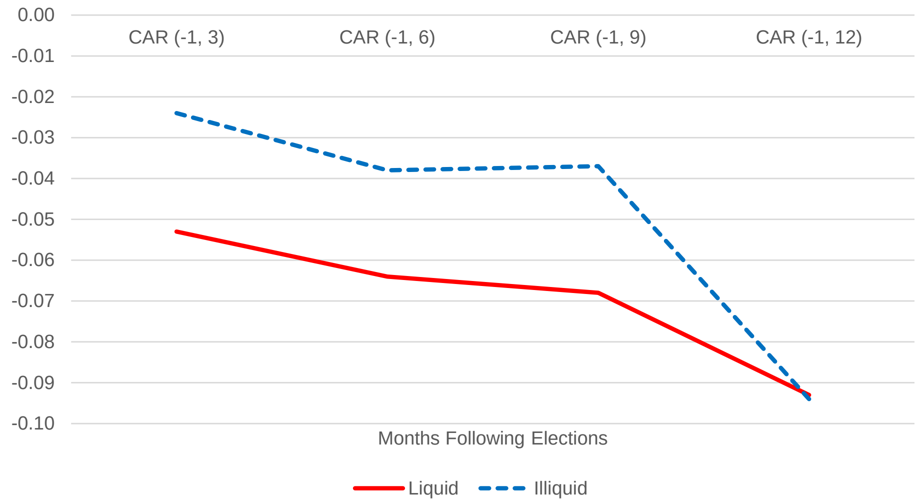


Figure 9. Liquidity and speed of adjustment
This figure shows results from separate local linear regressions for the subsamples of liquid and illiquid bonds. We measure bond liquidity as the ratio of price uncertainty to trading volume (Batta et al. (2015)). The red line shows the results for the subsample of liquid bonds, while the blue dashed line shows the results for the subsample of illiquid bonds.

quences they bring to workers and creditors. Notably, the bankruptcy process allows — even if only temporarily — for workers to continue receiving wages and enjoying benefits. Continuation of employment can be seen as a wealth transfer amongst corporate insiders. This welfare effect stands in contrast to transfers from firm insiders to outside parties, such as attorneys, financial advisors, and other professionals involved in court litigation. While it is difficult to measure these wealth effects, our setting allows us to perform a back-of-the-envelope calculation that helps tease out some of the magnitudes involved.

We start by calculating the total value loss to bondholders induced by unionization. From our estimates, a close union winner experiences a 470-basis-point decline in bond values over the 12-month post-election period following the union election (see Table 4). Given that the average firm in our sample has $1,087 million in bonds outstanding, this estimate translates to an average of $51 million total value loss for bondholders.

Next, we estimate bondholders' losses that arise from the increases in court costs attributable to unionization. Estimates of direct bankruptcy costs range from as low as 2.8% (Weiss (1990)) to 6% (Altman (1984)) of firms' total asset values. We choose a conservative figure of 2.8%. The estimations in Table 8 suggest that unionization is associated with 53% higher bankruptcy costs. Accordingly, we take that unionization is associated with a higher bankruptcy cost equivalent to 1.5% of a firm's total asset value (= 53% × 2.8%). The average firm in our sample has a total asset value of $21.5 billion; thus, we estimate that bankruptcy is likely to cost $294 million more for unionized firms (= 1.5% × $21.5 billion).

The last element we need to consider is the probability that firms default. We estimate default probabilities according to firms' credit ratings, and we employ two measures of default. We first use historical default probabilities from Moody's (see Canter et al. (2007)), which are simple statistics of past observed default events. We also use risk-neutral default probabilities estimated by Almeida and Philippon (2007), who account for investors' risk preferences, implying default probabilities that are higher than historical occurrences.[32] Given that our sample firms have an average credit rating of A3, they have a historical default probability of 1.6% and a risk-neutral default probability of 12%.

With these default probability statistics, we estimate an expected explicit bankruptcy cost of around $4.8 million for our sample firms under the historical default probability (= 1.6% × $294 million), a negligible portion of the $51 million total bondholder loss. Under the risk-neutral default probability, however, we expect bankruptcy costs to be $36 million (= 12% × $294 million), which accounts for a large proportion of total losses.

The estimates above point to two possible channels through which bondholders' wealth is dissipated in bankruptcy. Modern asset pricing theory suggests that risk-neutrality underlies the calculation of bond prices (Duffie and Singleton (1999) and Elton et al. (2001)). If bond investors price their claims using risk-neutral probabilities, then our results imply that over 70% of observed losses to bond values stem from expected court costs (wealth that is in great part transferred to professionals involved in the litigation process). If one relies on historical default probabilities, on the other hand, then a plausible conclusion

[32]Risk-neutral measures take into account investors' disutility when defaults happen in low consumption states. It correctly prices an Arrow-Debreu security that pays off $1 in different states of the world. As corporations are more likely to default in bad economic times, defaultable bond prices will be more heavily discounted compared to their actual historical default rates (Almeida and Philippon (2007)). In other words, risk-neutral default probabilities are higher than historical probabilities so that the securities are priced fairly.

is that only a small percentage of bondholder losses are due to in-court expenses, and the rest of the losses are likely to be captured by unionized workers, potentially due to improved job security and preserved wages and benefits (Abowd (1989)).

7 Concluding Remarks

Using a comprehensive sample of union elections spanning four decades, we study the effects of unionization on bond values using a regression discontinuity design. We find that union victories lead to significant declines in bond prices. As we investigate channels through which unionized labor affects bond values, we find that unionization is associated with significant increases in bankruptcy costs, yet no changes in the probability of bankruptcy. The impact of unionization on bond values are stronger for financially distressed firms, for firms with underfunded pension plans and in jurisdictions where unions are deemed to be better organized.

Our paper sheds new light on how organized labor interacts with financial stakeholders of the firm, unsecured creditors in particular. We show that unions can make bankruptcy more costly, prolonged, and convoluted through the way unionized workers' rights are assigned under Chapter 11 proceedings. Our study shows that the rights of unions in court are recognized by creditors, who in turn price it into firms' funding costs. The analysis we put forth provides insights for researchers and policymakers in better understanding how firm–labor relations shape corporate access to credit.

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Appendix A Variable Definitions

Vote Share for Union: The ratio of the number of employees in the unit voting for the union to the number of employees in the unit eligible to vote. Data source: NLRB

Union Victory: A dummy variable that equals one if the union gains more than half of the votes and obtain the legal representation status, and zero otherwise. Data source: NLRB

ROA: Earnings before interest and tax (EBIT)/total assets. Data source: Compustat

Size: ln(Total assets). Data source: Compustat

B/M: The ratio of the book value of equity to the market value of equity. Data source: Compustat and CRSP

Liability Ratio: Total liability/total assets. Data source: Compustat

Cash: The ratio of cash and short-term investments to total assets. Data source: Compustat

Tangibility: The ratio of property, plant, and equipment to total assets. Data source: Compustat

Z-Score: 3.3 × EBIT/total assets + 1.0 × sales/total assets + 1.4 × retained earnings/total assets + 1.2 × working capital/total assets. Data source: Compustat

O-Score: − 1.32 − 0.407 × size + 6.03 × liability ratio − 1.43 × working capital/total assets+ 0.0757 × current liabilities/current assets − 1.72 X − 2.37 × net income/total assets − 1.83 × funds from operations/total liabilities + 0.285 Y − 0.521 × (net income(t) − net income($t-1$))/(|net income(t)| + |net income($t-1$)|), where X is an indicator for total liabilities being larger than total assets, and Y is an indicator for net losses in the past two years. Data source: Compustat

Distance-Default: A measure of distance to default, as in Bharath and Shumway (2008). $\textit{Distance-Default}=\frac{ln(V/F)+(\mu-0.5\sigma_V^2)T}{\sigma_V\sqrt{T}}$. Data source: Compustata and CRSP

Bond Liquidity: The monthly normalized standard deviation of the bond price (normalized by the monthly average price) divided by the monthly trading volume (in millions $). If a firm has multiple bonds outstanding, bond liquidity is the average liquidity across all bonds outstanding. Data source: TRACE and FISD

Duration: The log of the number of days from the day on which the bankruptcy case was filed to the day on which the judge signed the order confirming a plan of reorganization or to the day on which the Chapter 11 case was converted to Chapter 7 or dismissed, whichever is applicable. Data source: UCLA-LoPucki Bankruptcy Research Database

Total Fees and Expenses Paid in Court: The log amount of fees and expenses awarded by the court in the bankruptcy case. Data source: UCLA-LoPucki Bankruptcy Research Database

Number of Legal and Financial Professionals Hired: The log number of professional firms filing fee applications in the bankruptcy case. Data source: UCLA-LoPucki Bankruptcy Research Database

Fees Paid to Attorneys: The log amount of fees and expenses awarded to attorneys of the bankruptcy case by the court. Data source: UCLA-LoPucki Bankruptcy Research Database

Fees Paid to Creditor Committee's Attorneys: The log amount of fees and expenses paid to the creditor committee's lead attorney. Data source: UCLA-LoPucki Bankruptcy Research Database

Table 1
Summary statistics
This table provides summary statistics of the variables of interest in our sample, including election information, firm characteristics, and bond statistics. *Election Year* is the year in which the election was held. *ROA*, *Size*, *Liability Ratio*, *Cash*, *Tangibility*, *B/M*, *Z-Score*, *O-Score*, and *Distance-Default* are based on the information collected during the year of the election. *# Bonds per Firm*, *Bond Maturity*, and *Bond Rating* are based on the information during the month of the election. *# Bonds per Firm* is the average number of bonds outstanding for a firm. *Bond Maturity* measures the time to maturity for a bond. *Bond Rating* is the Moody's credit rating on the bonds. When a firm has multiple bonds, we use a simple average to measure a firm's *Bond Maturity* and *Bond Rating*. The sample period is from 1977 to 2010.

	N	Mean	Std. Dev.	Median	5 Pct.	95 Pct.
Election Year	721	1990.030	9.447	1989	1978	2007
# Valid Votes	721	232.877	633.143	118	55	756
Vote Share for Union	721	0.414	0.187	0.384	0.165	0.800
ROA	698	0.090	0.045	0.085	0.025	0.166
Size	703	8.829	1.207	8.862	6.761	10.609
B/M	673	0.726	0.871	0.670	0.193	1.669
Liability Ratio	703	0.662	0.179	0.633	0.457	0.871
Cash	703	0.043	0.045	0.028	0.003	0.132
Tangibility	703	0.407	0.221	0.383	0.068	0.759
Z-Score	577	3.586	2.434	3.126	1.371	6.999
O-Score	703	–0.921	1.453	–0.988	–2.826	1.205
Distance-Default	671	7.005	3.965	6.529	2.035	14.572
# Bonds per Firm	721	4.08	3.59	3	1	46
Bond Maturity (years remaining)	721	13.21	7.07	12.615	0.71	34.66
Bond Rating (Aaa+=1, Aaa=2,...,C=22)	721	8.21	3.77	8	2	19.67

Table 2

Pre-trend test: Performance changes 5 years prior to election

This table provides the results of the pre-election trends in industry-adjusted performance using local linear regressions. The dependent variables are the changes in firm characteristics related to performance or risk during 5 years prior to the election, relative to the year of the election. Only the coefficients of *Union Victory* (standard errors) are reported. We use the Imbens and Kalyanaraman (2012) optimal bandwidth and rectangle kernel for estimation.

Year	*ROA*	*Size*	*B/M*	*Liability Ratio*	*Cash*	*Tangibility*	*Z-Score*	*O-Score*	*Distance-Default*
–1	0.007	–0.227*	–0.272	–0.001	0.020**	–0.009	1.125	0.007	–0.161
	(0.007)	(0.136)	(0.241)	(0.022)	(0.010)	(0.013)	(0.705)	(0.226)	(0.724)
–2	0.018	–0.201	–0.483*	–0.012	0.019**	–0.007	1.197**	–0.095	0.228
	(0.011)	(0.189)	(0.267)	(0.020)	(0.009)	(0.014)	(0.467)	(0.208)	(1.076)
–3	0.019	–0.098	–0.475*	-0.004	0.024**	–0.004	–1.649	0.087	–0.941
	(0.011)	(0.307)	(0.274)	(0.026)	(0.010)	(0.019)	(3.467)	(0.292)	(1.201)
–4	0.015	–0.18	–0.330*	0.022	0.029**	–0.011	4.908	–0.223	–1.015
	(0.012)	(0.217)	(0.200)	(0.030)	(0.013)	(0.022)	(3.246)	(0.191)	(1.059)
–5	0.013	–0.272	–0.416	0.022	0.019	–0.023	1.054	–0.276	–1.545
	(0.012)	(0.317)	(0.270)	(0.031)	(0.013)	(0.041)	(0.903)	(0.209)	(0.977)

*** p-value<0.01, ** p-value<0.05, * p-value<0.10

Table 3

Polynomial regression results for bond CARs

This table reports the results from polynomial regression analyses for bond CARs following union elections. *Union Victory* is a dummy variable that equals 1 if the union wins the election and equals 0 if not. *Vote Share for Union* is the percentage share of votes in support of unionization in the election. *Multiple Elections* is a dummy variable that equals 1 if the firm conducts more than one elections during our sample period. We also controlled for interaction terms of *Multiple Elections* with the polynomial terms of *Vote Share for Union* but suppressed their coefficients. Standard errors are clustered by firm.

	CAR (–1, 3)			*CAR* (–1, 6)			*CAR* (–1, 9)			*CAR* (–1, 12)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Union Victory	–0.000	–0.007*	–0.024***	0.000	–0.003	–0.023*	–0.003	–0.012*	–0.046**	–0.003	–0.016**	–0.056**
	(0.003)	(0.004)	(0.009)	(0.003)	(0.005)	(0.013)	(0.004)	(0.006)	(0.018)	(0.005)	(0.007)	(0.022)
Vote Share for Union		0.018*	0.004		0.011	–0.114		0.027**	–0.079		0.038***	–0.041
		(0.010)	(0.162)		(0.011)	(0.170)		(0.012)	(0.233)		(0.015)	(0.253)
(Vote Share for Union)^2			–1.156			–1.526			–1.908			–2.001
			(1.351)			(1.553)			(2.106)			(2.348)
(Vote Share for Union)^3			–6.616			–6.049			–7.926			–8.686
			(4.617)			(5.352)			(7.025)			(7.930)
Union Victory× *Vote Share for Union*			0.435			0.770*			1.135*			1.284*
			(0.314)			(0.394)			(0.588)			(0.704)
Union Victory× *(Vote Share for Union)*^{2}			–1.992**			–2.745**			–4.952***			–5.887***
			(0.944)			(1.228)			(1.668)			(2.086)
Union Victory× *(Vote Share for Union)*^{3}			15.920			15.780			22.539			25.008
			(9.823)			(11.499)			(15.047)			(17.359)
Multiple Elections			–0.008			–0.012**			–0.016***			–0.016**
			(0.005)			(0.005)			(0.006)			(0.007)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	721	721	721	721	721	721	721	721	721	721	721	721
R-squared	0.129	0.134	0.160	0.161	0.163	0.186	0.167	0.172	0.199	0.153	0.161	0.192

*** p-value<0.01, ** p-value<0.05, * p-value<0.10

Table 4
Local linear regression results for bond CARs
This table reports the results from local linear regression analysis for bond CARs following the NLRB election month. $CAR(T_1, T_2)$ denotes the cumulative abnormal return from month T_1 to month T_2 relative to the union election month. We report the coefficient on *Union Victory* for each dependent variable and specification. Panel A presents results based on estimations with rectangular kernels, and Panel B presents results based on estimations with triangular kernels. We use the optimal bandwidth defined in Imbens and Kalyanaraman (2012) for estimation. Standard errors are clustered by firm.

Panel A: Coefficients of Union Victory (Rectangular Kernel)

	CAR (–1, 3)	*CAR* (–1, 6)	*CAR* (–1, 9)	*CAR* (–1, 12)
Optimal Bandwidth	–0.021***	–0.022*	–0.040**	–0.047**
	(0.007)	(0.012)	(0.017)	(0.021)
Observations	366	321	264	296
75% Optimal Bandwidth	–0.021**	–0.023	–0.050**	–0.061**
	(0.009)	(0.014)	(0.021)	(0.025)
Observations	277	239	196	225
125% Optimal Bandwidth	–0.018***	–0.021**	–0.036**	–0.043**
	(0.006)	(0.009)	(0.015)	(0.017)
Observations	460	402	335	370

Panel B: Coefficients of Union Victory (Triangular Kernel)

	CAR (–1, 3)	*CAR* (–1, 6)	*CAR* (–1, 9)	*CAR* (–1, 12)
Optimal Bandwidth	–0.020***	–0.021*	–0.041**	–0.050**
	(0.007)	(0.012)	(0.018)	(0.021)
Observations	468	405	340	379
75% Optimal Bandwidth	–0.022**	–0.020	–0.043**	–0.055**
	(0.009)	(0.014)	(0.021)	(0.025)
Observations	352	298	254	279
125% Optimal Bandwidth	–0.018***	–0.020*	–0.038***	–0.044**
	(0.006)	(0.010)	(0.015)	(0.018)
Observations	554	491	429	468

*** p-value<0.01, ** p-value<0.05, * p-value<0.10

Table 5

Performance changes 5 years following election

This table provides the results of the changes in industry-adjusted performance using local linear regressions. The dependent variables are the changes in firm characteristics related to performance or risk, relative to the year prior to the election. Panel A reports the results of performance changes for firms with union election and bond return information. Panel B reports the results for all firms that have union elections. Only the coefficients of *Union Victory* (standard errors) are reported. We use the optimal bandwidth defined in Imbens and Kalyanaraman (2012) and the rectangle kernel for estimation.

Panel A: Union-Bond Sample, *N*=721 observations

Year	*ROA*	*Size*	*B/M*	*Liability Ratio*	*Cash*	*Tangibility*	*Z-Score*	*O-Score*	*Distance-Default*
1	0.002	0.119	-0.114	-0.006	0.018*	-0.027*	1.425**	-0.126	0.968
	(0.008)	(0.282)	(0.072)	(0.033)	(0.011)	(0.016)	(0.653)	(0.262)	(0.944)
2	-0.001	0.150	-0.250	-0.014	0.006	-0.011	1.398	-0.149	0.541
	(0.011)	(0.499)	(0.174)	(0.025)	(0.011)	(0.013)	(0.878)	(0.233)	(0.767)
3	0.022*	0.825*	-0.052	-0.041	0.021	0.017	0.155	-0.731**	1.562
	(0.011)	(0.465)	(0.180)	(0.039)	(0.014)	(0.026)	(0.930)	(0.347)	(1.340)
4	0.041***	0.715	-0.568	-0.021	0.030**	0.003	-1.290	-0.877*	1.301
	(0.016)	(0.467)	(0.548)	(0.042)	(0.013)	(0.020)	(2.373)	(0.461)	(0.813)
5	0.034*	0.391	-0.576	-0.027	0.019	0.008	0.783	-0.768	2.009
	(0.018)	(0.501)	(0.410)	(0.050)	(0.014)	(0.025)	(0.800)	(0.483)	(1.367)

Panel B: All Union Sample, *N*=4,058 observations

Year	*ROA*	*Size*	*B/M*	*Liability Ratio*	*Cash*	*Tangibility*	*Z-Score*	*O-Score*	*Distance-Default*
1	-0.002	-0.004	0.054	0.000	0.011*	-0.001	0.044	0.041	0.152
	(0.005)	(0.080)	(0.211)	(0.011)	(0.006)	(0.010)	(2.037)	(0.105)	(0.285)
2	0.004	0.007	0.122	-0.017	0.006	-0.013	2.078	-0.152	0.145
	(0.007)	(0.061)	(0.208)	(0.018)	(0.007)	(0.012)	(2.384)	(0.160)	(0.332)
3	0.004	-0.049	-0.275	-0.021	0.020**	-0.005	9.509	-0.040	-0.060
	(0.008)	(0.073)	(0.314)	(0.020)	(0.009)	(0.014)	(6.141)	(0.197)	(0.343)
4	-0.001	-0.022	-0.241	-0.008	0.013	-0.003	5.569	0.207	0.009
	(0.009)	(0.105)	(0.239)	(0.021)	(0.009)	(0.012)	(3.692)	(0.230)	(0.360)
5	0.003	-0.056	-0.283*	0.005	0.012	-0.017	4.154	-0.053	0.656
	(0.012)	(0.094)	(0.166)	(0.025)	(0.008)	(0.013)	(4.474)	(0.244)	(0.522)

*** p-value<0.01, ** p-value<0.05, * p-value<0.10

Table 6
Bond CARs for issues maturing within 5 years
This table reports the test results from local linear regressions on the impact of unionizations on bonds matured within 5 years after the election year. Only the coefficients of *Union Victory* (standard errors) are reported. The dependent variable is bond CAR. We use the optimal bandwidth defined in Imbens and Kalyanaraman (2012) for estimation. All standard errors are clustered by firm.

Panel A: Coefficients of Union Victory (Rectangular Kernel)

	CAR (–1, 3)	*CAR* (–1, 6)	*CAR* (–1, 9)	*CAR* (–1, 12)
Optimal Bandwidth	–0.012*	–0.037**	–0.041**	–0.026*
	(0.007)	(0.014)	(0.016)	(0.015)
Observations	293	193	191	266
75% Optimal Bandwidth	–0.017**	–0.039**	–0.048***	–0.038**
	(0.007)	(0.016)	(0.019)	(0.020)
Observations	234	139	135	198
125% Optimal Bandwidth	–0.011*	–0.034***	–0.034***	–0.029*
	(0.007)	(0.012)	(0.013)	(0.015)
Observations	341	237	230	308

Panel B: Coefficients of Union Victory (Triangular Kernel)

	CAR (–1, 3)	*CAR* (–1, 6)	*CAR* (–1, 9)	*CAR* (–1, 12)
Optimal Bandwidth	–0.014*	–0.036***	–0.042***	–0.033**
	(0.007)	(0.014)	(0.016)	(0.017)
Observations	348	239	234	313
75% Optimal Bandwidth	–0.016**	–0.038**	–0.048***	–0.039**
	(0.008)	(0.016)	(0.018)	(0.019)
Observations	280	187	177	254
125% Optimal Bandwidth	–0.012*	–0.034***	–0.037***	–0.028*
	(0.007)	(0.013)	(0.013)	(0.015)
Observations	389	285	279	361

*** p-value<0.01, ** p-value<0.05, * p-value<0.10

Table 7
The impact of unionization on the bankruptcy process
This table analyzes the impact of unionization on bankruptcy procedures. *Duration* is defined as the log of the number of days from the bankruptcy filing date to the conclusion of a Chapter 11 bankruptcy case. *DIP* is a dummy variable that equals one if a firm obtains debtor-in-possession financing during bankruptcy and zero otherwise. *Emergence* is a dummy variable that equals one if the company emerged from bankruptcy and zero otherwise. *Refiling* is a dummy variable that equals one if the emerging company refiled bankruptcy and zero otherwise. *Union* is a dummy variable that equals one if the bankruptcy firm had unionized workers before bankruptcy. Column (1) presents the result from OLS regression for *Duration*. Columns (2) through (4) present results from logistic regressions.

	(1)	(2)	(3)	(4)
Dep. Var.	*Duration*	*DIP*	*Emergence*	*Refiling*
Union	0.210**	1.098***	0.753***	0.602**
	(0.096)	(0.373)	(0.241)	(0.301)
ROA	–0.295	0.004	1.050	1.826*
	(0.289)	(1.116)	(0.821)	(1.091)
Size	0.092**	–0.159	0.019	–0.200
	(0.036)	(0.133)	(0.094)	(0.133)
Liability Ratio	–0.335***	–0.286	1.246***	0.757**
	(0.119)	(0.315)	(0.324)	(0.340)
Cash	–0.347	–5.678**	–1.867	–2.566
	(0.535)	(2.486)	(1.195)	(1.892)
Tangibility	–0.234	0.571	0.855*	–0.515
	(0.178)	(0.653)	(0.459)	(0.563)
Year FE	Yes	Yes	Yes	Yes
Observations	512	228	492	487
R-squared	0.175	0.156	0.144	0.182

*** p-value<0.01, ** p-value<0.05, * p-value<0.10

Table 8

The impact of unionization on bankruptcy costs

This table compares the fees and expenses during bankruptcy incurred by unionized and matched non-unionized firms. We compare bankruptcy fees across the following dimensions: (1) *Total Fees and Expenses Paid in Court*, measured as the log amount of total fees and expenses incurred in the bankruptcy court; (2) *Number of Legal and Financial Professionals Hired*, the log number of legal and financial professionals, (3) *Fees Paid to Attorneys*, the log amount of fees and expenses awarded to attorneys, indicating the legal costs among the expenses; and (4) *Fees Paid to Creditor Committee's Attorneys*, the log amount of fees and expenses awarded to the creditor committee's lead attorney, indicating the costs related to the creditor committee's lead attorney. We compare these dimensions of bankrutpcy costs by matching a unionized firm with four non-unionized firms that file for bankruptcy in the same year, with similar characteristics including *ROA*, *Size*, *Liability Ratio*, *Cash*, and *Tangibility*.

Dep. Var.:	(1) *Total Fees and Expenses Paid in Court*	(2) *Number of Legal and Financial Professionals Hired*	(3) *Fees Paid to Attorneys*	(4) *Fees Paid to Creditor Committee's Attorneys*
Union	0.534**	0.269*	0.676**	0.539*
	(0.213)	(0.137)	(0.268)	(0.308)
Observations	68	67	68	61

*** p-value<0.01, ** p-value<0.05, * p-value<0.10

Table 9
Firm heterogeneity

This table provides RDD results from local linear regressions on the impact of unionization on bond returns for firms with different default risks. Only the coefficients of *Union Victory* are reported. We examine healthy and distressed firms based on their *Z-Score* (above 3 or below 1.8), *Distance-Default* (top and bottom quintile), and *O-Score* (below or above 0.5) in the election year as well as their credit ratings (investment or speculative grade) in the election month. The dependent variable is bond CAR. We use the optimal bandwidth defined in Imbens and Kalyanaraman (2012) for estimation. All standard errors are clustered by firm.

Panel A: Coefficients of Union Victory (Rectangular Kernel)

	Distressed				Healthy			
	Z-Score	*O-Score*	*Distance-Default*	*Rating*	*Z-Score*	*O-Score*	*Distance-Default*	*Rating*
CAR (–1, 3)	–0.078***	–0.035*	–0.020	–0.062***	–0.008	–0.013*	–0.033*	–0.011*
CAR (–1, 6)	–0.094*	–0.139***	–0.008	–0.082**	–0.010	–0.003	0.011	–0.004
CAR (–1, 9)	–0.130*	–0.204***	–0.059*	–0.121***	–0.023	–0.010	–0.029	–0.010
CAR (–1, 12)	–0.150***	–0.239**	–0.075*	–0.152**	–0.028	–0.015*	–0.017	–0.018*

Panel B: Coefficients of Union Victory (Triangular Kernel)

	Distressed				Healthy			
	Z-Score	*O-Score*	*Distance-Default*	*Rating*	*Z-Score*	*O-Score*	*Distance-Default*	*Rating*
CAR (–1, 3)	–0.075***	–0.048**	–0.012	–0.058**	–0.011	–0.011	–0.037**	–0.009
CAR (–1, 6)	–0.088*	–0.135***	–0.011	–0.075**	–0.013	–0.003	0.002	–0.002
CAR (–1, 9)	–0.119*	–0.201***	–0.051	–0.118**	–0.023	–0.011	–0.031	–0.013
CAR (–1, 12)	–0.141***	–0.236**	–0.073*	–0.148**	–0.026	–0.016	–0.011	–0.017

*** p-value<0.01, ** p-value<0.05, * p-value<0.10

Table 10
The role of pension funding status
This table provides results from local linear regressions for subsamples based on whether a firm has underfunded or well-funded pension plans. We examine the impact of unionization on bond returns for each subsample and report the coefficients of *Union Victory* for all event horizons and both subsamples. The dependent variable is bond CAR. We use the optimal bandwidth defined in Imbens and Kalyanaraman (2012) for estimation. Standard errors are clustered by firm.

Panel A: Coefficients of Union Victory (Rectangular Kernel)

	Underfunded Pension		Well-funded Pension	
	Unionization Coef.	Std. Err.	Unionization Coef.	Std. Err.
CAR (–1, 3)	–0.040***	(0.012)	–0.014	(0.010)
CAR (–1, 6)	–0.053***	(0.017)	0.001	(0.008)
CAR (–1, 9)	–0.055**	(0.022)	–0.005	(0.009)
CAR (–1, 12)	–0.075**	(0.030)	–0.008	(0.015)

Panel B: Coefficients of Union Victory (Triangular Kernel)

	Underfunded Pension		Well-funded Pension	
	Unionization Coef.	Std. Err.	Unionization Coef.	Std. Err.
CAR (–1, 3)	–0.040***	(0.012)	–0.007	(0.009)
CAR (–1, 6)	–0.054***	(0.017)	0.002	(0.008)
CAR (–1, 9)	–0.057***	(0.021)	–0.006	(0.008)
CAR (–1, 12)	–0.077**	(0.031)	–0.012	(0.015)

*** p-value<0.01, ** p-value<0.05, * p-value<0.10

Table 11
The role of Right-to-Work (RTW) laws
This table provides results from local linear regressions for subsamples based on whether the union election takes place in states with or without RTW laws. We examine the impact of unionization on bond returns for each subsample and report the coefficients of *Union Victory* for all event horizons and both subsamples. The dependent variable is bond CAR. We use the optimal bandwidth defined in Imbens and Kalyanaraman (2012) for estimation. Standard errors are clustered by firm.

Panel A: Coefficients of Union Victory (Rectangular Kernel)

	RTW (not passed)		RTW (passed)	
	Unionization Coef.	Std. Err.	Unionization Coef.	Std. Err.
CAR (–1, 3)	–0.022**	(0.009)	–0.025*	(0.013)
CAR (–1, 6)	–0.030*	(0.015)	–0.005	(0.020)
CAR (–1, 9)	–0.054**	(0.022)	–0.017	(0.018)
CAR (–1, 12)	–0.067**	(0.028)	–0.018	(0.022)

Panel B: Coefficients of Union Victory (Triangular Kernel)

	RTW (not passed)		RTW (passed)	
	Unionization Coef.	Std. Err.	Unionization Coef.	Std. Err.
CAR (–1, 3)	–0.021**	(0.009)	–0.019	(0.012)
CAR (–1, 6)	–0.029*	(0.015)	–0.005	(0.021)
CAR (–1, 9)	–0.055**	(0.022)	–0.013	(0.018)
CAR (–1, 12)	–0.068**	(0.029)	–0.014	(0.022)

*** p-value<0.01, ** p-value<0.05, * p-value<0.10

Table 12

Robustness results for local linear analyses

This table reports the results from alternative specifications of local linear regression analyses for bond CARs following the NLRB election month. $CAR\,(T_1, T_2)$ denotes the cumulative abnormal return from month T_1 to month T_2 relative to the union election month. We report the RDD coefficient on *Union Victory* for each dependent variable and specification. Column (1) shows the benchmark local linear regression results with our sample. Column (2) shows results for firms in manufacturing, and transportation and communications industries (1-digit SIC being 2, 3, or 4). Column (3) shows the results for a sample of CARs for a firm's largest bond in market value instead of firm-level weighted average. Column (4) shows results from the subsample of elections where the national labor relations board is not dominated by Republican representatives. All regressions use rectangular kernels and Imbens and Kalyanaraman (2012) optimal bandwidths. Standard errors are clustered by firm.

	(1) Benchmark	(2) Industrial Firms	(3) Individual Bonds	(4) Non-Republican Board
CAR (–1, 3)	–0.021***	–0.021***	–0.013*	–0.026***
	(0.007)	(0.008)	(0.007)	(0.009)
CAR (–1, 6)	–0.022*	–0.024*	–0.010	–0.027*
	(0.012)	(0.013)	(0.014)	(0.015)
CAR(–1, 9)	–0.040**	–0.032**	–0.024*	–0.078***
	(0.017)	(0.015)	(0.014)	(0.020)
CAR(–1, 12)	–0.047**	–0.035**	–0.035*	–0.097***
	(0.021)	(0.016)	(0.021)	(0.032)
Observations	708	541	674	403

*** p-value<0.01, ** p-value<0.05, * p-value<0.10