# Debt Structure as a Strategic Bargaining Tool

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# Abstract

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**JEL Classification:** G30, G32, G33, J31, J51



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# Introduction

Does a firm's management use debt policies to influence its bargaining position relative to employees? Previous studies show that increasing debt level could strengthen management's bargaining power and find that firms increase leverage ratios as a response to the threat of unionization (Bronars and Deere, 1991; Matsa, 2010). However, firms, on average, do not strategically use debt to influence their bargaining positions as a response to employees being unionized (Appendix A.2 in Lee and Mas (2012); Schmalz (2015)). In this paper, I find causal evidence supporting the strategic use of corporate debt as a response to union certification when considering debt heterogeneity.

The theoretical mechanism is that debt represents a firm's commitment to making payments to creditors, reducing the surplus over which labor can negotiate with management without forcing firms into bankruptcy. From this point of view, the effectiveness of strategic debt is the commitment level of the debt payment or the credibility of the bankruptcy threats, which depends on the ease of renegotiating debt contracts (Perotti and Spier, 1993). The credibility of bankruptcy threats is higher for public debt than bank debt because renegotiating public debt is more difficult because of higher creditor dispersion. Bank debt, however, can be renegotiated more easily (Gilson, John, and Lang, 1990) and is indeed frequently renegotiated before maturity (Roberts and Sufi, 2009). Within bank debt, the likelihood of renegotiation also varies. It decreases with syndication size and increases with creditor ownership concentration because contract renegotiation becomes more difficult with more dispersed creditors. Thus, a proper test of the theory on the strategic use of debt in managerial bargaining should also take the structure of a firm's debt into consideration. In

theory, a firm is predicted to adjust debt structure toward debt with higher creditor dispersion, for example, public debt or syndicated bank loans with more creditors, as a response to an increase in employees' bargaining power.

In this study, I examine the adjustment of debt structure as a response to an increase in employees' bargaining power. To capture incremental changes in the bargaining power of labor, I use the information on labor union elections collected by the National Labor Relations Board (NLRB) and employ a regression discontinuity (RD) design to draw causal inferences. To capture a firm's debt structure, I employ a data set from firms' balance sheets between 1991 and 2012 to compute various debt structure measures. I also use new issuance data from the Securities Data Company (SDC) Platinum and the Loan Pricing Corporation (LPC) DealScan to measure the issuance behavior of different types of debt and the syndication structure of bank loans.

My main findings are as follows. First, the RD results show that firms increase leverage ratios for public debt and decrease leverage ratios for bank debt as a response to an increase in employees' bargaining power, leading to a close-to-zero effect on total leverage ratios. In particular, compared to firms in which unions barely lose elections (control firms), firms in which unions barely win elections (treatment firms) on average experience a 4.9-percentage-points increase in the ratio of public debt to the book value of total assets and a 5.5-percentage-points decrease in the ratio of bank debt to the book value of total assets three years after elections. The effect on debt structure adjustment is larger when elected unions are more powerful, firms' pre-election profits are lower, unions' pre-election expected bankruptcy costs are higher, or firms are more financially constrained before elections. Using new debt issuance data, I find that firms are more likely to issue public debt after union

certification, but there is little effect on the issuance probability of private placement or bank loans.

Second, I find that union certification also has an impact on the syndication structure of newly issued bank loans. Specifically, passing a labor union election on average leads to a 34.7% increase in the number of creditors (or 2.7 more creditors) and a 50.2% decrease in the Herfindahl-Hirschman Index (HHI) of creditor ownership in a bank loan tranche three years after the election. Such an effect is not driven by the effect of union certification on the issuance size of bank debt. The results suggest that firms could strategically increase the creditor dispersion of bank debt to advance the management's bargaining positions if they do not have access to corporate bond markets. This evidence complements the findings on the choice between public and bank debt.

Although the evidence is consistent with the interpretation that debt structure could play a strategic role in influencing firms' bargaining position, other mechanisms could also explain the results. I perform several tests showing that proposed alternative mechanisms are unlikely to drive the results. First, a firm may increase financial resilience to improve its bargaining position in labor negotiations. Avenancio-Leon, Piccolo, and Pinto (2023) shows that a firm extends the term to maturity to increase its financial resilience as a response to an increase in unions' bargaining power. Given that public debt on average has longer maturity than bank loans, it could be that financial resilience rather than debt renegotiability drives the results. To test this alternative mechanism, I examine the effect of union certification on debt maturity in my sample. Despite the fact that firms adjust the composition of public debt and bank debt in capital structure, I do not find evidence showing that firms adjust debt maturity as a response to union certification.

Second, it is possible that union certification leads to changes in some firm characteristics, which in turn results in changes in debt structure. If this proposed mechanism is true, then the changes in debt structure are not driven by management's strategic concern. To test this mechanism, I examine how firm characteristics that are important for debt structure choice respond to union certification. I find that passing a labor union election has little effect on the changes in these firm characteristics.

Third, another possibility is that the cost of bank loans increases while the cost of public debt decreases after union certification. As a result, shareholders would choose to issue more public debt simply because of lower financing costs, and has nothing related to strategic motivations. I argue that this proposed mechanism is unlikely to fully explain the results. Although Qiu and Shen (2017) shows that union certification leads to an increase of 30-40 basis points in the spread of the newly originated loans, the effect of union power on the cost of public debt is ambiguous in the literature. Chen, Kacperczyk, and Ortiz-Molina (2012) shows that the corporate bond yields are lower in firms operating in industries with higher union coverage rates, but Campello, Gao, Qiu, and Zhang (2018) documents that bond cumulative announcement returns (CARs) of firms in which unions barely win the elections dropped 420 basis points 12 months after the elections, relative to firms in which unions barely lose the elections. Therefore, given the evidence in the literature, it is unclear whether the cost of public debt becomes lower relative to the cost of bank loans when unions' bargaining power increases.

Fourth, another alternative explanation for the changes in debt structure is that firms could be more constrained from loan markets after union certification because of the potential conflicts between unions and banks. As a result, they may have to resort to the bond market

for financing. The conflicts between unions and banks could arise because the recovery rates of collateral for bank loans are lower in unionized firms (Qiu and Shen, 2017). To address this concern, I exploit the cross-sectional variation in the interest alignment between labor and management before union elections. The conflicts between unions and banks are expected to be exaggerated when the interests of labor and management are more aligned since labor would have more incentives to engage in behavior that benefits shareholders but hurts bank creditors, especially during the Chapter 11 procedures. As a result, if this alternative mechanism is at work, debt structure adjustment is expected to be stronger (weaker) after union certification when the interests of labor and management are more (less) aligned. I use the fraction of a firm's equity value held by employees through defined contribution (DC) pension assets to measure the interest alignment and find that the debt structure adjustment effect is actually weaker (stronger) after union certification when the interests between labor and management are more (less) aligned before elections. This evidence is inconsistent with the alternative explanation but is more consistent with the strategic bargaining view because the need for strategic bargaining is reduced when management and labor have more common interests.

This paper contributes to two strands of literature. First, this paper adds to the literature on the strategic role of financial policies in the bargaining relations with non-financial stakeholders, starting with Titman (1984).[1] This paper provides new evidence on how management responds to an increase in the bargaining power of non-financial stakeholders. Existing studies show that firms increase leverage ratios to improve their bargaining positions as a

[1]The paper is also related to the literature on the interactions between product markets and capital structure (Brander and Lewis, 1986; Chevalier, 1995a,b; Kovernock and Phillips, 1995; Mackay and Phillips, 2005). This paper shows that corporate debt policies also respond to strategic incentives from labor markets.

response to the threat of unionization. For example, Bronars and Deere (1991) document that the corporate leverage ratio is positively correlated with industry-level union coverage rates. Matsa (2010) further shows that the corporate leverage ratio is positively correlated with firm-level union power and varies with the adoptions and repeals of state laws governing unions' bargaining power. Michaels, Page, and Whited (2019) shows that wages and leverage are negatively correlated both in the cross-section and within firms. They show that wage bargaining plays an important role in explaining the results. However, existing evidence suggests that firms do not increase leverage ratios strategically as a response to union certification. For example, Lee and Mas (2012) finds that union certification has little impact on the corporate leverage ratio on average. Schmalz (2015) confirms the findings in Lee and Mas (2012) and further shows that the effect of union certification on corporate leverage ratio is heterogeneous for financially constrained and unconstrained firms. Related to Schmalz (2015), Ellul and Pagano (2019) recently shows that financially unconstrained (constrained) firms increase leverage more (less) as a response to an increase in corporate property value when employees have strong seniority in liquidation and weak rights in restructuring. Beyond the corporate leverage ratio, Avenancio-Leon, Piccolo, and Pinto (2023) shows that firms could adjust debt maturity in response to changes in labor bargaining power. My paper is also related to studies on the strategic use of corporate liquidity in union contracts bargaining (Klasa, Maxwell, and Ortiz-Molina, 2009; Yi, 2020).

My paper contributes to the literature by showing the importance of debt heterogeneity in the strategic role of corporate debt. In theoretical models (Baldwin, 1983; Bronars and Deere, 1991; Hennessy and Livdan, 2009; Matsa, 2010), debt is usually assumed to be non-renegotiable and the payments to creditors are fully-committed. As a result, the theoretical

results hold for debt with a high commitment level. However, if a firm's outstanding debt is easily renegotiable, then unions would be more likely to disagree with shareholders and are less likely to concede during wage negotiations because they expect a smaller probability of entering the Chapter 11 procedure. Holding the level of debt as constant, debt structure matters for the effectiveness of strategic debt because it affects the commitment level of corporate debt, which in turn impacts the credibility of bankruptcy threats (Perotti and Spier, 1993). When testing the theory of strategic debt, the role of debt structure is ignored in the literature and this paper fills in this gap. This paper provides the first empirical evidence showing that firms adjust debt structure toward debt that is more difficult to renegotiate as a response to union certification to increase the effectiveness of strategic debt. This evidence can possibly provide one way to reconcile the seemingly conflicting results regarding whether firms use strategic debt when responding to the threat of unionization or employees being unionized. The conclusions can be generalized to contract negotiations with other non-financial stakeholders, as long as the Chapter 11 procedure imposes larger costs on them than private workouts (e.g., lessors). Therefore, the results have broader implications beyond the labor union context.

This paper also fits within the strand of literature on the debt structure of firms and its determinants. Rauh and Sufi (2010) and Colla, Ippolito, and Li (2013) document large variations in firms' debt structures in both the cross-section and the time series. Researchers have also examined the determinants of debt structure including information monopoly (Rajan, 1992; Houston and James, 1996), credit rating (Diamond, 1991; Denis and Mihov, 2003), corporate governance (Lin, Ma, Malatesta, and Xuan, 2013), and collateral value (Park, 2000; Lin, 2016). Frank and Goyal (2023) reviews the literature on firms' debt structure decisions.

This paper contributes to this strand of literature by showing that management's strategic bargaining motivation is also an important determinant of a firm's financing structure.

# 1 Hypotheses Development

I develop hypotheses based on the trilateral bargaining model among the union, shareholders, and creditors in Perotti and Spier (1993). In the model, shareholders can choose whether to invest in a new project. If the new project is undertaken, then it will generate a surplus and the three parties engage in a generalized Nash bargaining and split the surplus. However, if shareholders choose not to invest, then the firm will be liquidated if the profits from existing assets cannot cover wage claims. Perotti and Spier (1993) shows that, when the firm's profits from existing assets are relatively low, shareholders have incentives to issue strategic debt, which makes shareholders' threat not to invest more credible. The union is willing to bargain and concedes to lower wages, compared to the case that debt-to-equity exchanges are not feasible.

More importantly, Perotti and Spier (1993) shows that the extent to which the union concedes depends on the bargaining power of the creditor, which in turn depends on the renegotiability of debt. When debt is easier to renegotiate (e.g., syndicated bank loans participated by a few creditors), then creditors have lower bargaining power and the union concedes less; in contrast when shareholders issue debt that is more difficult to renegotiate (e.g., public debt that is widely diffused), then creditors have more bargaining power and the union concedes more. To the extreme, when creditors' bargaining power is sufficiently large and commit not to bargain, then the model becomes a bilateral bargaining model between the

union and shareholders. In this case, the union's wages are lower compared to the outcome in the trilateral bargaining model. The first key insight from Perotti and Spier (1993) is that the effectiveness of strategic debt depends on debt structure: shareholders would gain more concessions from workers when corporate debt is more difficult to renegotiate. As a result, shareholders have incentives to issue strategic debt that is more difficult to renegotiate when the union has a higher bargaining power. This insight leads to the first hypothesis.

**Hypothesis I**: *A firm's management adjusts debt structure toward debt that is more difficult to renegotiate when the employees' bargaining power increases.*

In theory, creditor dispersion increases debt contract renegotiation costs (Bolton and Scharfstein, 1996; Diamond, 2004; Zhong, 2021). As a result, the likelihood of out-of-court debt contract renegotiation varies across debt types. For public debt, it is more difficult to renegotiate because it has a larger creditor dispersion, and arranging successful renegotiations between issuers and holders is more difficult due to the Trust Indenture Act of 1939, which requires the bondholders' unanimity to change the interest, principal, or maturity of public debt. On the contrary, bank debt can be renegotiated more easily because of a smaller creditor dispersion, as shown in Gilson, John, and Lang (1990), and bank loans are indeed frequently renegotiated before maturities (Roberts and Sufi, 2009). Furthermore, within bank debt, the renegotiation likelihood also varies. It decreases with the syndication size of a bank loan because contract renegotiation becomes more difficult when there are more creditors. In Table A.1, I provide supporting evidence that an increase in creditor dispersion, measured by the number of creditors in a loan facility, is associated with a longer debt contract renegotiation. Therefore, the results suggest that debt renegotiations become more

difficult when creditor dispersion increases.[2] As a result, firms are predicted to adjust debt structure toward public debt or bank debt with higher creditor dispersion as a response to an increase in employees' bargaining power.

The second key insight from Perotti and Spier (1993) is that strategic debt is only effective when a firm's profits are relatively low. In the model, if a firm's profits from existing assets are higher than the wage claims, then the shareholders would not be able to exploit the use of strategic debt. Therefore, shareholders have more incentives to issue strategic debt when profits are lower. This leads to the second hypothesis.

**Hypothesis II**: *The estimated effect on debt structure adjustment is stronger for firms with lower cash flows*

The third key insight from Perotti and Spier (1993) is that the effectiveness of strategic debt depends on the costs born by unions during bankruptcy. For the model to work, labor unions must bear larger costs under court-supervised bankruptcy than under private resolution of financial distress, and this is arguably true empirically. Section 1113 of the Bankruptcy Code allows firms to modify or reject a collective bargaining agreement (CBA) to reduce labor costs during a Chapter 11 reorganization process. Although the enactment of Section 1113 in 1984 does not allow employers to unilaterally reject a CBA without violating the National Labor Relations Act (NLRA), it has not favored labor unions in practice. In particular, Dawson (2010) studies the bankruptcy filings of all large U.S. public corporations between 2001 and 2007 and finds that debtors can reject CBAs in every filed 1113 motion. Recently, some union executives also expressed the opinion that "workers' rights in all kinds

[2]The data on bank loan contract renegotiations are from Roberts (2014) and are available at `http://finance.wharton.upenn.edu/~mrrobert/styled-9/styled-15/index.html`.

of bankruptcy cases have been eroded," which suggests that unions' bargaining power during bankruptcy is indeed weak.[3] The modification or rejection of CBAs outside of bankruptcy, however, is more costly for employers due to the NLRA. Once employers and employee representatives enter a CBA, it cannot be modified during the effective period, or otherwise the firms would commit unfair labor practices (Dawson, 2015).[4]

Overall, labor unions in the United States bear larger costs under court-supervised bankruptcy due to their reduced bargaining power. This argument is also supported by firms' actions in reality. For example, in 2006, a U.S. bankruptcy court allowed Delta Air Lines to terminate pilots' pension plans, which led to a more than $2 billion loss of pension benefits for pilots covered by the Air Line Pilots Association (Benmelech, Bergman, and Enriquez, 2012). Moreover, in 2012, the management of AMR Corporation used Section 1113 of the Bankruptcy Code against American Eagle Labor Unions to obtain cost reduction concessions.[5] The third hypothesis is summarized below.

**Hypothesis III**: *The estimated effect on debt structure adjustment is stronger if unions are expected to bear larger costs during Chapter 11 procedures*

Empirically, I use the underfunding status of a firm's defined benefit (DB) pension plans to capture unions' costs during a Chapter 11 reorganization. The use of this measure is motivated by the fact that the priority of pension contributions in bankruptcy is weaker

[3]Vincent Ryan, "Labor Unions Urge Chapter 11 Reform," CFO.com, March 28, 2013, `http://ww2.cfo.com/bankruptcy/2013/03/labor-unions-urge-chapter-11-reform/`.

[4]National Labor Relations Act, 29 U.S.C. Â§ 158(a)(1), (a)(5) (2006).

[5]The same situation applies to other non-financial stakeholders such as lessors. Section 365 of the Bankruptcy Code states: "The trustee, subject to the court approval, may assume or reject any executory contract or unexpired lease of the debtor." Under this Bankruptcy Code, any rejected contract constitutes a pre-petition general unsecured claim that only pays cents on a dollar. Therefore, lessors' unexpired contracts with debtors are usually subject to rejections during bankruptcy and, as a result, lessors bear a larger cost in Chapter 11 reorganizations, compared to under out-of-court private workouts.

compared to other labor claims such as severance payments and salaries in the United States (Ellul and Pagano, 2019). It is also motivated by the evidence in Benmelech, Bergman, and Enriquez (2012), which shows that the threat of bankruptcy is more acute for labor if the deficits of DB pension plans are larger.

I test the hypotheses using data on labor union elections. In particular, I examine whether management adjusts debt structure to decrease the ease of renegotiating debt contracts, such as increasing leverage through public debt or issuing bank debt with more creditors or less concentrated creditor ownership, when there is an increase in the bargaining power of employees.

# 2 Data and Sample Selection

## 2.1 NLRB Labor Union Election Data

The labor union election data come from two sources. The data from January 1992 to September 1999 are obtained from Thomas Holmes' website.[6] The data from October 1999 to December 2009 are obtained from the NLRB official website.[7] This combined data set contains employers' names, the city and state of an election, 3-digit SIC (January 1992-September 1999), NAICS (October 1999-December 2009), the close date of an election, number of eligible voters, petition type, and total votes for and against unions in an election. There are three types of petitions: representation petitions in which employees seek to

[6]Thomas J. Holmes' homepage for data used in "Geographic Spillover of Unionism," January 2006, `http://www.econ.umn.edu/~holmes/data/geo_spill/`. As described on the website, the data from 1977 to 1992 are from Henry Farber and Bruce Fallick; the data from 1993 to 1994 are from National Archives; and the data from 1995 to 1999 are from NLRB.

[7]National Labor Relations Board, `http://www.nlrb.gov/opengov/nlrb-data-data.gov`.

be represented by unions or unions seek to be certified, decertification petitions in which employees seek to remove existing unions, and employer-filed petitions in which employers seek to remove unions. I focus on the first type, which ensures that the employees in the bargaining unit are not unionized.[8] Following Lee and Mas (2012), I keep elections in which the number of eligible voters is greater than or equal to 100 in the sample. Following DiNardo and Lee (2004), I standardize the vote shares to the support for elections in which the minimum vote cast is 100.[9] Specifically, I assign the vote share of 50.5% to all vote shares between 50% and 51% and assign the vote share of 49.5% to all vote shares between 49% and 50%, and so forth. I merge labor union election data with firms in Compustat based on firm names. The details for data assembly are in Appendix A.1. The detailed institutional background is available in Appendix A.2.

## 2.2 Debt Structure Data

### 2.2.1 Balance Sheet Data

The debt structure data used in this paper come from firms' 10-K filings and span from 1991 to 2012. Because of SEC reporting regulations S-X and S-K, detailed information on firms' long-term debt issues and revolving credit facilities is available. For each union certification election that can be matched to a Compustat firm, I hand-collect the debt structure information from two years before the election to three years after the election from the section "Notes to Financial Statement" in the 10-Ks. Based on this information,

[8] After merging with debt structure data, the sample sizes for decertification and employer-filed petitions are too small to conduct a formal analysis.

[9] I do this is to restore the symmetry between small and large elections; otherwise, I mechanically put more weight on large elections when I focus on close elections. The results are robust without such manipulation.

I define public debt as the sum of the outstanding balance of commercial paper and bonds and notes for each fiscal year (Lin, Ma, Malatesta, and Xuan, 2013). Bank debt is defined as the sum of the outstanding balance of revolvers, term loans, and other bank loans for each fiscal year.[10]

I construct two debt structure measures for each type of debt. Specifically, "Public Debt/Total Assets" is defined as the outstanding balance of public debt on the balance sheet at the fiscal year-end scaled by the book value of total assets. "Public Debt/Total Debt" is defined as the outstanding balance of public debt on the balance sheet at the fiscal year-end scaled by the outstanding balance of the total debt. The measures for bank debt are defined in the same fashion. The sample used in this paper spans from 1992 to 2009 and includes 861 elections involving 436 unique firms.

Panel A of Table 1 presents the summary statistics for the debt structure measures based on the balance sheet. The data are available from one fiscal year before to three fiscal years after each labor union election. In this sample, public debt and bank debt on average account for 68.1% and 22.8% of a firm's total debt, respectively. These statistics are similar to those reported in Table 1 of Rauh and Sufi (2010).[11] Panel B of Table 1 reports the summary statistics for labor union election data. The average vote share is 42.4%, which is below the 50% share with which a union wins an election by a simple majority rule. On average,

[10]Bonds and notes include the following debt types: public bonds, private placements, revenue bonds, medium-term notes, shelf registration bonds, mortgage and equipment debt, and convertible debt. Moreover, excluding commercial paper from the public debt definition generates similar results. Due to data limitations, the public debt used in this paper actually includes both publicly and privately placed debt. I cannot differentiate public bond/Rule 144-A private placements and non-Rule 144-A private placements based on the information from 10-Ks. Therefore, this is a noisy classification, but the measurement errors should bias against our results.

[11]According to the statistics in Table 1 of Rauh and Sufi (2010), the fraction of all types of bonds in total debt is 68.73% and bank debt accounts for 26.29% of total debt in their sample.

unions win 28.1% of all elections in the sample, consistent with the statistics of the vote share. Panel B presents the distribution of the number of elections and the passage rate of elections by NAICS Sector. As expected, elections in manufacturing industries account for more than 55% of all elections in the sample. The year distribution of the number of elections is presented in Figure 1. On average, there are 358 employees eligible for casting votes in an election. The average fraction of eligible employees in a firm's total employment is 3.7%.

### 2.2.2 New Issuance Data

In order to examine the impact of employees' bargaining power on debt issuance behavior, I obtain new issuance data between 1992 and 2013 from the SDC Platinum for corporate bonds and the LPC DealScan database for bank loans.[12,13] One advantage of new issuance data is it has more detailed information on the types of corporate bonds. Following Gomes and Phillips (2012), I aggregate public bond and Rule 144-A private placements into the public debt category. I then assign each new issuance to one of three categories: (1) public debt, (2) non-Rule 144A private placements, and (3) bank debt. Furthermore, I consider the syndication size and creditor ownership concentration of newly issued bank loans as alternative dimensions of debt structure. I define syndication size as the number of creditors for each bank loan tranche or loan deal. For creditor ownership concentration, I follow

[12]Another commonly used data set for new public bond issuance is Mergent FISD. In this paper, I use SDC platinum because it coverage is larger than that of Mergent FISD. It would be beneficial if I could merge SDC and FISD data to obtain more complete coverage for new debt issues of U.S. firms using the identical identifier between SDC and FISD, the international securities identification number (ISIN). Most ISINs are missing in SDC, and therefore merging these two databases becomes difficult.

[13]Murfin (2012) finds that the actual contract date is 3 months (1 month prior to receiving the mandate and 2 months for the syndication/documentation process) before the start date reported in DealScan. Therefore, I adjust the loan facility start date to be 90 days prior to the date reported in DealScan.

Sufi (2007) and define it as the sum of the square of each creditor's ownership in each loan tranche.

Panel A of Table 1 also reports the summary statistics for the debt structure measures based on the new issuance data. The data are selected to be in the three years following each labor union election. On average, 50.2% of firms issue public debt in the three years following union elections. In the sample, 7.9% of firms issue private placements and 80.3% of firms issue bank debt in the three years following union elections. In the sample, the average number of creditors is around eight in a bank loan tranche or a bank loan deal. The average creditor ownership concentration, measured as the Herfindahl-Hirschman index (HHI) of creditor ownership, is 25.9%.

# 3 Empirical Strategy

## 3.1 Identification Strategy

In order to test the hypotheses, I use data on labor union elections and employ an RD design to estimate how debt structure is adjusted when employees' bargaining power increases. The exogenous variation in employees' bargaining power that I exploit comes from the rule that determines the outcome of a labor union election. By law, a union wins an election by a simple majority rule (i.e., strictly larger than 50% of total valid votes that are in favor of unionization). A union is certified as the collective bargaining agent in an establishment as the result of a secret ballot election won by the union. Consequently, employees' bargaining power in an establishment increases discontinuously once vote shares for unions pass 50%

(DiNardo and Lee, 2004).

To estimate the causal effect of union certification on debt structure adjustment, I use local linear regressions.[14] Specifically, I follow Frandsen (2021) and estimate the following specification combining difference-in-differences with an RD design. I use a weighting scheme $\omega_i$ within a chosen bandwidth $h$:

$$Y_i - Y_{i,-1} = \alpha + \beta_1 WIN_i + \beta_2 WIN_i \times (R_i - 0.5) + \beta_3 (R_i - 0.5) + \epsilon_i \quad (1)$$

with weights $\omega_i = K(\frac{R_i - 0.5}{h})$, where K(•) is a kernel function. K(•) could be either a rectangular (OLS estimation) or triangular kernel (WLS estimation). $WIN_i$ denotes the winning status dummy for election $i$, while $R_i$ denotes vote shares for the union in election $i$. $Y_i$ is the three-year average of each debt structure measure after election $i$. $Y_{i,-1}$ represents each debt structure measure one fiscal year before election $i$. Estimated $\beta_1$ represents the treatment effect of union certification. In all regressions, I treat the elections within the same firm in different years independently and cluster standard errors at the firm level to account for correlations within the same firm. I use the optimal bandwidth choice in Imbens and Kalyanaraman (2012) (IK-optimal) in main results. In the robustness section, I also use alternative choices of bandwidths and specifications to ensure the robustness of the results.

[14] An RD design can be implemented in two ways: by global polynomial regressions and by local polynomial regressions. See Lee and Lemieux (2010) for a comprehensive discussion of these two estimation methods. For a global polynomial regression, all available data are used and polynomials in vote shares are controlled to achieve the identification. In a local polynomial regression, the causal effect is estimated by choosing appropriate kernel functions and bandwidths and controlling linear or quadratic terms in vote shares. Following the suggestions in Gelman and Imbens (2019), I use local linear regressions instead of global polynomial regressions throughout. Gelman and Imbens (2019) argues that there are three drawbacks to global polynomial regressions. The first issue is that the implicit weights on observations far away from cutoffs are noisy. The second issue is that the estimated treatment effect is sensitive to the choice of polynomial order. The third issue is that the confidence interval obtained from global polynomial regressions is too narrow. My results are also robust if I use the polynomial regressions and the results are in Table **??**.

## 3.2 Validity Tests

The key identification assumption for a traditional RD design is the local continuity assumption, that is, the conditional distribution of potential outcomes as a function of vote share is continuous around the winning threshold. However, the identification of union certification effects based on equation (1) relies on a weaker identification assumption than the local continuity assumption. This weaker identification assumption requires the panel nature of the data and states that the conditional distribution of the first difference in the potential outcomes as a function of vote share for unions is continuous around the threshold. Frandsen (2014) terms it as the local continuity in differences assumption. Under this assumption, the union certification effect is identified by comparing the post-election change in the outcome variables between firms in which unions barely win and lose elections. One advantage of the specification in equation (1) is that the results would be valid in the presence of discontinuities in the levels of predetermined firm characteristics, as long as the local continuity in differences assumption is satisfied. Below I perform two tests to support the validity of RD estimations.

### 3.2.1 Vote Share Density

First, we examine whether vote shares are perfectly manipulated by voters around the 50% cutoff. If we cannot reject the null hypothesis, then the local continuity assumption, and hence the local continuity in differences assumption, is more likely to be satisfied (Lee, 2008). I use the procedures developed in McCrary (2008) to test the discontinuities in the vote share distribution. The results of the vote share density test in McCrary (2008) are presented in

Figure 2. The $x$-axis is the vote share for unions, and the solid line is the fitted density with a 95% confidence interval around it. The discontinuity estimate is -0.001, and the corresponding standard error is 0.173. Therefore, I cannot reject the hypothesis that there is no perfect manipulation of vote shares around the cutoff at the conventional 5% level. Overall, the results of McCrary's test suggest that the vote share is unlikely to be perfectly manipulated in the sample.

### 3.2.2 Continuities in the Trends of Pre-election Firm Characteristics

Second, I examine whether there are discontinuities in the trends of pre-election firm characteristics before union certification elections in year $T$. If the local continuity in differences assumption is satisfied, then the trends of firm characteristics between year *T-2* and year *T-1* should be similar between firms in which unions barely win and lose elections. I examine several important firm characteristics including debt structure measures, the natural logarithm of total assets, book leverage ratio, market-to-book ratio, tangibility, profits, modified $Z$-score, and cash holding. For each firm characteristic, $Y$, I estimate the effect of union certification based on equation (1) with a rectangular kernel and the IK-optimal bandwidth. The dependent variable is $Y_{-1} - Y_{-2}$, where $Y_{-1}$ and $Y_{-2}$ are firm characteristics one and two fiscal years before elections, respectively.

Table 2 reports the results and shows that all estimates are small and statistically insignificant. Therefore, the results suggest that within the vicinity of the 50% cutoff, the trends of predetermined observable firm characteristics between year *T-2* and year *T-1* are comparable between firms in which unions barely win and lose elections. In Table A.2, I also report the results of testing the discontinuities in the *levels* of pre-election firm characteris-

tics in year *T-1*. The results show that the levels of pre-election firm characteristics between the two groups of firms are also comparable. Overall, the results in Figure 2 and Table 2 together imply that the identification assumption for specification in equation (1) is more likely to be satisfied in the sample.

# 4 Empirical Results

In this section, I present the effects of union certification on debt structure adjustments. In subsections 4.1-4.3, I present the effects of union certification on the choice between public and bank debt. I use data from the balance sheets of firms in Section 4.1-4.2 and use the new issuance data in 4.3. In subsection 4.4, I examine the effects of union certification on the syndication structure of newly issued bank loans.

## 4.1 Balance Sheet Data Evidence

In this subsection, I use balance sheet data and report RD evidence showing that debt structure is adjusted in response to the new legal recognition of unions. I initially confirm the results in the literature that, on average, management does not adjust the corporate leverage ratio as a response to an increase in employees' bargaining power. I first present the graphical analysis and then report the regression-based results.

In Figure 3, I plot the empirical expected value of the difference between the average book leverage ratio three years after an election and the value one year before the election condition on vote shares and check whether there is any significant discontinuity around the 50% cutoff. In the plot, the $x$-axis represents the vote share for unions, and I use the

IK-optimal bandwidths. Each dot represents the average book leverage ratio adjustment in a 2% bin, and the dots are fitted using a linear line on each side of the 50% cutoff, with the shaded area being the 95% confidence interval. I do not observe significant discontinuities in the change in book leverage ratio around the 50% cutoff, suggesting that union certification has little effect on the adjustment in corporate leverage ratio.

I also estimate the treatment effect of union certification on the change in book leverage ratio using local linear regressions with the rectangular kernel. Column (1) reports the result using the optimal bandwidth. Columns (2)-(4) report results using bandwidths of 5%, 10%, and 15%, respectively. The estimations in Table 3 are all economically small and statistically insignificant, confirming the patterns shown in Figure 3. These results are consistent with the findings in Appendix A.2 in Lee and Mas (2012) and Schmalz (2015).

Next, I report results showing that management actively adjusts debt structure as a response to union certification. In Figure 4, I plot the empirical expected value of the difference between the average debt structure three years after an election and the value one year before the election condition on vote shares using the IK-optimal bandwidths and check whether there is any significant discontinuity around the 50% cutoff. In each plot, a dot represents the average change in debt structure in a 2% bin, with the shaded area being the 95% confidence interval. The plots on the left- and right-hand sides represent the changes in debt structure measures for public and bank debt, respectively. In all plots, there are significant discontinuities around the 50% cutoff, which is a sign of the causal effects of union certification on debt structure adjustments.

Table 4 reports the RD estimations and I use the IK-optimal bandwidths and rectangular kernel in all local linear regressions. For each type of debt, I report results using two different

measures of debt structure as the dependent variables. The results show that firms in which unions barely win elections significantly increase leverage in public debt and decrease leverage in bank debt, compared to similar firms in which unions barely lose elections. Specifically, results in Panel A show that passing a labor union election leads to a 4.9-percentage-points increase in the ratio of the outstanding balance of public debt to the book value of total assets and a 5.5-percentage-points decrease in the ratio of the outstanding balance of bank debt to the book value of total assets. These results are statistically significant and economically large, given that the sample means of book leverage in public and bank debt are 21.6 percentage points and 7.2 percentage points, respectively. The change in debt structure after union certification is consistent with the close-to-zero effect of union certification on the leverage ratio.

The results in the discontinuity samples in Table 4 are not driven by a small number of firms. For example, there are 218 and 179 firms involved in the close-election samples for columns (1) and (4), respectively. Overall, the results are consistent with Hypothesis I in Section 1. The estimations suggest that management adjusts debt structure to decrease the ease of renegotiating debt contracts but hold the level of debt constant in response to union certification.

## 4.2 Heterogeneity Analyses

In this subsection, I exploit the cross-sectional heterogeneity in unions' bargaining power (subsection 4.2.1), firms' pre-election profits (subsection 4.2.2), unions' expected costs during Chapter 11 procedures before elections (subsection 4.2.3), and firms' pre-election financial

constraints (subsection 4.2.4) to further strengthen the identification of the effects of union certification on a firm's debt structure adjustments.

### 4.2.1 Right-to-Work Law

A right-to-work (RTW) law is legislation that prohibits union shops. In states with RTW laws, employees in workplaces with CBAs are not required to pay union dues even though they can receive the benefits of collective bargaining. Such a law can create free-rider problems for unions, which makes joining them less economically attractive to workers. The combination of reduced financial support and workers' unwillingness to join unions diminishes unions' ability to organize strikes (Ellwood and Glenn, 1987), which diminishes unions' bargaining power. Since management bargains with union representatives in each plant, I split the sample into RTW and non-RTW elections based on election states.[15]

I examine whether the effects of union certification are stronger (weaker) for elections held in states without (with) RTW laws. The results are reported in Panel A of Table 5. The estimations show that the effect of union certification on debt structure adjustments are larger and statistically significant for elections held in non-RTW states, but are much smaller and statistically insignificant for elections held in RTW states. Specifically, column (1) shows that passing a labor union election leads to a 7.4-percentage-points increase in the ratio of the outstanding balance of public debt to the book value of total assets for elections held in non-RTW states while the estimated effect is -0.6 percentage points for elections

[15]The states that have passed RTW laws as of 2009 are: Alabama, Arizona, Arkansas, Florida, Georgia, Idaho, Iowa, Kansas, Louisiana, Mississippi, Nebraska, Nevada, North Carolina, North Dakota, Oklahoma (after 2001), South Carolina, South Dakota, Tennessee, Texas (after 1993), Utah, Virginia, and Wyoming. Indiana and Michigan passed the "right-to-work" legislation in 2012 and 2013, respectively. Wisconsin adopted RTW laws in 2015 and Kentucky and Missouri adopted RTW laws in 2017.

held in RTW states. The difference between these two estimates in columns (1) and (3) is statistically significant at the 5% level, with a p-value of 0.038. For the change in the leverage ratio for bank debt, the estimated effect is also larger for elections held in non-RTW states than the one for elections held in RTW states (-0.063 in column (2) vs. -0.024 in column (4)). Although the difference is not economically small, it is not statistically significant at the conventional level, with a p-value of 0.27.

#### 4.2.2 Profitability

In this subsection, I test Hypothesis II in Section 1. I examine how a firm's profits before union certification elections affect debt structure adjustment as a response to union certification. The theory in Perotti and Spier (1993) shows that shareholders have more incentives to employ strategic leverage when profits are lower. Otherwise, the bankruptcy threat is empty to unions if a firm's profits are high and could cover wage claims. Therefore, when a firm's pre-election profits are lower, strategic debt is expected to be more effective and the adjustment of debt structure is predicted to be more aggressive.

I measure a firm's profits as operating income before depreciation scaled by sales. A firm is defined to have low (high) profits if its profits fall in the top (bottom) tercile of the sample one year before union certification elections. I report the heterogeneity results in Panel B of Table 5. Column (1) shows that when a firm's profits are low prior to union certification elections, passing a labor union election leads to a 7.6-percentage-points increase in the ratio of the outstanding balance of public debt to the book value of total assets; in contrast, the estimated effect is -0.033 when a firm's pre-election profits are high, as shown in column (3). The difference between the two estimates in columns (1) and (3) is statistically significant at

the 1% level, with a p-value of 0.008. For the change in the leverage ratio for bank debt, the estimated effect is also larger for firms with low profits than the one for firms with high profits before elections (-0.135 in column (2) vs. -0.01 in column (4)). The difference is statistically significant at the 1% level, with a p-value of 0.005. Overall, the evidence shows that the effect of union certification on debt structure adjustments concentrates on firms with lower pre-election profits, consistent with the theoretical prediction in Perotti and Spier (1993).

### 4.2.3 Unions' Bankruptcy Costs

In this subsection, I test Hypothesis III in Section 1. I investigate whether and how the results in Table 4 vary with unions' expected costs during bankruptcy procedures. If debt structure adjustment is strategic, then the effect is expected to be larger in firms where unions are expected to bear larger bankruptcy costs. To capture a union's expected costs during a Chapter 11 reorganization, I use the pre-election underfunding status of a firm's defined benefit (DB) pension plans. The use of this measure is motivated by the fact that the priority of pension contributions in bankruptcy is weaker compared to other labor claims such as severance payments and salaries in the United States (Ellul and Pagano, 2019). It is also motivated by the evidence in Benmelech, Bergman, and Enriquez (2012), which shows that the threat of bankruptcy is more acute for labor if the deficits of DB pension plans are larger. DB pension plan data come from Compustat Pension Annual Database. The deficit of a firm's DB pension plans is defined as the difference between the projected benefit obligations and the fair value of pension plan assets. Unions are defined to bear larger (smaller) costs during Chapter 11 procedures if firms' DB pension plans are underfunded (not underfunded) before elections. I report the heterogeneity results conditional on a firm's

underfunding status of its DB pension plans in Panel C of Table 5.

Column (1) shows that when unions are expected to bear larger costs during Chapter 11 procedures, passing a labor union election leads to a 12.2-percentage-points increase in the ratio of the outstanding balance of public debt to the book value of total assets; in contrast, the estimated effect is -0.007 for firms in which unions are expected to bear smaller bankruptcy costs before union certification elections, as shown in column (3). The difference between the two estimates in columns (1) and (3) is statistically significant at the 1% level, with a p-value of 0.003. For the change in the leverage ratio for bank debt, the estimated effect is also larger for firms in which unions are expected to bear larger bankruptcy costs than the one for firms in which unions are expected to bear smaller bankruptcy costs before certification elections (-0.108 in column (2) vs. 0.023 in column (4)). The difference is statistically significant at the 5% level, with a p-value of 0.021.

## 4.3 Financial Constraints

Existing studies show that financial constraints affect a firm's strategic use of debt. Schmalz (2015) shows that the effect of union certification on corporate leverage is heterogeneous by firms' pre-election financial constraints. He finds that firms that are more financially constrained before elections increase leverage ratios as a response to union certification; in contrast, firms that are financially unconstrained before elections decrease leverage ratios after unions win elections. Ellul and Pagano (2019) finds that leverage increases more (less) as a response to an increase in corporate property value in financially unconstrained (constrained) firms when employees have strong seniority in liquidation and weak rights in

restructuring. In this subsection, I examine whether and how financial constraints impact the estimated effect of union certification on debt structure.

I follow Schmalz (2015) and use the Whited-Wu index (Whited and Wu, 2006) to measure a firm's financial constraints. A firm is defined to be financially constrained (unconstrained) if its Whited-Wu index falls in the top (bottom) tercile of the sample one year before union certification elections. I report the heterogeneity results in Panel D of Table 5. Column (1) shows that when a firm is financially constrained prior to union certification elections, passing a labor union election leads to an 8.0-percentage-points increase in the ratio of the outstanding balance of public debt to the book value of total assets; in contrast, the estimated effect is -0.018 when a firm is financially unconstrained before union certification elections as shown in column (3). The difference between the two estimates in columns (1) and (3) is statistically significant at the 5% level, with a p-value of 0.019. For the change in the leverage ratio for bank debt, the estimated effect is also larger for financially constrained firms than the one for financially unconstrained firms before elections (-0.085 in column (2) vs. 0.022 in column (4)). The difference is statistically significant at the 1% level, with a p-value of 0.007. The results in this panel show that the effect of union certification on debt structure concentrates on financially constrained firms before union certification elections. This result suggests that the strategic use of debt is more effective in this subset of firms as they can more credibly make the claims to unions that higher wages could not be provided because of the weaker access to capital.

Overall, the results in Table 5 suggest that debt structure adjustments after union certification are stronger when unions are more powerful, firms' pre-election profits are lower, unions are expected to bear larger bankruptcy costs before elections, or firms are more fi-

nancially constrained before elections. This cross-sectional evidence is consistent with the theoretical predictions in Section 1 and further strengthens the interpretation of the RD results in Table 4.

## 4.4 Robustness Check Results and Placebo Tests

### 4.4.1 Robustness Check Results

In this subsection, I provide robustness checks for the results in Table 4. The robustness checks include using alternative bandwidths and kernels in estimations as well as using an alternative sample selection procedure for labor union elections. We report results in Table A.3. Panels A and B report results for public debt and bank debt, respectively.

In columns (1) and (2) of each panel, I use bandwidths of 5% and 10%, instead of the IK-optimal bandwidths. The results are based on local linear regressions with rectangular kernels. The results show that the results in Table 4 are robust to alternative choices of bandwidths. In order to further assess the sensitivities of the results to various bandwidths, I plot the local linear estimations with rectangular kernels against bandwidths from 0.01 to 0.5 in Figure A.1. The plots on the left- and right-hand sides represent the results for public and bank debt, respectively. The vertical line in each plot represents the results with the IK-optimal bandwidths. Figure A.1 shows that the results are stable across the chosen bandwidths, suggesting that the local linear estimations are robust to alternative choices of bandwidths.

In column (3) of each panel in Table A.3, I use the triangular kernel and IK-optimal bandwidth to estimate the result. The result is robust. In column (4) of each panel , I present

results for an alternative sample selection procedure for labor union elections. Specifically, I keep the first election in each firm-year observation instead of the largest election. The results show that the results in Table 4 are robust to this alternative sample construction.

### 4.4.2 Placebo Tests

I also conduct a placebo test to rule out the possibility that the causal relation between union certification and debt structure adjustments is spurious. In particular, I investigate whether the results in Table 4 disappear if I arbitrarily choose a winning threshold other than 50%. I randomly choose a number between 0.3 and 0.7 as the artificial threshold each time and then estimate how debt structure is adjusted as a response to the pseudo union certification using a local linear estimation. This exercise is repeated 5,000 times, and the histograms of the estimations are reported in Figure A.2. The vertical lines represent the results in Table 4 in which the winning threshold is 50%. Figure A.2 shows that all histograms are centered around 0, suggesting that any impact of union certification on debt structure adjustment disappears if an artificially winning threshold is chosen. This placebo test results further strengthen the causal relations in Table 4.

## 4.5 New Issuance Data Evidence

One drawback of the balance sheet data is that they do not differentiate public bond/Rule 144-A private placements from non-Rule 144-A private placements within the defined public debt. In this subsection, I use data from the SDC Platinum and DealScan and estimate the causal impacts of union certification on the new issuance probability of different types of debt in the three years after union elections. Columns (1)–(3) of Table 6 report estimations

for public debt, non-Rule 144-A private placements, and bank debt, respectively.[16] The estimations suggest that firms in which unions barely win elections are 29.6% more likely to issue public debt in the following three years, compared to firms in which unions barely lose elections. The impacts of union certification on the issuance probability of non-Rule 144-A private placements and bank loans are economically smaller and statistically insignificant.

The results in Table 6 suggest that management only chooses to issue more public debt, which is difficult to renegotiate, after union certification. The issuance probability of private placements or bank debt, which is easier to renegotiate, is not significantly affected by union certification. Overall, these estimates are consistent with the interpretation that management adjusts debt structure to strategically advance bargaining positions after union certification.

## 4.6 Union Certification and the Syndication Structure of Bank Loans

Another limitation of the results in Table 4 is that firms not covered by Compustat are excluded from the sample. In this subsection, I consider another dimension of debt structure—the syndication structure of bank loans—and examine whether firms issue loans with a larger creditor dispersion as a response to an increase in employees' bargaining power if they are constrained from corporate bond markets. This sample includes both publicly traded firms in Compustat as well as privately held firms.

I employ a 36-month window after each election and use two measures for the syndication structure of newly issued bank loans: the natural logarithm of post-election average syndication size and the natural logarithm of post-election average creditor ownership con-

[16]The number of observations for each estimation is different because the optimal bandwidth in the RD estimation (reported in the Table 6) varies.

centration.[17] In order to mitigate the concern that the differences in syndication structure could be due to the differences in loan amount, I also estimate the effect of union certification on the average loan amount in the 36 months after elections.

Table 7 reports the effects of union certification on the syndication structure of bank loans. Columns (1) and (2) report results for syndication size defined at the loan tranche and loan deal levels, respectively. Column (3) reports the result for creditor ownership concentration, and column (4) presents the result for the loan amount. I find that the syndication size of bank debt increases, and creditor ownership becomes more dispersed after union certification. In particular, the result in column (1) suggests that compared to firms in which unions barely lose elections, the syndication size of new bank loans increases by 34.7% (or 2.7 more creditors) in firms in which unions barely win elections. The result in column (3) shows that the Herfindahl-Hirschman index (HHI) of creditor ownership of new bank loans decreases by 50.2% once a labor union is certified. Finally, the result in column (4) shows that union certification has little effect on the amount of loan issuance, mitigating the concern that the effects of union certification on the loan amount drive the effects of union certification on the syndication structure. Overall, the results in Table 7 suggest that firms structure debt to make debt contract renegotiation more difficult when employees' bargaining power increases. They complement the results in Table 4.[18]

[17] I exclude the following loans from the sample: (1) tranches that are not syndicated in the U.S., (2) tranches that are not denominated in U.S. dollars, (3) the 364-day facility or loan primary purpose is for working capital, and (4) any loan with maturity less than or equal to one year. The short-term loans are usually treated as part of working capital instead of capital structure.

[18] I also test whether union certification affects the syndication structure of bank loans issued within 12 months before elections. The results show that union certification has little effect, which suggests that there is little difference in the pre-election level of syndication structure between treatment and control groups.

# 5 Alternative Explanations

Although the results in Table 4 are consistent with the strategic view of debt structure, other mechanisms could also explain the results. In Section 5.1, I examine the effect of union certification on the change in debt maturity. In Section 5.2, I examine whether debt structure adjustments after union certification are driven by changes in other firm characteristics. In Section 5.3, I discuss whether the results in Table 4 could be driven by changes in the costs of public debt and bank loans after union certification. Finally, in subsection 5.4, I examine whether the adjustments of debt structure after union certification are because firms are constrained from the bank loan market rather than management's strategic demand.

## 5.1 Does Union Certification Affect Debt Maturity?

The first alternative explanation is that a firm may increase financial resilience to improve its bargaining position in labor negotiations. Avenancio-Leon, Piccolo, and Pinto (2023) shows that a firm extends the term to maturity to increase its financial resilience as a response to an increase in unions' bargaining power. Given that public debt on average has longer maturity than bank loans, it is possible that it is financial resilience rather than debt renegotiability that drives the results. To test this alternative mechanism, I examine how debt maturity is adjusted by firms where unions marginally win elections compared to firms where unions marginally lose elections.

We use four measures of debt maturity: the value of debt maturing longer than three or five years scaled by the book value of total assets (*LTD3/Total Assets* or *LTD5/Total Assets*) and the value of debt maturing longer than three or five years scaled by the book

value of total debt (*LTD3/Total Debt* or *LTD5/Total Debt*). We report the results in Table 8. Columns (1) and (3) show that firms tend to increase the ratio of debt maturing longer than three years to total assets or to total debt after union certification, but the estimates are not statistically significant. In columns (2) and (4), the results show that union certification leads firms to lower the ratio of debt maturing longer than five years to total assets or to total debt, but the estimates are not statistically significant either. Overall, at least in my sample, I do not find strong evidence showing that firms adjust debt maturity despite the fact that they adjust the composition of public debt and bank debt in capital structure. This result could be consistent with the argument in Perotti and Spier (1993) that strategic debt does not tend to be sustained over time.

## 5.2 Does Union Certification Affect Other Firm Characteristics?

The second alternative explanation is that the observed changes in debt structure after union certification could be due to changes in other firm characteristics. Therefore, the results are not driven by a firm's strategic concern. To test this mechanism, I examine the effects of union certification on the changes in other firm characteristics that are important for debt structure decisions, including firm size, market-to-book ratio, asset tangibility, R&D investment, capital investment, return on assets, total factor productivity, modified $Z$-score, credit rating, and bid-ask spread. A change in a firm characteristic is defined as the difference between its average value in the three years after an election and the value one year before the election.

Table 9 presents the effects of union certification on the changes in these firm character-

istics. The results show that union certification has little effect on these firm characteristics, suggesting that debt structure adjustments after union certification are not only responses to changes in firm size, growth opportunity, asset tangibility, corporate investment (R&D investment and capital investment), firm performance (profits and productivity), corporate risk (modified $Z$-score), or information asymmetry (credit rating and bid-ask spread).

### 5.3 Are Results Driven by Changes in Cost of Debt?

Third, another concern is that the results in Table 4 could be driven by the possibility that the cost of bank loans increases while the cost of public debt decreases after union certification. As a result, shareholders would choose to issue more public debt simply because of lower financing costs, and has nothing related to strategic motivations. Although Qiu and Shen (2017) shows that union certification leads to an increase of 30-40 basis points in the spread of the newly originated loans, the effect of union power on the cost of public debt is ambiguous in the literature. Chen, Kacperczyk, and Ortiz-Molina (2012) shows that the corporate bond yields are lower in firms operating in industries with higher union coverage rates, but Campello, Gao, Qiu, and Zhang (2018) documents that bond cumulative announcement returns (CARs) of firms in which unions barely win the elections dropped 420 basis points 12 months after the elections, relative to firms in which unions barely lose the elections. Therefore, given the evidence in the literature, it is unlikely that the proposed mechanism alone would fully explain the results in Table 4.

## 5.4 Are Firms More Constrained from Loan Markets after Union Certification?

Fourth, another alternative explanation is that firms could be more constrained from bank loan markets after unions win elections because of the potential conflicts between unions and banks, and firms have to resort to the bond market for financing. The conflicts between unions and banks could arise because the recovery rates of collateral for bank loans are lower in unionized firms (Qiu and Shen, 2017).

To mitigate this concern, I exploit the cross-sectional variation in the interest alignment between labor and management before elections. The conflicts between unions and banks are expected to be exaggerated when the interests of labor and management are more aligned since labor would have more incentives to engage in behavior that benefits shareholders but hurts bank creditors, especially during Chapter 11 reorganizations. As a result, if this alternative mechanism is at work, then the substitution effect between bank loans and public debt is expected to be stronger after union certification.

Following Rauh (2006), I use the fraction of a firm's equity held by employees through defined contribution (DC) pension assets (DC pension ownership) as a proxy for the interest alignment between labor and management.[19] The interests of labor and management are defined to be more (less) aligned in a firm if the DC pension ownership is larger (smaller) than the sample median.[20]

[19]The data on fair value and detailed asset holdings of DC pension plans come from IRS Form 5500 through the Center for Retirement Research at Boston College and the Department of Labor. The data from 1990 to 2007 are from Center for Retirement Research at Boston College are available at `http://crr.bc.edu/data/form-5500-annual-reports/`. The post-2007 data are from the Department of Labor, available at `https://www.dol.gov/agencies/ebsa/researchers/data/retirement`. I exclude plan-year observations such that part or all of the assets are in common or master trusts, following Rauh (2006).

[20]Out of 861 elections, the labor-management interest alignment measure one year before election is

Table 10 reports the effects of union certification conditional on the interest alignment between labor and management. Columns (1) and (2) report results for firms with lower DC pension ownership. Columns (3) and (4) report results for firms with higher DC pension ownership. The result in column (1) shows that passing a labor union election leads to a 7.9-percentage-points increase in the ratio of the outstanding balance of public debt to the book value of total assets when the interest between labor and management is more divergent; however, the estimate is -1.3 percentage points for firms in which the interest between labor and management is more aligned. The difference between the two estimates in columns (1) and (3) is statistically significant at the 5% level, with a p-value of 0.03.

The results in Table 10 are inconsistent with the alternative channel as the substitution effect between public and bank debt is weaker instead of stronger after union certification. The results are more consistent with the view that debt structure is adjusted strategically to improve management's bargaining position against labor unions because the need for strategic bargaining is reduced when labor and management have more common interests.

# 6 Conclusion

In this paper, I provide new evidence on how management adjusts debt policies as a response to an increase in employees' bargaining power. When testing the theory of strategic debt, the role of debt structure is ignored in the literature and this paper fills in this gap. This paper provides the first empirical evidence showing that firms adjust debt structure toward debt that is more difficult to renegotiate as a response to union certification to increase the

non-missing for 343 elections. Due to smaller sample, I split the sample by median rather than by terciles.

effectiveness of strategic debt. This evidence can possibly provide one way to reconcile the seemingly conflicting results regarding whether firms use strategic debt when responding to the threat of unionization or employees being unionized.

Using data on NLRB labor union elections and a regression discontinuity design, I show that debt structure is adjusted toward debt that is more difficult to renegotiate as a response to an increase in employees' bargaining power. In particular, passing a labor union election leads to an increase in the leverage in public debt and a decrease in the leverage in bank debt, leading to a close-to-zero effect on the leverage ratio. Furthermore, the syndication structure of newly issued bank loans also becomes more dispersed after union certification.

I further show that the results are more likely driven by several management's strategic concerns, rather than by alternative explanations after union certification. Specifically, union certification has little effect on the change in debt maturity, suggesting that the financial resilience channel in Avenancio-Leon, Piccolo, and Pinto (2023) could not explain the results. Furthermore, I find that union certification has little effect on the changes in other firm characteristics that are important for debt structure choice, suggesting that the debt structure adjustments are unlikely only responses to changes in other firm characteristics after union certification. Moreover, I argue that the results are unlikely driven by the changes in costs of public debt and bank loans, given the evidence in the literature. Finally, I show that the results are unlikely driven by the possibility that firms are more constrained from loan markets after union certification due to potential conflicts between unions and banks. I show that the effects of union certification on debt structure adjustments are smaller, not larger, when the interests of labor and management are more aligned, which would exaggerate the conflicts between unions and banks.

Although I focus on the interactions between management and labor in this paper, the findings have more general implications for non-financial stakeholders in firms. As long as court-supervised bankruptcy procedures impose larger costs on non-financial stakeholders than out-of-court workouts (e.g., lessors), debt structure could serve as a strategic bargaining tool, since it alters the credibility of bankruptcy threats to non-financial stakeholders.

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Figure 1: Number of Elections: Year Distribution

This figure reports the year distribution of the number of elections in the sample.

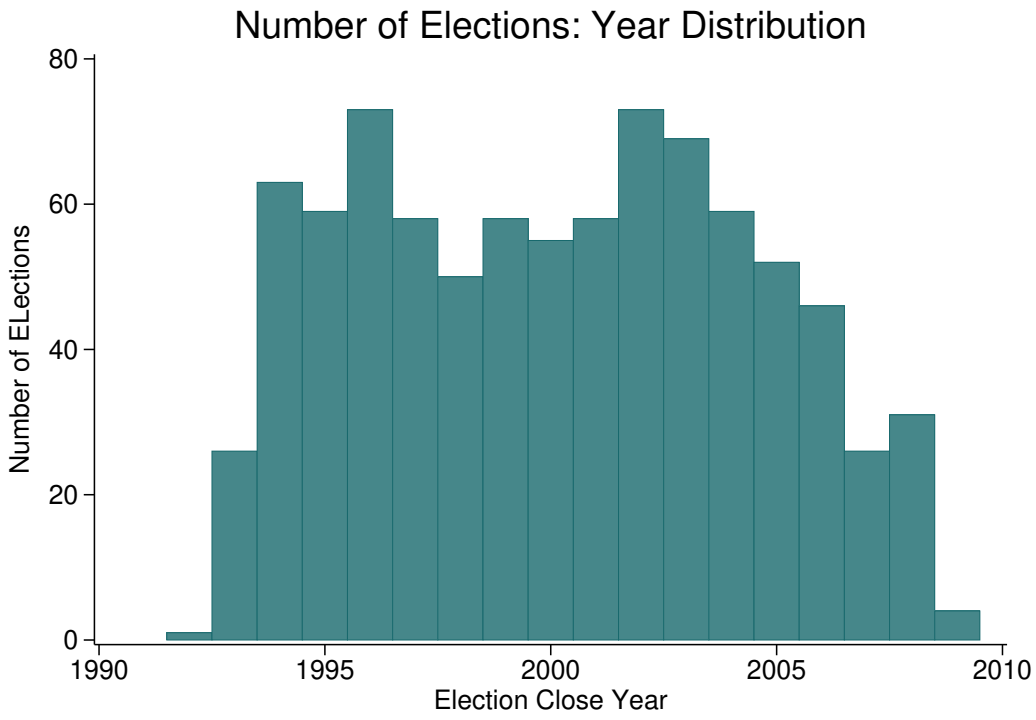
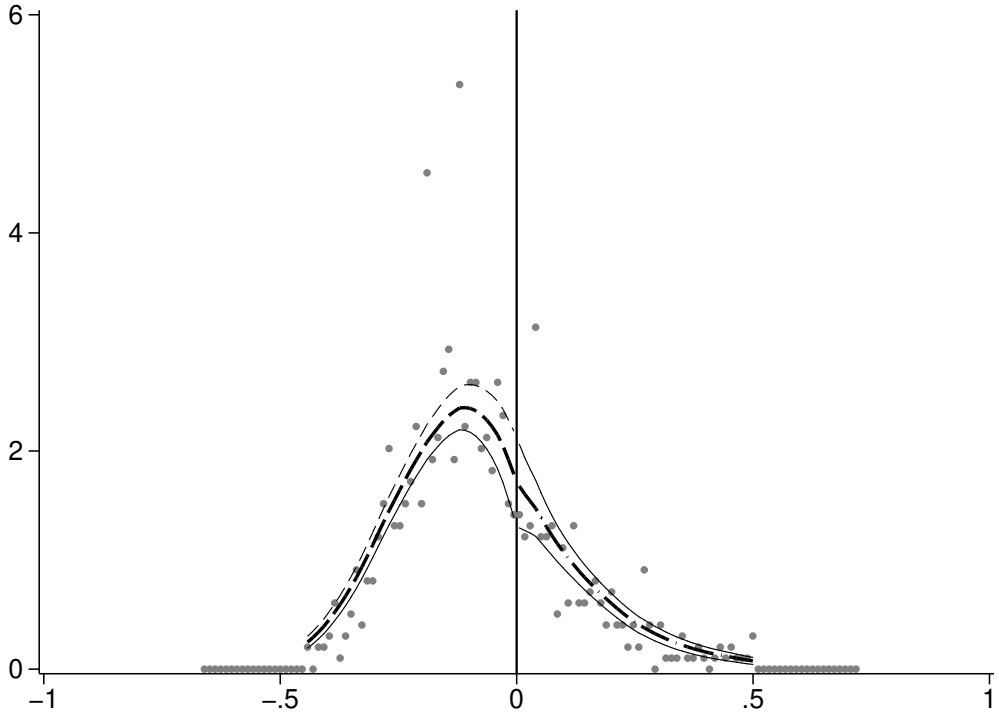


Figure 2: Vote Share Manipulation Tests

This figure reports the vote share density test results in McCrary (2008) using a triangular kernel with a bandwidth of 0.217. The $x$-axis is the vote share for unions, and the solid line is the fitted density with a 95% confidence interval around it. The discontinuity estimate is -0.001, and the corresponding standard error is 0.173.




McCrary's Formal Test

Figure 3: Graphical Analysis: Change in Book Leverage Ratio

This figure reports regression discontinuity plots and shows the relation between change in leverage ratio and vote share for unions non-parametrically. The change in leverage ratio is defined as the difference between the average book leverage ratio three years after an election and the value one year before the election. In the plot, I use the optimal bandwidths in the estimations, and each dot represents the average of debt structure adjustment in a 2% bin. The dots are fitted using a linear line on each side of the 50% cutoff. The shaded area in each plot represents the 95% confidence interval.

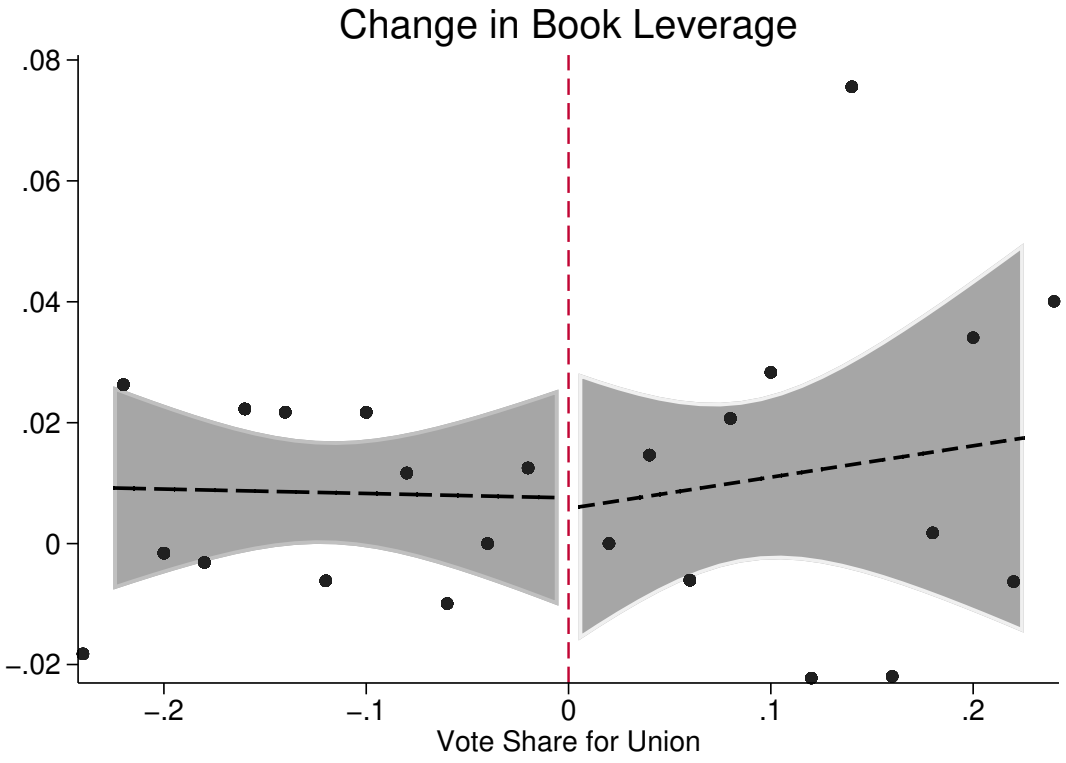


Figure 4: Graphical Analysis: Changes in Debt Structure Measures

This figure reports regression discontinuity plots and shows the relation between the changes in debt structure measures and vote share for unions non-parametrically. The change in a debt structure measure is defined as the difference between the average of the debt structure measure three years after an election and the value one year before the election. The left and right plots present the results for public and bank debt, respectively. In each plot, I use the optimal bandwidths in the estimations, and each dot represents the average of debt structure adjustment in a 2% bin. The dots are fitted using a linear line on each side of the 50% cutoff. The shaded area in each plot represents the 95% confidence interval.

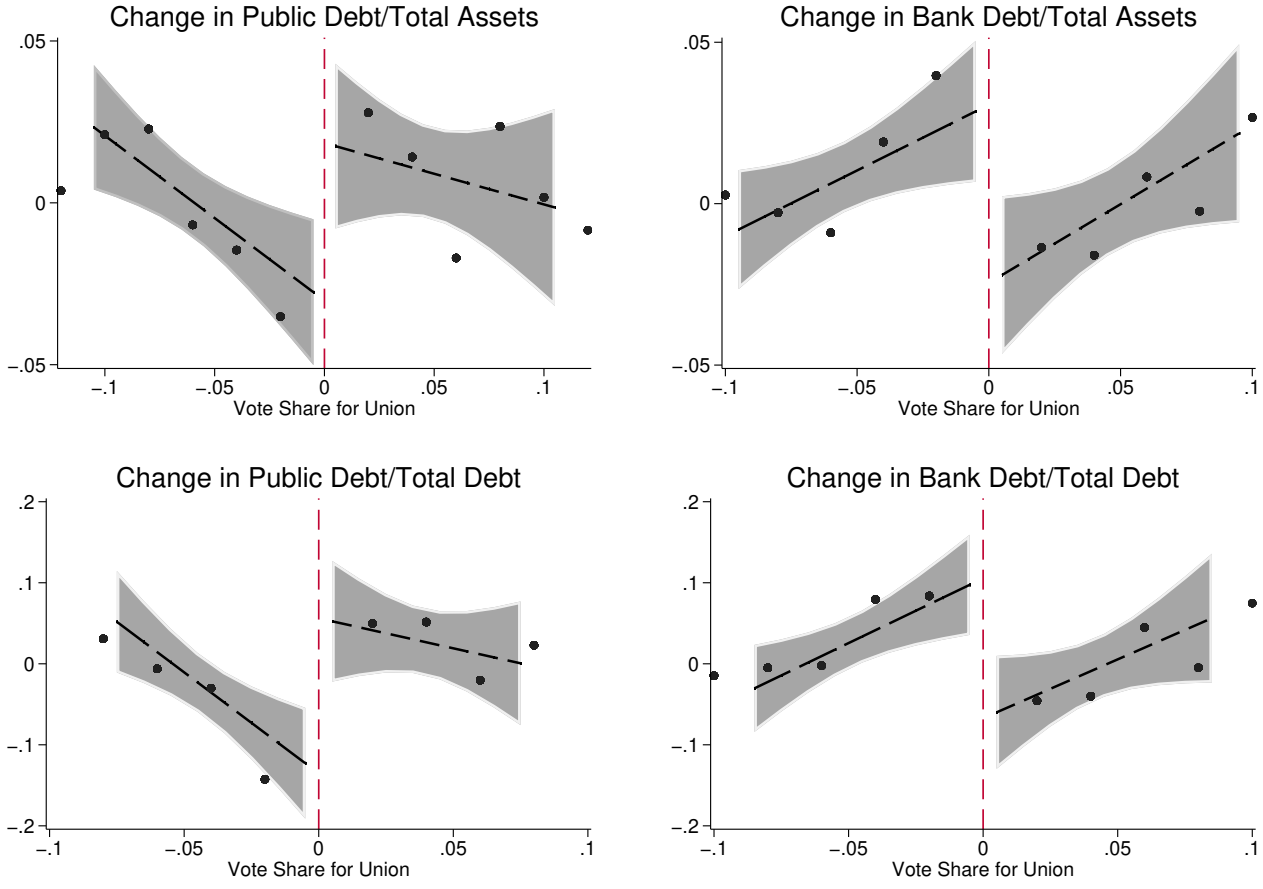


Table 1: **Summary Statistics**

This table reports the summary statistics of data in the sample. The variable definitions are in Appendix A.4. Panel A reports the summary statistics for debt structure measures based on balance sheets and new debt issuance. The balance sheet data are from one fiscal year before to three fiscal years after each labor union election, and the new issuance data are from the three years after each labor union election. Panel B reports the statistics for labor union election data. Panel C reports the distribution of the number and passage rate of elections by NAICS Sector.

**Panel A: Debt Structure**

| | N | Mean | Std. Dev. | Median |
|---|---|---|---|---|
| **Balance Sheet** | | | | |
| Public Debt/Total Assets | 861 | 0.216 | 0.136 | 0.209 |
| Public Debt/Total Debt | 861 | 0.681 | 0.318 | 0.792 |
| Bank Debt/Total Assets | 861 | 0.072 | 0.099 | 0.019 |
| Bank Debt/Total Debt | 861 | 0.228 | 0.297 | 0.077 |
| **New Issuance** | | | | |
| Public Issuance Prob. | 861 | 0.502 | 0.500 | 1.000 |
| Private Issuance Prob. | 861 | 0.079 | 0.270 | 0.000 |
| Bank Issuance Prob. | 861 | 0.803 | 0.398 | 1.000 |
| **Syndication Structure** | | | | |
| SyndSize1 | 1269 | 7.680 | 6.841 | 6.000 |
| SyndSize2 | 1259 | 7.788 | 7.094 | 6.000 |
| Creditor Ownership Concentration | 525 | 0.259 | 0.286 | 0.125 |

**Panel B: Election Statistics**

| | N | Mean | Std.Dev. | Median |
|---|---|---|---|---|
| Vote Shares for Unions | 861 | 0.424 | 0.168 | 0.405 |
| WIN | 861 | 0.281 | 0.450 | 0.000 |

**Panel C: Election Industry Distribution**

| NAICS Sector | # of Elections | Passage Rate |
|---|---|---|
| 11 | 1 | 0.00% |
| 21 | 10 | 10.00% |
| 23 | 11 | 18.18% |
| 31-33 | 471 | 26.11% |
| 42 | 58 | 18.97% |
| 44-45 | 59 | 18.64% |
| 48-49 | 75 | 25.33% |
| 51 | 34 | 23.53% |
| 54 | 6 | 50.00% |
| 55 | 1 | 100.00% |
| 56 | 43 | 44.19% |
| 62 | 50 | 60.00% |
| 71 | 9 | 55.56% |
| 72 | 17 | 29.41% |
| 81 | 15 | 26.67% |
| 92 | 1 | 0.00% |

Table 2: **Tests of Discontinuities in the Trends of Pre-election Firm Characteristics**

This table reports the results of tests for the null hypothesis that there is no systematic difference in the trends of pre-election firm characteristics. For union certification elections in year $T$, I report the results on the trends of firm characteristics between year *T-2* and year *T-1* between firms in which unions barely win and lose elections. I implement a regression discontinuity estimation with a rectangular kernel and the optimal bandwidth for each firm characteristic, including debt structure measures, the natural logarithm of total assets (*Firm Size*), book leverage (*BookLev*), market-to-book ratio (*MTB*), tangibility, profits, modified $Z$-score, and cash holding. All results are estimated using local linear regressions with the optimal bandwidths and rectangular kernels. Standard errors are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

| Variables: | Coeffient | T-stat Value |
|---|---|---|
| **Outcome Variables** | | |
| ΔPublic Debt/Total Assets | 0.010 | 0.705 |
| ΔPublic Debt/Total Debt | 0.039 | 1.144 |
| ΔBank Debt/Total Assets | -0.010 | -0.745 |
| ΔBank Debt/Total Debt | -0.039 | -1.099 |
| **Other Firm Characteristics** | | |
| ΔFirm Size | 0.002 | 0.053 |
| ΔBookLev | -0.007 | -0.728 |
| ΔMTB | -0.054 | -1.360 |
| ΔTangibility | -0.001 | -0.195 |
| ΔProfits | -0.001 | -0.227 |
| ΔModified $Z$-score | 0.020 | 0.262 |
| ΔCash Holding | 0.006 | 0.997 |

Table 3: **Do Firms Adjust the Debt Level as a Response to Union Certification?**

This table reports the adjustment of the book leverage ratio to union certification. Book leverage is defined as the ratio of total debt to the book value of total assets. The dependent variable is the difference between the average book leverage ratio three years after an election and the value one year before the election ($\Delta$*Book Leverage*). All results are estimated using local linear regressions with the rectangular kernel. Column (1) reports the result using the optimal bandwidth. Columns (2)-(4) report results using bandwidths of 5%, 10%, and 15%, respectively. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

| | $\Delta$Book Leverage | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| WIN | -0.002 | -0.002 | -0.007 | -0.004 |
| | [0.015] | [0.033] | [0.024] | [0.020] |
| Bandwidth | 0.232 | 0.050 | 0.100 | 0.150 |
| N | 672 | 148 | 312 | 466 |

Table 4: **Do Firms Adjust Debt Structure as a Response to Union Certification?**

This table presents the adjustment of debt structure measures to union certification. Four measures of debt structure are used: the balance of public or bank debt scaled by the book value of total assets or total debt. The dependent variable in column (1) is the difference between the average ratio of the balance of public debt to total assets in the following three years after an election and the value one year before the election ($\Delta$*Public Debt/Total Assets*). The dependent variable in column (2) is the difference between the average ratio of the balance of public debt to total debt in the following three years after an election and the value one year before the election ($\Delta$*Public Debt/Total Debt*). The dependent variable in column (3) is the difference between the average ratio of the balance of bank debt to total assets in the following three years after an election and the value one year before the election ($\Delta$*Bank Debt/Total Assets*). The dependent variable in column (4) is the difference between the average ratio of the balance of bank debt to total debt in the following three years after an election and the value one year before the election ($\Delta$*Bank Debt/Total Debt*). All results are estimated using local linear regressions with the optimal bandwidths and rectangular kernels. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

| | ΔPublic Debt/Total Assets | ΔPublic Debt/Total Debt | ΔBank Debt/Total Assets | ΔBank Debt/Total Debt |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| WIN | 0.049*** | 0.191*** | -0.055*** | -0.173*** |
| | [0.018] | [0.061] | [0.020] | [0.054] |
| Bandwidth | 0.106 | 0.084 | 0.099 | 0.089 |
| N | 340 | 312 | 312 | 275 |

Table 5: **Cross-Sectional Heterogeneities**

This table reports heterogeneous effects of union certification on debt structure adjustment. Panel A reports results conditional on whether the state of an election has adopted the right-to-work (RTW) laws at the time of the election. Columns (1) and (2) report results for elections held in Non-RTW states. Columns (3) and (4) report results for elections held in RTW states. Panel B reports results conditional on a firm's profits one year before union elections. A firm's profits are measured as operating income before depreciation and amortization scaled by sales (Compustat item OIBDP/Compustat item SALE). A firm is defined to have high (low) profits if the firm's profits fall in the top (bottom) tercile of the sample one fiscal year before an election. Columns (1) and (2) report results for firms with low profits. Columns (3) and (4) report results for firms with high profits. Panel C reports results conditional on unions' expected bankruptcy costs. Unions' expected bankruptcy costs are proxied by a firm's underfunding status of defined benefit (DB) pension plans. Data on pension plans come from the Compustat Pension Annual Database. DB pension plan deficit is the difference between the projected benefit obligations and the fair value of pension assets. Unions are defined to have high (low) expected bankruptcy costs if a firm's DB pension plans are (not) underfunded one fiscal year before an election. Columns (1) and (2) report results for firms in which unions are expected to bear high bankruptcy costs. Columns (3) and (4) report results for firms in which unions are expected to bear low bankruptcy costs. Panel D reports results conditional on a firm's financial constraints one year before union elections. A firm's financial constraints are measured by the Whited-Wu index in Whited and Wu (2006) A firm is defined to be financially constrained (unconstrained) if the firm's Whited-Wu index falls in the top (bottom) tercile of the sample one fiscal year before an election. Columns (1) and (2) report results for financially constrained firms. Columns (3) and (4) report results for financially unconstrained firms. In each panel, the dependent variable in columns (1) and (3) is the difference between the average ratio of the balance of public debt to total assets in the following three years after an election and the value one year before the election ($\Delta$*Public Debt/Total Assets*). The dependent variable in columns (2) and (4) is the difference between the average ratio of the balance of bank debt to total assets in the following three years after an election and the value one year before the election ($\Delta$*Bank Debt/Total Assets*). All results are estimated using local linear regressions with optimal bandwidths and rectangular kernels. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

**Panel A: RTW Adoption**

| | Non-RTW | | RTW | |
|---|---|---|---|---|
| | $\Delta$Public Debt/Total Assets | $\Delta$Bank Debt/Total Assets | $\Delta$Public Debt/Total Assets | $\Delta$Bank Debt/Total Assets |
| | (1) | (2) | (3) | (4) |
| WIN | 0.074*** | -0.063** | -0.006 | -0.024 |
| | [0.021] | [0.027] | [0.032] | [0.026] |
| Bandwidth | 0.102 | 0.096 | 0.145 | 0.141 |
| N | 216 | 216 | 134 | 134 |

**Panel B: Profitability**

| | Low | | High | |
|---|---|---|---|---|
| | $\Delta$Public Debt/Total Assets | $\Delta$Bank Debt/Total Assets | $\Delta$Public Debt/Total Assets | $\Delta$Bank Debt/Total Assets |
| | (1) | (2) | (3) | (4) |
| WIN | 0.076*** | -0.135*** | -0.033 | -0.010 |
| | [0.029] | [0.037] | [0.030] | [0.027] |
| Bandwidth | 0.122 | 0.083 | 0.131 | 0.112 |
| N | 110 | 74 | 137 | 113 |

| Panel C: Unions' Expected Bankruptcy Costs | | | | |
|---|---|---|---|---|
| | High | | Low | |
| | ΔPublic Debt/Total Assets | ΔBank Debt/Total Assets | ΔPublic Debt/Total Assets | ΔBank Debt/Total Assets |
| | (1) | (2) | (3) | (4) |
| WIN | 0.122*** | -0.108*** | -0.007 | -0.023 |
| | [0.039] | [0.033] | [0.019] | [0.019] |
| Bandwidth | 0.069 | 0.065 | 0.289 | 0.259 |
| N | 93 | 93 | 274 | 257 |
| **Panel D: Financial Constraints** | | | | |
| | Constrained | | Unconstrained | |
| | ΔPublic Debt/Total Assets | ΔBank Debt/Total Assets | ΔPublic Debt/Total Assets | ΔBank Debt/Total Assets |
| | (1) | (2) | (3) | (4) |
| WIN | 0.080*** | -0.085** | -0.018 | 0.022 |
| | [0.028] | [0.033] | [0.032] | [0.023] |
| Bandwidth | 0.118 | 0.102 | 0.129 | 0.112 |
| N | 124 | 106 | 128 | 108 |

Table 6: **Do Firms Issue More Public Debt?**

This table reports results using new issuance data. Columns (1), (2), and (3) report results for public debt, private placement, and bank debt, respectively. For each type of debt, the dependent variable is issuance probability in the following three years after union elections. Public debt includes both public corporate bond and Rule 144-A private placements. Private placement includes non-Rule 144-A private placements. All results are estimated using local linear regressions with optimal bandwidths and rectangular kernels. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

| | Public Debt | Private Placement | Bank Debt |
|---|---|---|---|
| | (1) | (2) | (3) |
| WIN | 0.296** | -0.057 | 0.081 |
| | [0.129] | [0.050] | [0.081] |
| Bandwidth | 0.078 | 0.146 | 0.143 |
| N | 244 | 466 | 431 |

Table 7: **Does Union Certification Affect Bank Loan Syndication Structure?**

This table reports the effect of union certification on the syndication structure of newly issued bank loans within 36 months after union certification. *Log(Syndsize1)* is the natural logarithm of the average syndication size defined at the loan tranche level. *Log(Syndsize2)* is the natural logarithm of average syndication size defined at the loan deal level. *Log(HHI)* is the natural logarithm of the Herfindahl-Hirschman index (HHI) of creditor ownership, which is defined as the sum of the square of each creditor's ownership in each loan tranche. *Log(Amt)* is the natural logarithm of the average loan amount. All results are estimated using local linear regressions with the optimal bandwidths and rectangular kernels. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

| | Log(Syndsize1) | Log(Syndsize2) | Log(HHI) | Log(Amt) |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| WIN | 0.347** | 0.302* | -0.502** | 0.098 |
| | [0.174] | [0.177] | [0.246] | [0.239] |
| Bandwidth | 0.131 | 0.128 | 0.170 | 0.144 |
| N | 566 | 562 | 322 | 607 |

Table 8: **Does Union Certification Affect Debt Maturity?**

This table reports the effects of union certification on changes in debt maturity. A change in a measure of debt maturity is defined as the difference between its average value in the following three years after an election and the value one year before the election. Four measures of debt maturity are used. In column (1), the dependent variable is the change in the ratio of the value of debt maturing more than three years to total assets ($\Delta$*LTD3/Total Assets*). In column (2), the dependent variable is the change in the ratio of the value of debt maturing more than five years to total assets ($\Delta$*LTD5/Total Assets*). In column (3), the dependent variable is the change in the ratio of the value of debt maturing more than three years to total debt ($\Delta$*LTD3/Total Debt*). In column (4), the dependent variable is the change in the ratio of the value of debt maturing more than five years to total debt ($\Delta$*LTD5/Total Debt*). All results are estimated using local linear regressions with the optimal bandwidths and rectangular kernels. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

| | $\Delta$LTD3/Total Assets | $\Delta$LTD5/Total Assets | $\Delta$LTD3/Total Debt | $\Delta$LTD5/Total Debt |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| WIN | 0.009 | -0.022 | 0.034 | -0.060 |
| | [0.020] | [0.015] | [0.050] | [0.039] |
| Bandwidth | 0.116 | 0.173 | 0.102 | 0.169 |
| N | 323 | 446 | 273 | 446 |

Table 9: **Does Union Certification Affect Other Firm Characteristics?**

This table reports the effects of union certification on changes in firm characteristics that are important for debt structure choice. A change in a firm characteristic is defined as the difference between its average value in the following three years after an election and the value one year before the election. The definition of each firm characteristic is available in Appendix A.4. All results are estimated using local linear regressions with the optimal bandwidths and rectangular kernels. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

| | ΔFirm Size | ΔMTB | ΔTangibility | ΔR&D | ΔCapex | ΔProfits | ΔTFP | ΔModified $Z$-score | ΔCredit Rating | ΔBid-Ask Spread |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| WIN | -0.038 | -0.075 | -0.012 | 0.000 | 0.000 | -0.003 | -0.016 | -0.056 | -0.412 | 0.002 |
| | [0.080] | [0.066] | [0.012] | [0.001] | [0.006] | [0.010] | [0.048] | [0.117] | [0.733] | [0.006] |
| Bandwidth | 0.104 | 0.181 | 0.136 | 0.131 | 0.188 | 0.104 | 0.099 | 0.136 | 0.135 | 0.156 |
| N | 312 | 526 | 429 | 404 | 564 | 311 | 254 | 410 | 419 | 481 |

Table 10: **Does the Interest Alignment between Labor and Management Matter?**

This table reports the effects of union certification on debt structure adjustment conditional on pre-election interest alignment between labor and management. The interest alignment is measured by the fraction of a firm's equity value held by employees through defined contribution (DC) pension assets (DC pension ownership). Columns (1) and (2) report results for firms with low pre-election DC pension ownership. Columns (3) and (4) report results for firms with high pre-election DC pension ownership. The dependent variable in columns (1) and (3) is the difference between the average ratio of the balance of public debt to total assets in the following three years after an election and the value one year before the election ($\Delta$*Public Debt/Total Assets*). The dependent variable in columns (2) and (4) is the difference between the average ratio of the balance of bank debt to total assets in the following three years after an election and the value one year before the election ($\Delta$*Bank Debt/Total Assets*). All results are estimated using local linear regressions with optimal bandwidths and rectangular kernels. Standard errors are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

| | Low | | High | |
|---|---|---|---|---|
| | ΔPublic Debt/Total Assets | ΔBank Debt/Total Assets | ΔPublic Debt/Total Assets | ΔBank Debt/Total Assets |
| | (1) | (2) | (3) | (4) |
| WIN | 0.079** | -0.126*** | -0.013 | -0.029 |
| | [0.035] | [0.046] | [0.027] | [0.037] |
| Bandwidth | 0.119 | 0.095 | 0.305 | 0.108 |
| N | 71 | 46 | 154 | 57 |

# Appendix

## A.1 Data Assembly

In order to merge labor union election data with firm-level data, I match employers' names in the NLRB data with historical stock names (DSENAME file in CRSP) and Compustat firm names.[21] I refer to the file containing historical stock names and Compustat firm names as the standard firm name file. Three steps are involved in the name-matching process:

1. I follow Lee and Mas (2012) and use a SAS algorithm to perform a fuzzy name matching between the employers' names in the NLRB labor union election data and the standard firm name file.

2. I manually check each match to verify whether it is correct after the fuzzy matching. When one firm in the NLRB data cannot be matched with any name in the standard firm name file, I use the LexisNexis Corporate Affiliation Database and Bloomberg Businessweek to check whether this firm is a subsidiary of another firm in the standard firm name file. This step generates the NLRB-CRSP-COMPUSTAT merged data. I obtain GVKEY and CIK as identifiers for each matched election.

3. I use information on CIK to hand-collect the firm's debt structure information from a firm's 10-Ks' "Notes to Financial Statements" section in the EDGAR database for each election in NLRB-CRSP-COMPUSTAT. The debt structure information is collected from one fiscal year before an election to three fiscal years after the election.

[21] I also match Compustat firm names to increase the sample size, since some firms covered in Compustat are not covered in CRSP. If a firm in Compustat changed its name after the union election, then the name of the firm where the election was held is possibly not matched to a Compustat firm name.

In the database, there are multiple elections within some plants. For purely duplicative records, I simply drop the duplicative observations. For the cases in which there are multiple elections simultaneously held in the same establishment because of multiple bargaining units or unions, I retain the election with the largest vote share, as in Frandsen (2014). Because labor union elections are conducted at the plant level, it is possible to have multiple elections in one year within the same firm. For each firm-year observation, I keep the election with the largest number of eligible voters, since such elections are possibly most important for corporate decisions. Moreover, for each election I also require that debt structure information is available one year before and at least one year after the election in the following three years. Finally, the final main sample used in this paper spans from 1992 to 2009 and includes 861 elections involving 436 unique firms.

Furthermore, following similar procedures, I also manually match labor union election data with DealScan by firm names in order to examine the effects of union certification on loan issuance behavior.

## A.2 Institutional Background of Labor Union Elections

The following steps describe the NLRB labor union election process. The steps are largely adapted from the description on the NLRB website.[22]

1. A group of employees file a petition with the nearest NLRB Regional Office. The portion of employees who show interest in labor unions must be at least 30%. The agents will investigate whether the Board has jurisdiction, the union is qualified, and

[22]National Labor Relations Board, `http://www.nlrb.gov/what-we-do/conduct-elections`.

there is any wage contract in place.

2. Agents will seek an agreement between the employer and union about the conditions of elections. If an agreement is reached, then the parties will authorize the regional director to conduct an election. If no agreement is reached, the regional director will set election conditions and order an election.

3. An election is typically held within 30 days of a director's authorization or order. The outcomes of representation and decertification elections are determined by a majority of votes cast. Objections may be filed with the appropriate regional director by any party within seven days of the vote count. The outcome of an election will be set aside if conduct by either the employer or union interfered with employees' freedom of choice.

4. When a union is in place, another union could file an election petition as long as the labor contract has expired or is about to expire and 30% of employees show interest in the competing union. This typically leads to a three-way election, with the choices being the incumbent, the challenging one, and none.

5. If no objection is raised by either party, the union that receives the majority of the votes cast is certificated as the bargaining representative. The employer recognizes this union as the exclusive bargaining agent for employees in that unit.

Employees can use a second approach to choose a representative. They can persuade the employer to voluntarily recognize a union if they can show that majority support for the union is present among employees. These agreements are made out of the NLRB process.

DiNardo and Lee (2004) also show that there is no single path to union representation.

## A.3 Appendix Figures and Tables

Figure A.1: Local Linear RD Estimations with Varying Bandwidths

This figure reports the robustness of the main results to alternative choices of bandwidths. All results are estimated using local linear regressions with rectangular kernels. The $x$-axis represents the bandwidths varying from 0.01 to 0.5. The plots on the left- and right-hand sides represent results for public and bank debt, respectively. The solid line represents the local linear estimations, and dotted lines represent the 95% confidence intervals. The vertical line in each plot represents the estimated results with the optimal bandwidths in Imbens and Kalyanaraman (2012). *Public Debt/Total Assets* and *Bank Debt/Total Assets* are the ratios of public and bank debt to book value of total assets, respectively. *Public Debt/Total Debt* and *Bank Debt/Total Debt* are the ratios of public and bank debt to total debt, respectively.

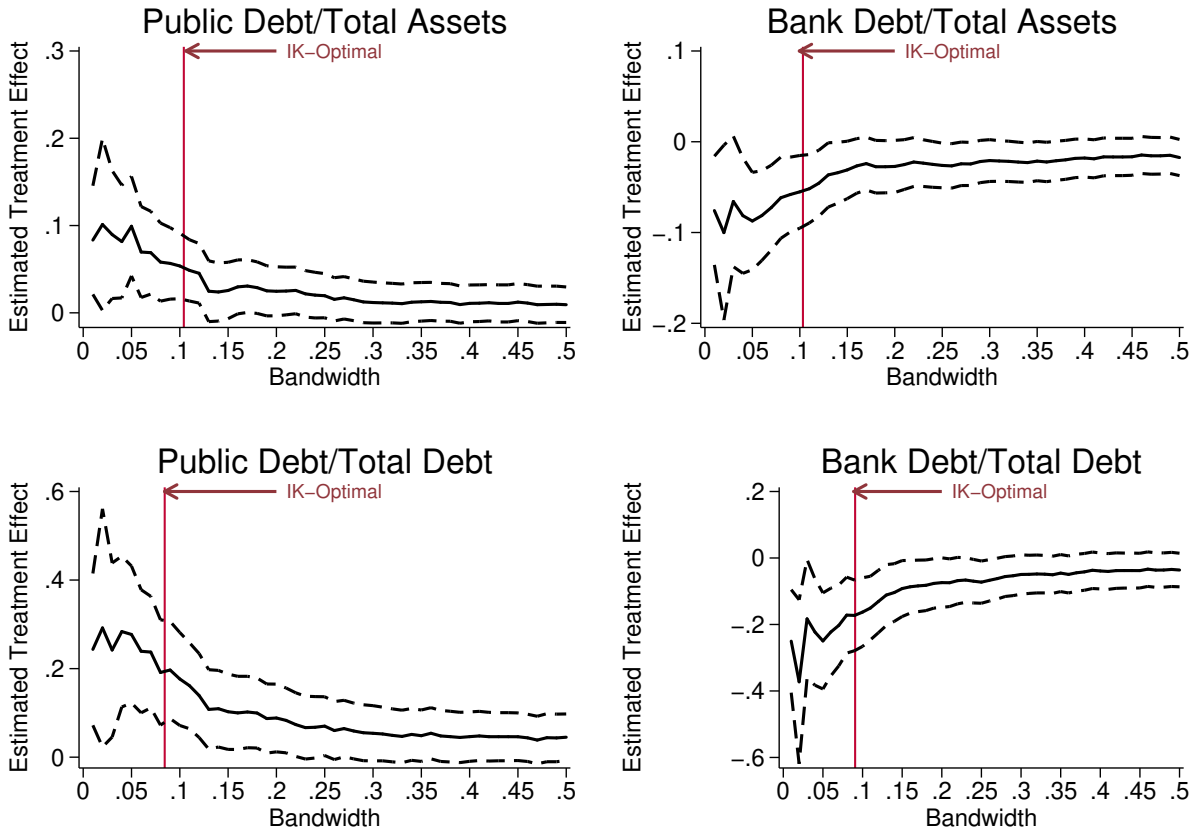


Figure A.2: Placebo Effects of Union Certification on Debt Structure Adjustment

This figure reports the results of placebo tests. The placebo tests are implemented as follows. I first randomly choose a number other than 50% between 0.3 and 0.7 as the artificial winning threshold and then estimate the effect of union certification on debt structure adjustment as for Table 4. The results are estimated using local linear regressions with the optimal bandwidths and rectangular kernels. This exercise is repeated 5,000 times, and the histograms of the estimation results are reported. The vertical lines represent the estimated results presented in Table 4 when the winning threshold is 50%. *Public Debt/Total Assets* and *Bank Debt/Total Assets* are the ratios of public and bank debt to book value of total assets, respectively. *Public Debt/Total Debt* and *Bank Debt/Total Debt* are the ratios of public and bank debt to total debt, respectively.

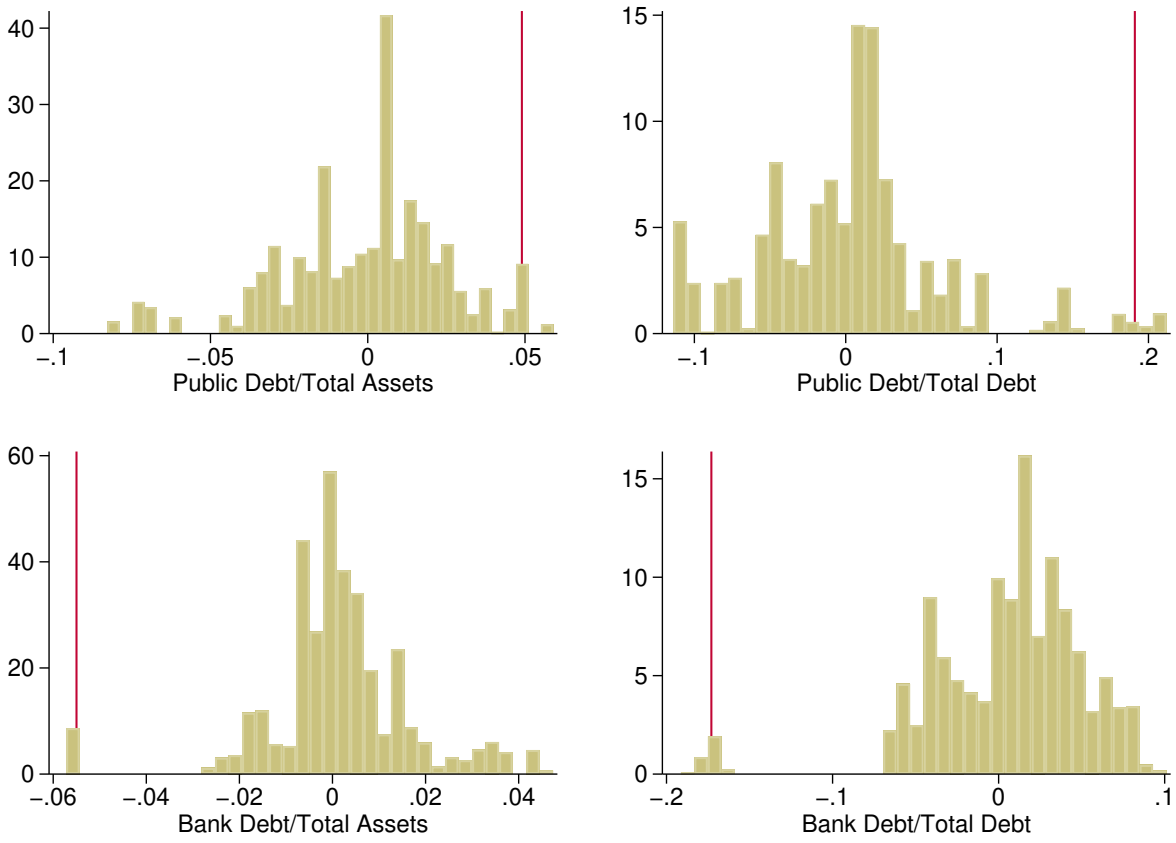


Table A.1: **Creditor Dispersion and Duration of Debt Contract Renegotiations**

This table reports the relation between the number of creditors in a loan tranche and the duration of debt contract renegotiations. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

| Dependent Variable: | **Log(Duration of Debt Contract Renegotiations)** |
|---|---|
| # of Creditors | 0.008*** |
| | [0.003] |
| Log(Assets) | 0.079 |
| | [0.057] |
| Leverage | -0.601** |
| | [0.288] |
| Profits | 0.406 |
| | [1.223] |
| Tangibility | -0.034 |
| | [0.273] |
| Capex | -0.976 |
| | [0.678] |
| Market to Book | 0.011 |
| | [0.073] |
| Stock Return Volatility | -6.005 |
| | [4.859] |
| Log(Maturity) | 0.140 |
| | [0.101] |
| Log(Amount) | -0.060 |
| | [0.061] |
| Loan Type & Purpose FEs | Y |
| Adj. $R^2$ | 0.091 |
| N | 387 |

Table A.2: **Tests of Discontinuities in the Levels of Preelection Firm Characteristics**

This table reports the results of tests for the null hypothesis that there is no systematic difference in the levels of preelection in firm characteristics one year before union certification elections in year $T$ between firms in which unions barely win and lose elections. I implement a regression discontinuity estimation with a rectangular kernel and the optimal bandwidth for each firm characteristic, including debt structure measures, the natural logarithm of total assets (*Firm Size*), book leverage (*BookLev*), market-to-book ratio (*MTB*), tangibility, profits, modified $Z$-score, and cash holding. All results are estimated using local linear regressions with the optimal bandwidths and rectangular kernels. Standard errors are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

| Variables: | Coeffient | T-stat Value |
|---|---|---|
| **Outcome Variables** | | |
| Public Debt/Total Assets | 0.003 | 0.111 |
| Public Debt/Total Debt | 0.035 | 1.605 |
| Bank Debt/Total Assets | -0.098 | -1.371 |
| Bank Debt/Total Debt | 0.106 | 1.567 |
| **Other Firm Characteristics** | | |
| Firm Size | 0.407 | 1.445 |
| BookLev | 0.014 | 0.464 |
| MTB | -0.112 | -1.221 |
| Tangibility | 0.050 | 1.410 |
| Profits | -0.009 | -0.834 |
| Modified $Z$-score | -0.011 | -0.055 |
| Cash Holding | -0.012 | -1.630 |

Table A.3: **Robustness Checks**

This table reports robustness check results for the main results in Table 4. Panels A and B report results for public and bank debt, respectively. The dependent variable in Panel A is the change in the ratio of public debt balance to the book value of total assets. The dependent variable in Panel B is the change in the ratio of bank debt balance to the book value of total assets. Column (1) of each panel reports the result estimated based on the bandwidth of 5% and rectangular kernel. Column (2) of each panel reports the result estimated based on the bandwidth of 10% and rectangular kernel. Column (3) of each panel reports the result estimated based on the optimal bandwidth and triangular kernel. Column (4) of each panel reports the result using the first election in each firm and the election close year, based on the optimal bandwidth and rectangular kernel. All results are estimated using local linear regressions. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

| **Panel A: ΔPublic Debt/Total Assets** | | | | |
|---|---|---|---|---|
| | 5% Bandwidth | 10% Bandwidth | Triangular Kernel | First Election |
| | (1) | (2) | (3) | (4) |
| WIN | 0.099*** | 0.054*** | 0.050*** | 0.039** |
| | [0.029] | [0.019] | [0.019] | [0.017] |
| Kernel | Rectangular | Rectangular | Triangular | Rectangular |
| Bandwidth | 0.05 | 0.10 | 0.135 | 0.116 |
| N | 148 | 312 | 431 | 362 |
| **Panel B: ΔBank Debt/Total Assets** | | | | |
| | 5% Bandwidth | 10% Bandwidth | Triangular Kernel | First Election |
| | (1) | (2) | (3) | (4) |
| WIN | -0.087*** | -0.055*** | -0.057*** | -0.054*** |
| | [0.027] | [0.020] | [0.020] | [0.019] |
| Kernel | Rectangular | Rectangular | Triangular | Rectangular |
| Bandwidth | 0.05 | 0.10 | 0.127 | 0.107 |
| N | 148 | 312 | 406 | 336 |

## A.4 Data Sources and Variable Definitions

The labor union election data are from the Thomas J. Holmes website and the NLRB website. The debt structure data come from a hand-collected data set from the section "Notes to Financial Statement" in 10-Ks. The bond and bank loan new issuance data are from SDC Platinum and LPC DealScan database, respectively. The accounting data are from Compustat. Debt structure and Compustat variables are winsorized at the 5% level on each tail. Item names refer to Compustat annual data items.

| Variable | Definition |
|---|---|
| **Labor Union Election Data** | |
| WIN | A dummy variable equal to one if a majority of employees vote for unions in an election and zero otherwise. Source: Thomas J. Holmes website and NLRB website. |
| Vote Share | The portion of votes for unions over total valid votes in an election. Sources: Thomas J. Holmes website and NLRB website. |
| **Debt Structure Balance Sheet Data** | |
| Public/Total Assets | Outstanding balance of public debt scaled by the book value of total assets. Sources: A hand-collected data set and Compustat. |
| Public/Total Debt | Outstanding balance of public debt scaled by the outstanding balance of the total debt. Sources: A hand-collected data set and Compustat. |
| Bank/Total Assets | Outstanding balance of bank debt scaled by the book value of total assets. Sources: A hand-collected data set and Compustat. |
| Bank/Total Debt | Outstanding balance of bank debt scaled by the outstanding balance of the total debt. Sources: A hand-collected data set and Compustat. |
| **Debt Structure New Issuance Data** | |
| Public Issuance Prob. | A dummy variable equal to one if a firm issues public debt in the following three years after each labor union election and zero otherwise. Sources: NLRB and SDC. |
| Private Issuance Prob. | A dummy variable equal to one if a firm issues non-Rule 144-A private placements in the following three years after each labor union election and zero otherwise. Sources: NLRB and SDC. |
| Bank Issuance Prob. | A dummy variable equal to one if a firm issues bank debt in the following three years after each labor union election and zero otherwise. Sources: NLRB and SDC. |
| SyndSize1 | Number of creditors defined at loan tranche level. Source: DealScan. |
| SyndSize2 | Number of creditors defined at loan deal level. Source: DealScan. |
| Creditor Ownership Concentration | HHI of creditor ownership in a bank loan tranche. Source: DealScan. |

| Variable | Definition |
|---|---|
| **Firm Characteristics** | |
| Firm Size | The natural logarithm of Item AT (in 2010 dollars). Source: Compustat. |
| Total Debt | Item DLTT+ Item DLC. Source: Compustat. |
| Book Leverage | (Item DLTT+ Item DLC)/Item AT. Source: Compustat. |
| LTD3/Total Assets | (Item DLTT-Item DD2-Item DD3)/Item AT. Source: Compustat. |
| LTD5/Total Assets | (Item DLTT-Item DD2-Item DD3-Item DD4-Item DD5)/Item AT. Source: Compustat. |
| LTD3/Total Debt | (Item DLTT-Item DD2-Item DD3)/(Item DLC+Item DLTT). Source: Compustat. |
| LTD5/Total Debt | (Item DLTT-Item DD2-Item DD3-Item DD4-Item DD5)/(Item DLC+Item DLTT). Source: Compustat. |
| Market-to-Book | (Item PRCC_F×Item CSHO+Item DLTT + Item DLC+Item PSTKL-Item TXDITC) / Item AT. Source: Compustat. |
| Tangibility | Item PPENT/Item AT. Source: Compustat. |
| Profits | Item OIBDP/Item SALE. Source: Compustat. |
| Cash Holding | Item CHE/Item AT. Source: Compustat. |
| TFP | Firm-level total factor productivity. Source: Selale Tuzel's webpage avaialble at `http://www-bcf.usc.edu/~tuzel/`. |
| R&D | Item XRD/Item SALE. Missing values in Item XRD are replaced with zero. Source: Compustat. |
| Capex | Item CAPX/Item AT. Source: Compustat. |
| Modified $Z$-score | 3.3×(Item IB+Item TXT+Item XINT)/Item AT+1.4×Item RE/Item AT+Item SALE/Item AT+1.2×(Item ACT-Item LCT)/Item AT. Source: Compustat. |
| Credit Rating | Each S&P long-term debt rating is assigned to a numerical number. 1 for "AAA", 2 for "AA+", 3 for "AA", ...Source: Compustat. |
| Bid-Ask Spread | The median monthly bid-ask spread deflated by the stock price at the end of a fiscal year. When bid-ask spread is missing, the value is replaced by the difference between closing ask and closing bid. Source: CRSP. |
| **Other Data** | |
| Underfunding status of DB Pension Plan | A dummy variable equal to one if Item PPLAO is less than or equal to Item PBPRO and zero otherwise. Source: Compustat Pension Annual. |
| DC Pension Ownership | Fraction of a firm's equity value held by employees through DC pension assets. EOYSTOCK/(Item PRCC_F*Item CSHO*$10^6$). Sources: IRS 5500 Form and Compustat. |

## About ECGI

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