

Hard Marriage with Heavy Burdens: Labor Unions as Takeover Deterrents

Xuan Tian

Kelley School of Business
Indiana University
tianx@indiana.edu
(812) 855-3420

Wenyu Wang

Kelley School of Business
Indiana University
wenywang@indiana.edu
(812) 855-0189

This version: March, 2014

* We remain responsible for any errors or omissions.

Hard Marriage with Heavy Burdens: Labor Unions as Takeover Deterrents

Abstract

We examine the causal effect of unionization on a firm's takeover exposure. To establish causality, we use a regression discontinuity design that relies on "locally" exogenous variation generated by elections that pass or fail by a small margin of votes. Barely passing a union election leads to a significant reduction in a firm's probability of receiving takeover bids. Conditional on receiving a takeover bid, firms that are barely unionized enjoy a lower announcement return, receive a lower takeover premium, and have a smaller transaction value. The negative effect of unions on takeover exposure is absent in states with right-to-work legislation. Our paper provides new insights into the real effects of unionization regarding the market for corporate control.

Key words: Takeover exposure; Labor unions; Regression discontinuity design

JEL classification: G34, G30, J51

1. Introduction

There has been an intensive debate among academics, practitioners, and regulators about the real economic effect of labor unions in the past a few decades. Advocates argue that unions lead to increased productivity by reducing employee turnover, improving cooperation among workers, and implementation of better policies that reflect the aggregate preferences of all employees. However, critics of unions claim that they raise wages above the equilibrium level, encourage shirking, and lower society's output through the ability (and realization) of workers to go on strike. In this paper, we focus on a specific real effect of labor unions, takeover exposure, which is perhaps the most important disciplining mechanisms the markets impose on firms (e.g., Marris, 1964; Manne, 1965; Jensen, 1993; Edmans, Goldstein, and Jiang, 2012) and has significant impact on equity returns and firm valuation (e.g., Bates, Becher, and Lemmon, 2008; Cremers, Nair, and John, 2009).

While there are likely merits to both sides of the above debate, identifying the causal effect of labor unions on a firm's takeover exposure remains a challenge because of the endogenous nature of unionization: workers forming labor unions could give rise to or result from the underlying characteristics that are related to a firm's exposure to takeovers. For example, unionization status could be correlated with unobservable firm heterogeneity that also affects a firm's takeover exposure (the omitted variable concern) or firms that want to deter takeovers may be more likely to pass unionization elections (the reverse causality concern).¹

In this paper, to tackle the above endogeneity problem and provide the first empirical study that examines the causal effect of labor unions on takeover exposure, we focus on a sample of firms that hold union elections and use a regression discontinuity design (RDD) that relies on

¹ Pagano and Volpin (2005) advance that often times incumbent management form alliances with employees by offering them higher wages to fend against takeover threat.

“locally” exogenous variation in unionization status generated by these elections that pass or fail by a small margin of votes. This approach compares takeover exposure of firms that barely pass the union election to that of firms that barely fail to pass the union election. It is a powerful and appealing identification strategy because for these close-call elections, passing is very close to an independent, random event and therefore is unlikely to be correlated with firm unobservable characteristics.

We propose two competing hypotheses developed from the prevailing views of unionization. Our first hypothesis postulates that labor unions increase a firm’s takeover exposure. Firms with labor unions tend to have sticky wages and rigid employment contracts, which dramatically increases its operating cost and risk. If an acquirer who actively tries to identify under-performing target firms aim to achieve more operation efficiency through aggressive cost-cutting after the merger (as the *Q*-theory of M&A proposed by Jovanovic and Rousseau, 2002), firms with labor unions may appear more attractive to potential acquirers because acquirers can unlock greater efficiency gains by reducing the target’s union power and constraints on the firm’s operation. Shleifer and Summers (1988) propose a theory, arguing that takeovers breach implicit labor contracts between incumbent managers and workers. Li (2012) finds that the effects of labor unions on wages and employment are weakened after takeovers, supporting a possible source of takeover gain as unlocking the operation efficiency through weakening the target unions.

An alternative hypothesis makes the opposite empirical prediction. Precisely because firms with labor unions tend to have sticky wages and rigid employment contracts, they are less attractive to potential acquirers if the acquirers aim to gain more general synergistic benefits such as achieving the scale of economy, combining complementary assets, and replacing entrenched

managers. Labor unions could be treated as a heavy burden and hurdle to potential acquirers to create synergies. In addition, negotiation between target unions and acquirer managers may significantly increase the uncertainty of deal closure. Even after mergers closed, potential conflicts between target unions and acquirer management threaten efficient integration of these two firms.² In the best case scenario, even if the mergers consummated with the blessing of labor unions, numerous studies painted a negative picture of unions in destroying firms' value (e.g., Grout, 1984; Connolly, Hirsch, and Hirschey, 1987; Malcomson, 1997; Lee and Mas, 2012; Bradley et al, 2013). Overall, taking over target unions without a good way to deal with them leaves a significant burden to acquirers both in the short run and in the long run. Therefore, our second hypothesis argues that unions reduce a firm's takeover exposure.

We test the above two hypotheses by examining the dominant effect of labor unions on firm takeover exposure. We collect firms' union election results from the National Labor Relations Board (NLRB) over year 1978 to 2004 and collect mergers and acquisitions information from the SDC database over 1978 to 2009. We capture a firm's exposure to takeovers by a variety of proxies which include not only a firm's probability of receiving a takeover bid but also its abnormal returns as a target upon a takeover announcement, the offer premium it receives, and the transaction value involved in the takeover.

After performing various diagnostic tests to ensure that the key identifying assumptions of the RDD are satisfied, we show that unionization has a causal, negative effect on firm takeover exposure. According to our nonparametric local linear regression estimation, barely

² Abundant union battles regarding union representation and contract seniority ruling occurred during the merger talks or after merger completion in airline industries. For example, in the case of the merger between American Airline and US Airways, rival unions represent cabin crews at two airline companies, and they fight to represent the 24,000 flight attendants in the combined company. In the case of the merger between US Airways and America West, pilots from the two airlines fight on a controversial seniority ruling that appears to favor west pilots. In the case of the merger between Delta Airline and Northwest Airline, it remains unsettled whether the flight attendants and ground workers would unionize even 3 years after merger completion.

passing a union election reduces the average number of takeover bids a firm receives by 0.065 within 3 years post union election. Given the number of takeover bids being 0.05 each year for an average firm, the takeover exposure for firms that marginally unionized is reduced by as much as 43% over a 3-year horizon.

Conditional on receiving a takeover bid, firms that barely pass union elections receive a significantly lower offer premium (25 percentage points lower) and experience a much lower price run-up and announcement return (the abnormal return is 41 percentage points lower in total) than firms that barely fail to pass union election. Transaction values of marginally unionized firms are also much smaller than those of firms that marginally fail to unionize. These results are robust to alternative choices of bandwidths, and are absent at artificially chosen thresholds that determine union election outcomes. Overall, our findings are consistent with the second hypothesis that labor unions reduce a firm's takeover exposure.

Next, we explore how cross-sectional variation in union bargaining power alters the negative effect of labor unions on firm takeover exposure. We use state-level right-to-work legislation to capture labor unions' bargaining power. In states that have adopted right-to-work legislation, unions cannot force employees to join the union and pay union dues as preconditions of employment. Hence, in right-to-work states, unions have considerably less bargaining power than in non-right-to-work states. We find that the negative effect of unionization on takeover exposure is particularly strong in firms whose union elections are held in states without right-to-work law, and the effect is absent in firms whose union elections are held in states with right-to-work law. This finding is consistent with our second hypothesis that unions are obstacles to takeovers, especially when unions have larger bargaining power.

Our paper contributes to two strands of literature. First, our paper is related to the literature on M&A and unions. While little is known regarding the causal effect of unionization on takeover exposure, there is a strand of research studying how successful takeovers affect labor and labor unions. This literature tends to provide mixed results. In the very first study in this area, Brown and Medoff (1988) find, depending on the type of takeovers, a wage effect between -5% ~ 5% and an employment effect between -5% ~ 9%. On the negative side, Kaplan (1989) finds significant loss of employment (12%) for the target firms after leveraged buyouts (LBOs). Lichtenberg (1992) finds that ownership change results in reductions in employment and wages at central offices but not at establishments. Davis et al. (2011) and Li (2012) use Census Bureau's data to track employment and wage changes post takeovers, respectively, and both find job destruction post takeovers. However, on the positive side, McGuckin and Nguyen (2001) show that takeovers improved jobs, wages, and survival probability at plant level. Ouimet and Zarutskie (2009) use micro-data from the US Census and document that employee wages increase by 9.4% post mergers.

Several other papers move one step further to investigate how much takeover gains to shareholders can be attributed to the wealth transferred from unionized workers. Rosett (1990) and Becker (1995) reach the conclusion that only a small portion of the gains (1~2%) from a takeover can be attributed to a reduction in workers' wages, suggesting little evidence that acquirers may gain from reducing target union power post mergers. Pontiff, Shleifer, and Weisbach (1990) document that pension asset reversions can partially explain takeover premium if they do occur. Bhagat, Shleifer, and Vishny (1990) find layoffs in hostile takeover attempts accounts for about 11~26% of the premium, though such ratio is much lower in friendly takeover

bids. Overall, the evidence in this literature seems to be quite limited, if ever exists, that acquirers can significantly reduce target union power and unlock great efficiency gains.

Second, our paper also contributes to the literature that examines various effects of labor unions on corporate investment and financial policies. Lee and Mas (2012) show negative abnormal returns over a long period to union victories, implying that unionization destroys shareholder wealth. Bradley, Kim, and Tian (2013) show an underlying mechanism through which unions destroy firm value: its hindrance on firm innovation. Klasa, Maxwell, and Ortiz-Molina (2009) and Matsa (2010) finds that unionized firms strategically hold less cash and are more likely to use financial leverage, which allows them to shield their cash flows from union demands. Chen, Kacperczyk, and Ortiz-Molina (2011a, 2011b) find that the cost of equity is significantly higher in more unionized industries but the cost of debt is lower in these industries. Chyz et al. (2013) show unionized firms are less likely to engage in aggressive tax strategies. Our paper complements this literature by showing a tight link between unionization and firms' subsequent exposure to takeovers, an important field of corporate investment and financial policies.

The rest of our paper proceeds as follows. Section 2 describes the data and presents descriptive statistics. Section 3 provides our main results. Section 4 concludes.

2. Data and descriptive statistics

We compile our data from multiple sources. The union election data are collected from the NLRB over 1978 to 2008. It contains firm name, location, SIC code, the date of the election, the number of participants, and the outcomes of the voting.³ We eliminate observations if the

³ For a thorough discussion of the union election process, see DiNardo and Lee (2004, pages 1,388 - 1,392).

election voting outcome is not available or if the number of employees participating in the election is less than 100, consistent with Lee and Mas (2012). The analysis of takeover premium, announcement return and other measures of interest require data on firms' performance and valuation, so we restrict our union election sample to publicly traded firms only. We identify 4,160 unique union elections for public firms in total. In the data, some firms have union elections in consecutive years, and a few even have multiple union elections occurring in the same year (for different plants). To mitigate the confounding effects of multiple union elections on firms' takeover exposure, we only keep the union elections that have no preceding elections in the last 4 years and no subsequent elections in the next 4 years of the election close date.⁴ We also require that the state information of union elections is available. Our final sample consists of 1,784 union elections over 1978 to 2004.

We collect all takeover bids from SDC Mergers and Acquisitions database over 1978 to 2009. We require the deal value exceeds one million dollars, and the bidder seeks to acquire more than 50 percent of target shares in order to gain control of the firm and holds less than 50 percent of target shares beforehand. We link the takeover data to the union election data, and keep the takeover bids received by these firms within 3 years post union elections.

Insert Table 1 about here

We report summary statistics in Table 1, which describes the union election and takeover data. Aggregating the votes from the 1,784 elections in our sample, 44% are in favor of unionization with a standard deviation of 21%. The unionization passage rate is 30%, which

⁴ We investigate firms' takeover exposure within 3 years after the union elections, so a 4-year screening window ensures that no multiple union elections exist during this period.

suggests that on average approximately one third of all elections favor unions. We identify 120 bids received by the firms in our sample within 3 years post their union elections. The average number of bids received by these firms in the 3-year horizon is about 0.07, while in the sample of all public firms, the average number of incoming bids is about 0.15 in 3-year horizon. The contrast seems to suggest that firms with union elections on average receive less takeover bids.⁵ The average offer premium is about 45% and the average announcement return including 2-month target price run-up is about 30% in our sample of bids, very close to what are reported for the sample of all takeover bids over 1978 to 2009.

Insert Figure 1 about here

We plot a time series of union election frequencies and passage rates across our sample period in Figure 1. There is a considerable spike followed by a sharp decline in the number of firms holding union elections in the early 1980s. Beyond this period, there is a quite stable trend with roughly 50 elections per year. The second plot in Figure 1 shows passage rates for union elections across time. There is considerable variation through time, but in each year the majority of union elections fail to pass, which is consistent with the general downtrend of unionization rates in the U.S.

3. RDD and main results

We present our main empirical results in this section. Section 3.1 discusses our empirical strategy and reports various diagnostic tests for the validity of using the regression discontinuity

⁵ We only describe the correlation between the existence of union elections and takeover exposures here, and do not try to draw any inference of casual effect between them.

design (RDD). Section 3.2 presents our main RDD results. Section 3.3 reports a variety of sensitivity tests to check the robustness of the main results. Section 3.4 examines how right-to-work legislation alters the main results.

3.1 Empirical strategy and diagnostic tests

A naïve approach to evaluate the effect of unionization on firms’ takeover exposure is to estimate the following model using the ordinary least squares (OLS) in a firm-year panel:

$$TakeoverExposure_{i,t \rightarrow t+N} = \alpha + \beta Unionization_{i,t} + \gamma' Z_{i,t} + \varepsilon_{i,t} \quad (1)$$

where i indexes firm, t indexes time and $t+N$ indexes the horizon of our study on takeover exposure. The dependent variable, *Takeover Exposure*, is one of the measures of takeover exposure such as the number of bids received, offer premium, announcement returns, transaction value, etc. The variable of interest is *Unionization*, which is a binary variable that equals one if the union election passes and leads to unionization, and zero if the union election fails to lead to unionization. Z is a vector of observable determinants of a firm’s takeover exposure.

However, firm unobservable characteristics related with both union election results and takeover exposure could bias the results (omitted variables), or firms’ takeover exposure may affect union election results (reverse causality). Thus, β cannot be interpreted as a causal effect of unionization. To establish causality, we use RDD that rests on the assignment of a firm’s unionization status based on a simple majority (50%) passing rule and exploits a unique feature of the union election data—we observe the percentage vote for unionization in every union election.

The RDD relies on “locally” exogenous variation in unionization generated by union elections that pass or fail by a small margin of votes around the 50% threshold. Conceptually,

this empirical approach compares firms' takeover exposure subsequent to union elections that pass by a small margin to those union elections that do not pass by a small margin. It is an appealing and powerful identification strategy because for these close-call elections, randomized variation in firm unionization status is a consequence of the RDD, which helps us to identify the causal effect of unionization on firm innovation. Another advantage of the RDD is that we do not have to include observable covariates, Z , in the analysis because the inclusion of covariates is unnecessary for identification (Lee and Lemieux, 2010). Thus, we are able to make use of nearly all our observations even though some of them have missing data on covariates.

A key identifying assumption of the RDD is that agents (both voters and employers in our setting) cannot *precisely* manipulate the forcing variable (i.e., the number of votes) near the known cutoff (Lee and Lemieux, 2010).⁶ If this identifying assumption is satisfied, the variation in union recognition status is as good as that from a randomized experiment. To check the validity of this assumption, we perform two diagnostic tests.

Insert Figure 2 about here

First, Figure 2 shows a histogram of the sample distribution of union vote shares in 40 equally-spaced vote share bins (with a bin width of 2.5%) and the x-axis represents the percentage of votes favoring unionization. If there is a systematic sorting of firms within close proximity of the threshold, this sorting would be observed by a discontinuity in the vote share distribution at the 50% vote threshold. The figure shows that the vote share distribution is

⁶ Lee (2008) shows that even in the presence of manipulation, as long as firms do not have precise control over the forcing variable, an exogenous discontinuity still allows for random assignment to the treatment.

continuous within close proximity of the cutoff. Therefore, there is no evidence of precise manipulation by either workers or firms at the cutoff point.

Second, we follow McCrary (2008) and provide a formal test of a discontinuity in the density. Using the two-step procedure developed in McCrary (2008), Figure 3 plots the density of union vote shares.⁷ The x-axis represents the percentage of votes favoring unionization. The dots depict the density and the solid line represents the fitted density function of the forcing variable (i.e., the number of votes) with a 95% confidence interval around the fitted line. The density appears generally smooth and the estimated curve gives little indication of a strong discontinuity near the 50% threshold. The discontinuity estimate is 0.22 with a standard error of 0.17. Therefore, we cannot reject the null hypothesis that the difference in density at the threshold is zero.⁸ Overall, the above two tests suggest that the validating assumption that there is no precise manipulation by voters at the known threshold is not violated.

Insert Figure 3 about here

Another important assumption of the RDD is that there should not be discontinuity in other covariates that are correlated with firm innovation at the cutoff point. In other words, firms that vote to unionize should not be systematically different ex ante from firms that vote not to unionize. We perform this diagnostic test by comparing the covariates of firms that fall in a narrow band of vote shares [48%, 52%] around the winning threshold. Therefore, we are comparing firms that win or lose by a very small margin.

⁷ See <http://emlab.berkeley.edu/~jmccrary/DCdensity> for a detailed discussion of the algorithm.

⁸ Although our sample periods are different, DiNardo and Lee (2004) also find little evidence of precise manipulation of union votes around the 50% threshold, which is consistent with our findings.

We report the results in Table 2. Observable covariates include firm size ($\ln(\text{Size})$), profitability (ROA), leverage (Leverage), growth opportunities (Q), cash holdings ($\text{Cash}/\text{Assets}$), asset structure (PPE/Assets), external blockholders (BLOCK), and industry takeover activities (Industry Bid). Those covariates have been used in the prior literature seeking to explain the probability of takeovers (see, for example, Cremers, Nair and John, 2008; Hasbrouck, 1985; Palepu, 1986; and Ambrose and Megginson, 1992). Some of them are also important determinants of offer premium and target announcement returns (see, for example, Bradley, 1980; Walkling, 1985; Officer, 2003, 2004; Bates and Lemmon, 2003; Barger, 2005; Betton, Eckbo and Thorburn, 2008; and Betton et al., 2014). The covariates are similar between firms that barely unionize and those that barely elect not to.

Insert Table 2 about here

Overall, the diagnostic tests presented above suggest that there does not appear to be a precise manipulation by voters within close proximity of the 50% threshold. Further, there is no discontinuity in other covariates at the cutoff point.

3.2 Main RDD results

We present the main RDD results in this subsection. Takeovers are rare events. On average, only about 5% of public firms receive takeover bids each year, so a very short horizon (e.g., less than 1 year) suffers from a small sample problem that may create significant noises. However, over a too long horizon (e.g., more than 5 years) there might be other firm activities that affect their takeover exposure and contaminate the results. Therefore, we examine the effect

of unionization on firms' takeover exposure over a two-year as well as a three-year horizon post-election.

We first present RDD results in Figure 4 to visually check the relation around the cutoff. We investigate the number of bids that firms receive within 3 years past union election (left-top panel), firms' abnormal returns upon receiving the bid (right-top panel), bid offer premium (left-bottom panel) and the bid transaction values (right-bottom panel).⁹ The x-axis represents the percentage of votes for unionization. We once again divide the spectrum of vote shares into 40 equally-spaced bins (with a bin width of 2.5%).¹⁰ In all plots displayed, firms that fail to unionize are to the left of the 50% threshold and firms that succeed in unionizing are to the right of the threshold. The dots depict the average value of the corresponding variables in the bins. The solid line represents the fitted local polynomial kernel estimate with a 90% confidence interval around the fitted value.

Insert Figure 4 about here

The figures show significant discontinuity in all measures of interest at the threshold. Specifically, within close proximity of the threshold, the number of bids a firm receives within 3 years past union elections drops significantly if the percentage of votes in favor of unionization just crosses the 50% cutoff point. This finding suggests that, *ceteris paribus*, the existence of union reduces a firm's exposure to takeover attempts. Conditional on receiving a bid, firms those

⁹ A large number of research document that target runup is significantly positive and comparable in size to 3-day announcement return, reflecting possible information leakage or anticipation of the bid announcements. Therefore, we include a 2-month runup in our announcement return to capture the whole effect.

¹⁰ The choice of the bin width reflects a tradeoff discussed in Imbens and Lemieux (2008). The bin width needs to be large enough to have a sufficient amount of precision so that the plots look smooth on either side of the threshold, but small enough to make the jump around the threshold clear. We use alternative bin widths and get similar results from both plots and regressions.

barely pass union elections on average receive a significantly lower offer premium than those that barely fail to pass union elections. Consistent with this finding, those firms also experience a significantly lower price run-up and abnormal return when the takeover bids are publicly announced. Lower offer premium is also translated to smaller transaction values on average for target firms that are barely unionized. These findings are consistent with our conjecture that unions of target firms are considered as potential burdens by acquirers and hence they discount target firms with unions by paying a lower offer premium that leads to a lower target announcement return. Overall, our observations from the visual check point to a strong negative, causal effect of unionization on a firm's takeover exposure.

Insert Table 3 about here

We next employ a nonparametric local linear estimation to deliver our RDD results formally. The estimation uses the optimal bandwidth defined by Imbens and Kalyanaraman (2012) that minimizes the mean squared error (MSE) in a sharp regression discontinuity setting. In Table 3, we report the local linear estimation results using a triangular kernel.¹¹ The coefficient estimates on *Unionization* are all negative and statistically significant at the 5% or the 1% level, suggesting a negative, causal effect of unionization on firms' takeover exposure. Economically, the estimates suggest that passing a union election reduces the number of bids received by a magnitude of 0.065 within 2 to 3 years past union elections, which is a 43%

¹¹As Imbens and Lemieux (2008) point out, the choice of kernel typically has little impact on estimation in practice. The statistics literature has also shown that a triangular kernel is optimal for estimating local linear regressions at the boundary, because it puts more weight on observations closer to the cutoff point.

reduction from the average number of bids a firm receives in our full takeover sample (the average firm has about 0.15 bid for a 3-year horizon).

Conditional on receiving a takeover bid, firms that barely pass the union election receive a significantly lower offer premium and enjoy a much lower announcement return. The magnitudes of the reductions are economically sounded. The low offer premium is also translated into low transaction values for firms that barely passed union elections. Overall, these RDD test results confirm our visual check presented in Figure 4 regarding the sharp discontinuity in a firm's takeover exposure at the cutoff point.

3.3 Robustness checks

We perform a variety of robustness checks that examine the sensitivity of our RDD results. First, we present an alternative regression discontinuity analysis using an estimation of a global polynomial series model (e.g., Cuñat, Gine, and Guadalupe (2012)). This model uses the entire support of all union election observations in our sample. Specifically, we estimate the following model:

$$TakeoverExposure_{t \rightarrow t+N} = \alpha + \beta Unionization_t + P_l(v, c) + P_r(v, c) + \varepsilon_t \quad (2)$$

where t indexes time and N represents the horizon post union elections. $P_l(v, c)$ is a flexible polynomial function for observations on the left-hand side of the threshold c with different orders; $P_r(v, c)$ is a flexible polynomial function for observations on the right-hand side of the threshold c with different polynomial orders; v is a total vote share (percentage of votes in favor). Because union elections win with a simple majority of support among the voters, c equals 50% in our setting.

In this estimation, β is the key variable of interest and its magnitude is estimated by the difference in these two smoothed functions at the cutoff, which captures the causal effect of passing a union election on firm takeover exposure over N years post-election. Note, however, that because RDD estimates are essentially weighted average treatment effects where the weights are the ex-ante probability that the value of an individual union elections falls in the neighborhood of the win threshold (Lee and Lemieux, 2010), this coefficient should be interpreted locally in the immediate vicinity of the win cutoff.

Insert Table 4 about here

We present the results estimating Equation (2) in Table 4. We report the result with polynomials of order three, but our results are qualitatively similar using other polynomial orders. The coefficient estimates on *Unionization* are all negative and in most cases statistically significant, suggesting a negative, causal effect of unionization on firms' takeover exposure. Our findings also suggest a sizable economic effect of passing an union: passing a union election on average reduces the number of bids a firm receives by a magnitude of 0.075 within 2-3 years past union elections, which is a 50% reduction from the average number of bids a firm receives in our full takeover sample (about 0.15 over a 3-year horizon). The reductions in announcement return and transaction value are also economically significant. The number of observations differs for each variable of interest. For the number of bids received, we have data for all firms in our union election sample. For the bid-related variables such as announcement return, offer premium, and transaction value, we only have data for announced deals. Since only a relatively small fraction of firms receive takeover bids in our sample period, the numbers of observations in these tests

are much smaller. All the results obtained from the global polynomial series model are consistent with the conclusions we draw from local linear estimation of RDD.

Next, we examine whether our local linear estimates are robust to alternative bandwidths. The choice of bandwidth reflects a tradeoff between precision and bias. Using a wider bandwidth includes more observations and yields more precise estimates. However, a wider bandwidth can bias the estimates because the linear specification is less likely to be accurate. The reverse occurs if we use a narrower bandwidth. Therefore, we perform the first robustness test to ensure that our results are not sensitive to alternative bandwidths.

Specifically, we repeat the regression for different bandwidths around the threshold with a triangular kernel, and plot the results in Figure 5. The x-axis represents bandwidths where “100” represents the optimal bandwidth based on Imbens and Kalyanaraman (2012) and used in the estimations reported in Table 3, “200” represents twice the optimal bandwidth, and so forth. The left-hand figures plot the number of patents and the right-hand plots the number of citations per patent. The solid line represents the RDD estimators and the dotted lines represent 90% confidence intervals.

Insert Figure 5 about here

From Figure 5, we observe that the RDD estimates are always negative and are stable in both economic and statistical significance over the spectrum of bandwidth choices. This observation suggests that the baseline RDD results using local linear regressions are robust to alternative choices of bandwidths.

Next, if our main RDD results truly reflect a causal effect of labor unions on a firm's takeover exposure, the results should be absent at alternative cutoff along the spectrum of union election votes. Hence, we do a series of placebo tests to check if we are still able to observe a discontinuity in takeover exposure at artificially chosen thresholds that are different from the true 50% threshold. We first randomly select an alternative threshold along the spectrum of union vote shares between 0 and 1 other than 0.5. We then assume it is the threshold that determines union election outcomes and re-estimate the local linear model with a triangular kernel. We repeat this placebo estimation 1,000 times and plot a histogram of the distribution of the RDD estimates from these placebo tests in Figure 6. We also include a dashed vertical line that represents the RDD estimate at the true threshold reported in Table 3.

Insert Figure 6 about here

The histogram is centered at 0, which is consistent with the conjecture that the treatment effect of unionization on firm takeover exposure is absent at artificially chosen vote thresholds. It also suggests that the negative effect of unionization on firm takeover exposure we document is unlikely driven by chance and therefore our RDD estimates are unlikely spurious.

3.4 Right-to-work legislation

As discussed in the introduction of the paper, states that have adopted right-to-work legislation cannot force employees to join the union and pay union dues as preconditions of employment. Therefore, in right-to-work states, unions have considerably less bargaining power than in non-right-to-work states. A potential consequence of weaker union bargaining power is

that a unionized workforce in a right-to-work state will have less of an impact on takeover exposure than in states without similar legislation. We test this conjecture in this subsection.

Table 5 reports the results for firms with union elections that are located in right-to-work states compared to those that are located in states without right-to-work legislation, using local linear RDD estimations as in Table 3. The top panel presents the results for firms located in right-to-work states, while the bottom panel reports the results for firms located in states without right-to-work legislation.¹²

Insert Table 5 about here

In states with right-to-work laws, we find that the coefficient estimates on *Unionization* are negative, but statistically insignificant across all measures of interest except for the transaction values. On the other hand, reported in the bottom panel, firms winning union elections in states without right-to-work legislation (which affords unions more bargaining power) have a much larger economic and statistical impact on firm takeover exposure. The results are consistent with the conjecture that unions in states with right-to-work law legislation have lower bargaining power and therefore have much smaller effect on a firm's exposure to takeovers.

4. Conclusion

¹² States with right-to-work legislation as of 2004 (our union election sample end year) include Alabama, Arizona, Arkansas, Florida, Georgia, Idaho, Iowa, Kansas, Louisiana, Mississippi, Nebraska, Nevada, North Carolina, North Dakota, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, and Wyoming.

In this paper, we examine the causal effect of unionization on a firm's takeover exposure. To establish causality, we use a regression discontinuity design that relies on "locally" exogenous variation generated by elections that pass or fail by a small margin of votes. Barely passing a union election leads to a significant reduction in a firm's probability of receiving a takeover bid. Conditional on a takeover announcement, firms that are barely unionized enjoy a lower announcement return, receive a lower takeover premium, and have a smaller transaction value. The negative effect of unions on takeover exposure is absent in states with right-to-work legislation. Our paper provides new insights into the real effects of unionization. In addition, given that labor unions in the U.S. are regulated and can be altered by labor laws and regulations over time, our paper also provides important policy implications for policy makers when they alter union regulations or labor laws to promote the market for corporate control.

References

- Acs, Z. J., and D. B. Audretsch. 1988. Innovation in large and small firms: An empirical analysis. *American Economic Review* 78: 678-90.
- Allen, S. G. 1988. Productivity levels & productivity change under unionism. *Industrial Relations: A Journal of Economy and Society* 27: 94-113.
- Ambrose, K.W. and W. L. Megginson, 1992. The role of asset structure, ownership structure and takeover defenses in determining acquisition likelihood. *Journal of Financial and Quantitative Analysis* 27: 575–589.
- Bargeron, L., 2005. Do shareholder tender agreements inform or expropriate shareholders? Working Paper, University of Pittsburgh.
- Bates, T. W., D. A. Becher, and M. L. Lemmon, 2008. Board classification and managerial entrenchment: Evidence from the market for corporate control, *Journal of Financial Economics* 87: 656-677.
- Becker, B., 1995. Union rents as a source of takeover gains among target shareholders. *Industrial and Labor Relations Review* 49: 3-19
- Betton, S., B. E. Eckbo and K. S. Thorburn, 2008. Markup pricing revisited. Working Paper, Tuck School of Business at Dartmouth College.
- Betton, S., B. E. Eckbo, R. Thompson, and K. S. Thorburn, 2014. Merger negotiations with stock market feedback. *Journal of Finance*, forthcoming.
- Bhagat, S., A. Shleifer and R. Vishny, 1990. Hostile takeovers in the 1980s: The return to corporate specialization. *Brookings Papers on Economic Activity: Microeconomics*.
- Bradley, D., I. Kim, and X. Tian, 2013. The causal effect of labor unions on innovation. Working Paper, Indiana University.
- Bradley, M., 1980. Interfirm Tender Offers and the Market for Corporate Control. *Journal of Business* 53: 345–376.
- Brown, C., and J. L. Medoff, 1988. The impact of firm acquisition on labor. In A. J. Auerbach (Ed.), *Corporate Takeovers: Causes and Consequences*. University of Chicago Press, Chicago.
- Chen, H. J., M. Kacperczyk, and H. Ortiz-Molina. 2011a. Labor unions, operating flexibility, and the cost of equity. *Journal of Financial and Quantitative Analysis* 46: 25-58.
- Chen, H., M. Kacperczyk, and H. Ortiz-Molina. 2011b. Do nonfinancial stakeholders affect the pricing of risky debt? Evidence from unionized workers. *Review of Finance* 16: 347-83.
- Chyz, J. A., W. S. Ching Leung, O. Li, and O. Rui. 2013. Labor unions and tax aggressiveness. *Journal of Financial Economics* 108: 675-98.
- Cremers, M, V. Nair, and K. John, 2009. Takeover and the cross-section of returns, *Review of Financial Studies* 22: 1409-1445.
- Connolly, R. A., B. T. Hirsch, and M. Hirschey. 1986. Union rent seeking, intangible capital, and market value of the firm. *Review of Economics and Statistics* 68: 567-77.

- Cuñat, V., M. Gine, and M. Guadalupe. 2012. The vote is cast: The effect of corporate governance on shareholder value. *Journal of Finance* 67: 1943-77.
- Davis, S. J., J. Haltiwanger, R. Jarmin, J. Lerner, and J. Miranda, 2011. Private equity and employment. NBER Working Paper No. 17399.
- DiNardo, J., and D. S. Lee. 2004. Economic impacts of new unionization on private sector employers: 1984–2001. *Quarterly Journal of Economics* 119: 1383-1441.
- Edmans, Alex, Itay Goldstein and Wei Jiang, 2012. The real effects of financial markets: The impact of prices on takeovers. *Journal of Finance* 67: 933-971.
- Frandsen, B. 2012. Why unions still mater: The effects of unionization on the distribution of employee earnings. *Working paper*.
- Griliches, Z., A. Pakes, and B. H. Hall. 1988. The value of patents as indicators of inventive activity. *NBER Working Paper No. 2083*.
- Grout, P. A. 1984. Investment and wages in the absence of binding contracts: A Nash bargaining approach. *Econometrica* 52: 449-60.
- Hasbrouck, J., 1985. The characteristics of takeover targets. *Journal of Banking and Finance* 9: 351–362.
- Hirsch, B., and A. Link. 1987. Labor union effects on innovative activity. *Journal of Labor Research* 8: 323-32.
- Hirsch, B. T. 1992. Firm investment behavior and collective bargaining strategy. *Industrial Relations* 31: 95-121.
- Imbens, G., and T. Lemieux. 2008. Regression discontinuity designs: A guide to practice. *Journal of Econometrics* 142: 615-35.
- Imbens, G., and K. Kalyanaraman. 2012. Optimal bandwidth choice for the regression discontinuity estimator. *Review of Economic Studies* 79: 933-59.
- Jensen, Michael C., 1993, The modern industrial revolution, exit, and the failure of internal control systems, *Journal of Finance* 48: 831–880.
- Jovanovic, Boyan, and Peter L. Rousseau, 2002. The Q-theory of mergers. *American Economic Review* 92: 198-204.
- Kaplan, S. N. 1989. The effects of management buyouts on operating performance and value. *Journal of Financial Economics* 24: 217-254.
- Klasa, S., W. F. Maxwell, and H. Ortiz-Molina. 2009. The strategic use of corporate cash holdings in collective bargaining with labor unions. *Journal of Financial Economics* 92: 421-42.
- Lee, D. S. 2008. Randomized experiments from non-random selection in U.S. house elections, *Journal of Econometrics* 142: 675-97.
- Lee, D. S., and T. Lemieux. 2010. Regression discontinuity designs in economics. *Journal of Economic Literature* 48: 281-355.

- Lee, D. S., and A. Mas. 2012. Long-run impacts of unions on firms: New evidence from financial markets, 1961–1999. *Quarterly Journal of Economics* 127: 333-78.
- Li, X., 2012. Workers, unions, and takeovers, *Journal of Labor Research* 33: 443-460.
- Lichtenberg, F. R., 1992. Corporate takeovers and productivity. MIT Press, Cambridge, MA.
- Malcomson, J. M. 1997. Contracts, hold-up, and labor markets. *Journal of Economic Literature* 35: 1916-57.
- Manne, H., 1965. Mergers and the market for corporate control, *Journal of Political Economy* 73, 110–120
- Marris, R., 1964. The economic theory of managerial capitalism (Macmillan, London)
- Matsa, D. A. 2010. Capital structure as a strategic variable: Evidence from collective bargaining. *Journal of Finance* 65: 1197-1232.
- McCrary, J. 2008. Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics* 142: 698-714.
- McGuckin, R. and S. V. Nguyen, 2001. The impact of ownership changes: A view from labor markets. *International Journal of Industrial Organization* 19: 739-762.
- Officer, M. S., 2004, Collars and renegotiations in mergers and acquisitions. *Journal of Finance* 59: 2719–2743.
- Officer, M. S., 2003. Termination fees in mergers and acquisitions. *Journal of Financial Economics* 69: 431–467.
- Ouimet, P. and R. Zarutskie, 2009. Mergers and employee wages. Working paper, University of North Carolina, Chapel Hill
- Pagano, M. and P. F. Volpin, 2005. Managers, workers, and corporate control. *Journal of Finance* 60: 841-868.
- Palepu, K. G., 1986. Predicting takeover targets: A methodological and empirical analysis. *Journal of Accounting and Economics* 8: 3–35.
- Pontiff, J., A. Shleifer, and M. Weisbach, 1990. Reversions of excess pension assets after takeovers. *RAND Journal of Economics* 21: 600-613.
- Rosett, J. G., 1990. Do union wealth concessions explain takeover premiums? *Journal of Financial Economics* 27: 263-282.
- Shleifer, A. and L. Summers, 1988. Breach of trust in hostile takeovers. In A. J. Auerbach (Ed.), *Corporate Takeovers: Causes and Consequences*. University of Chicago Press, Chicago.
- Walkling, R., 1985. Predicting tender offer success: A logistic analysis. *Journal of Financial and Quantitative Analysis* 20: 461–478.

Figure 1
Number of union elections and passage rates by year

This figure plots the number of union elections by year (top) and the average passage rates by year (bottom) in our final sample. Union election results are from the National Labor Relations Board (NLRB) over 1978 to 2004.

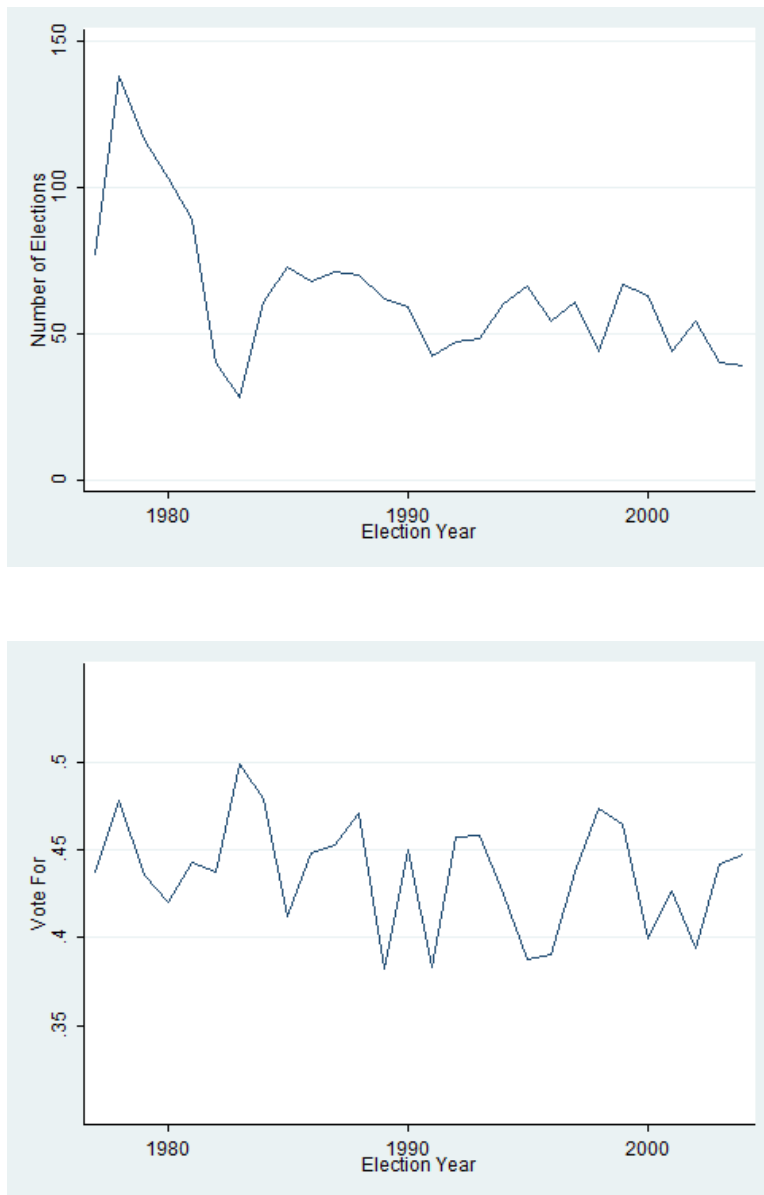


Figure 2
Distribution of votes

This figure plots a histogram of the distribution of the number of elections with the percentage of votes for unionizing in our sample across 40 equally-spaced bins (with a 2.5% bin width). Union election results are from the National Labor Relations Board (NLRB) over 1978 to 2004.

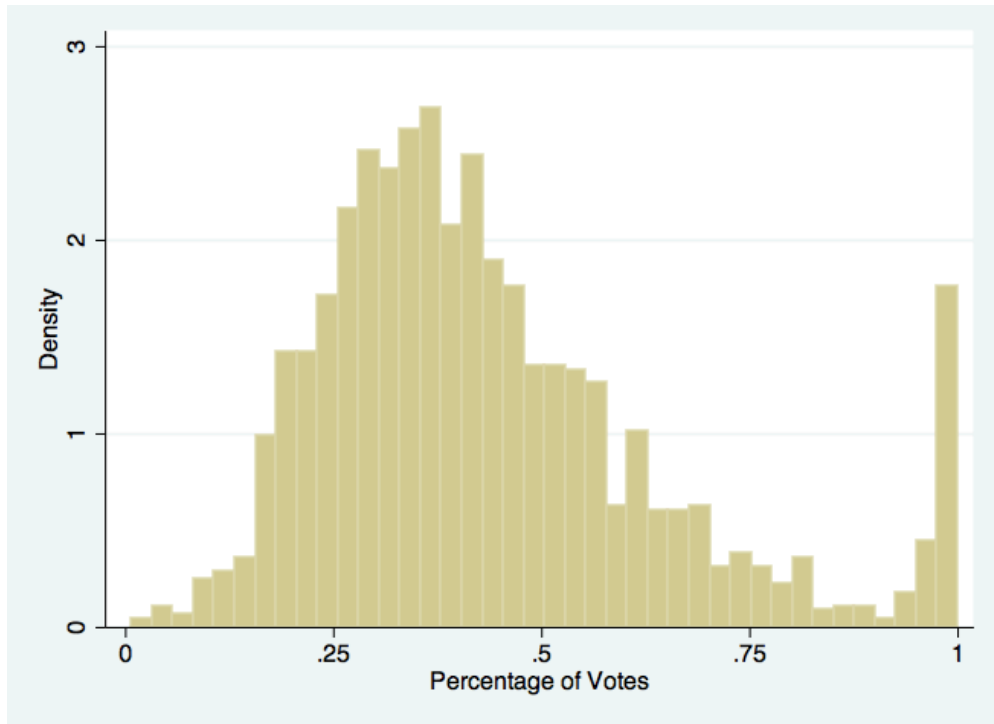


Figure 3
Density of union vote shares

This figure plots the density of union vote shares following the procedure in McCrary (2008). The x-axis is the percentage of votes favoring unionization. The dots depict the density estimate. The solid line represents the fitted density function of the forcing variable (the number of votes) with a 95% confidence interval around the fitted line. Union election results are from the National Labor Relations Board (NLRB) over 1978 to 2004.

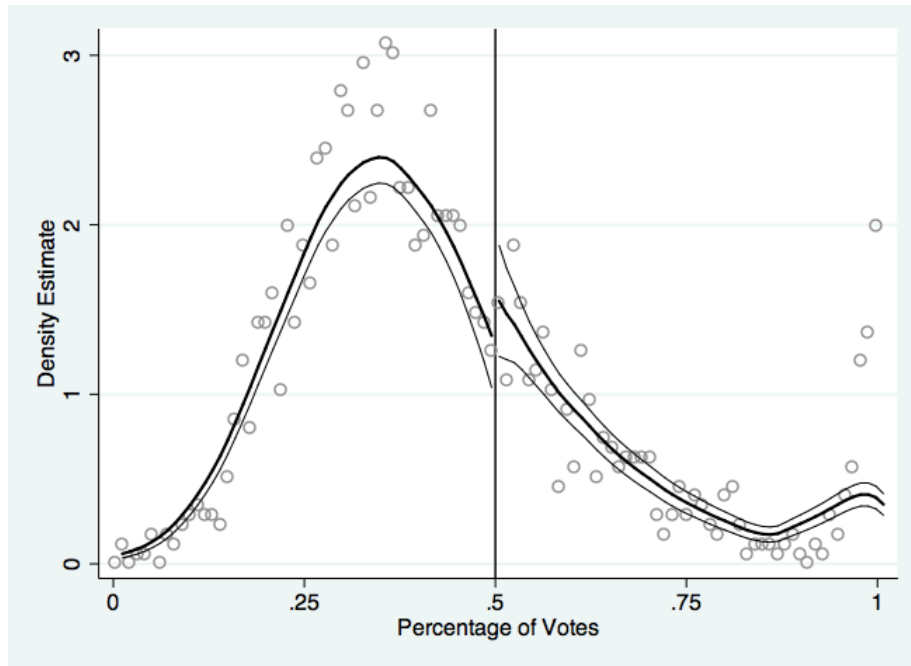


Figure 4
Regression discontinuity plots

This figure presents regression discontinuity plots using a fitted local kernel estimate with a 90% confidence interval around the fitted value. The x-axis is the percentage of votes favoring unionization. The dots depict different takeover exposure variables in each of 40 equally-spaced bins (with a bin width of 2.5%). Union election results are from the National Labor Relations Board (NLRB) over 1978 to 2004. Takeover and stock valuation data are collected from SDC database and CRSP over the 1978 to 2009 time period.

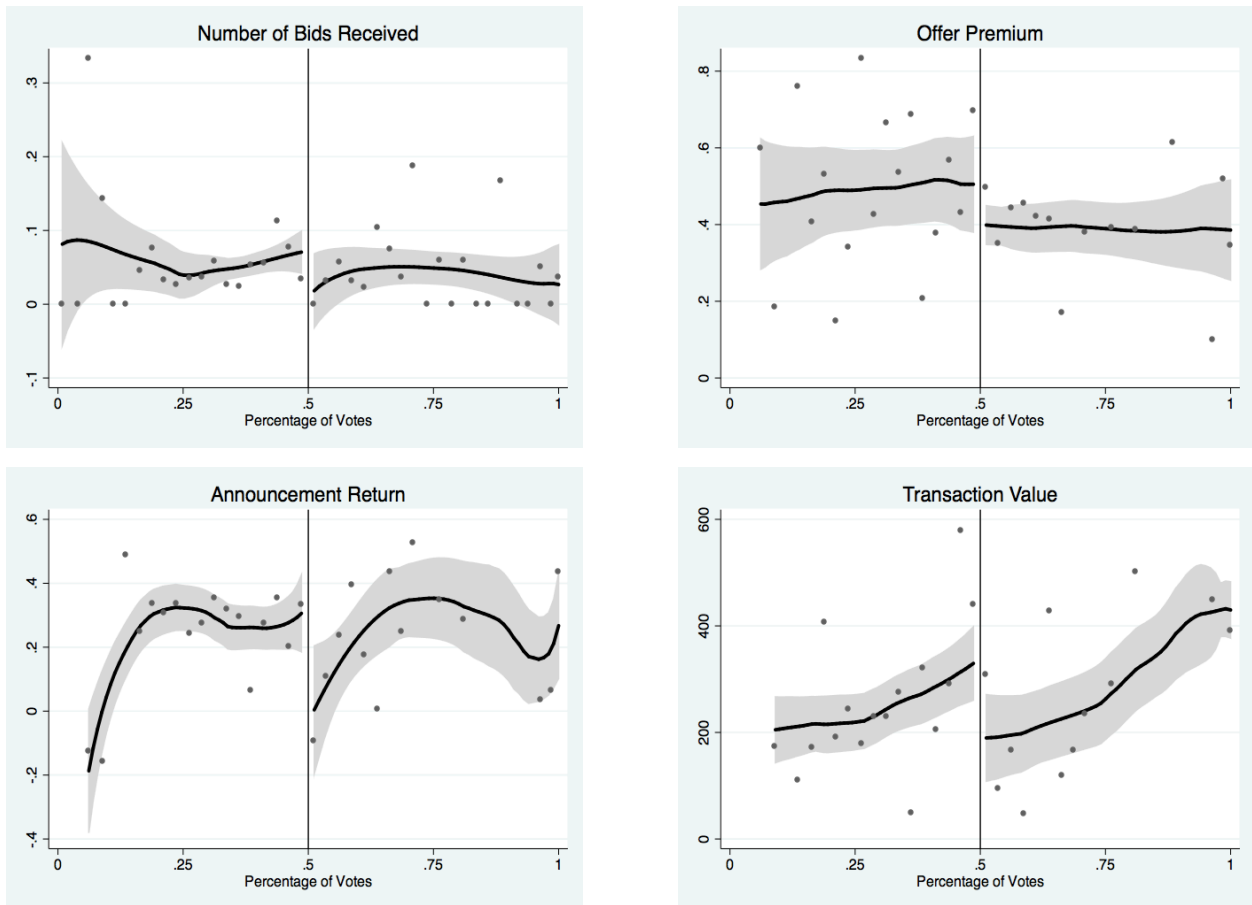


Figure 5
RDD bandwidths

This figure plots the RDD estimates with alternative bandwidths using the local linear regression with the choice of optimal bandwidth following Imbens and Kalyanaraman (2012). The x-axis represents the bandwidth where '100' is the optimal bandwidth reported in Table 3, '200' is 2 times the optimal bandwidth, etc. Union election data are from the National Labor Relations Board (NLRB) over 1978 to 2004. Takeover data are from the SDC database over 1978 to 2009.

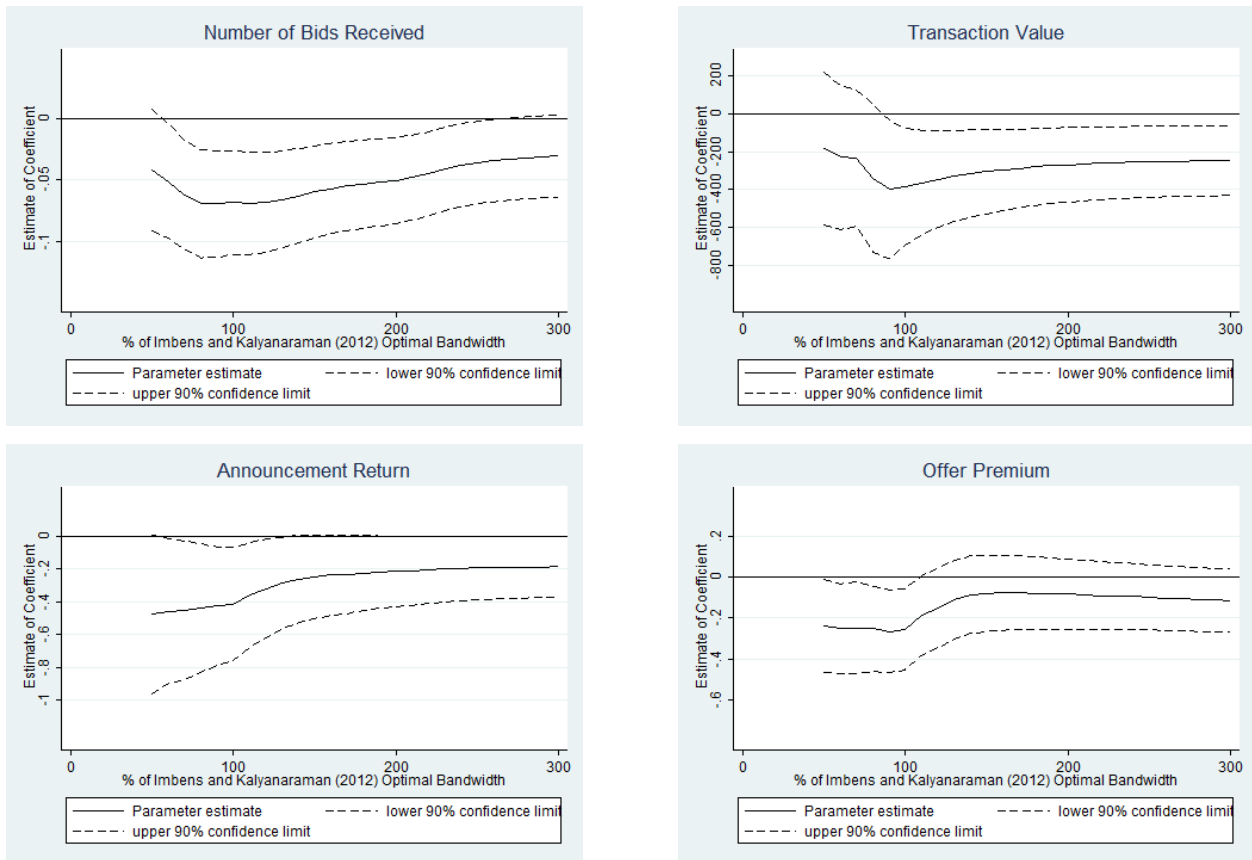


Figure 6
Placebo tests

This figure plots a histogram of the distribution of the RDD estimates from placebo tests. The x-axis represents the RDD estimates from a placebo test that artificially assumes an alternative threshold other than 50%. The dashed vertical line represents the RDD estimate at the true 50% threshold. Union election results are from the National Labor Relations Board (NLRB) over 1978 to 2004. Takeover data are from the SDC database over 1978 to 2009.

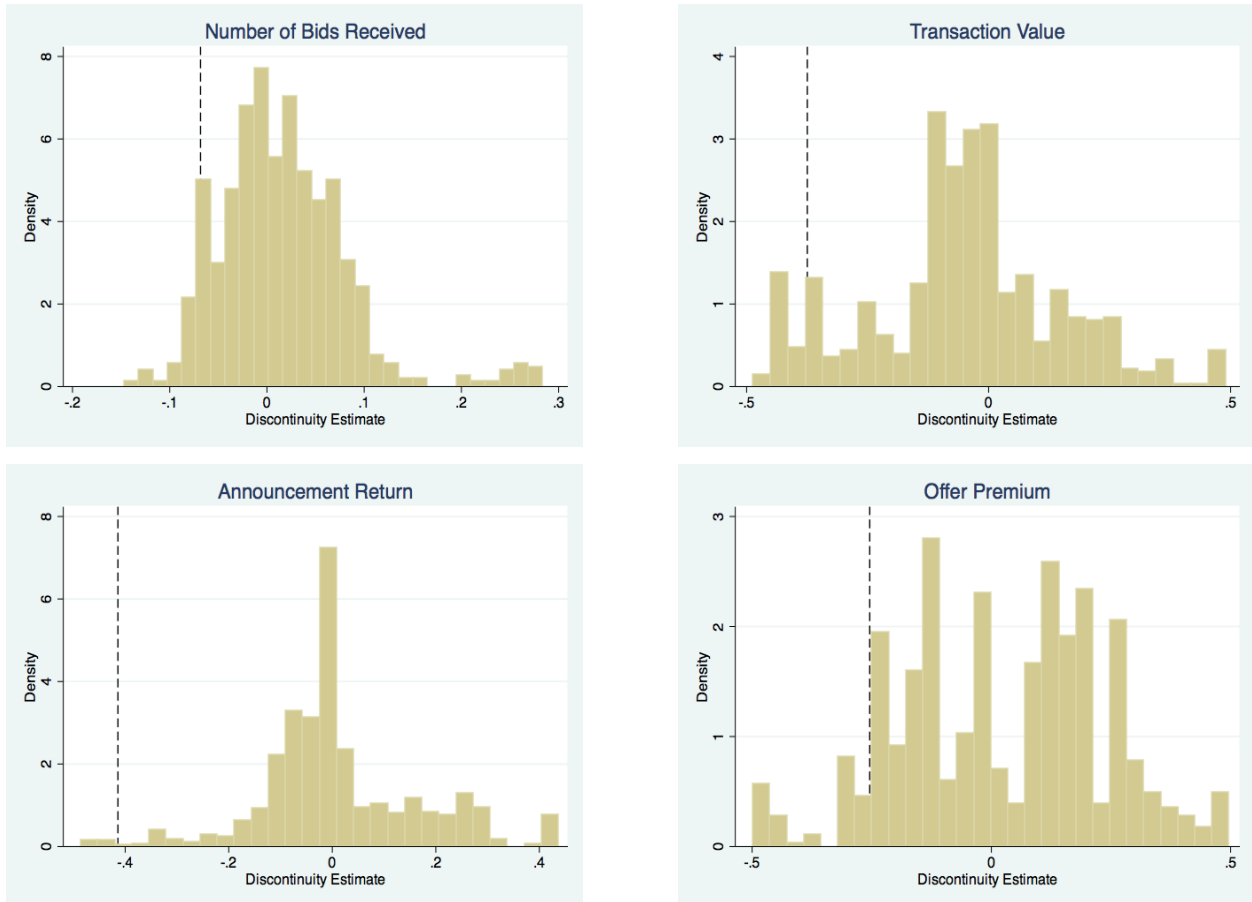


Table 1
Descriptive statistics

This table presents descriptive statistics of our sample. We report union election statistics and takeover statistics. “Vote for union” is the total number of votes for unionization divided by total votes in a given election. “Passage” is an indicator variable that equals one if a firm is unionized as a result of an election and otherwise zero. “Num. of bids in 3 Yrs” is the number of bids received by firms within 3 years post union elections. “Offer premium” is defined as the bid price per share divided by the price of target stock 4 weeks before takeover announcement. “Run-up + Ann. Ret.” is the target’s abnormal cumulative return from 2 months before the takeover announcement to 1 day after announcement computed from the market model. “Trans. Value” is the transaction value of the bids. Union election results are from the National Labor Relations Board (NLRB) over 1978 to 2004. Takeover data are from the SDC database over 1978 to 2009.

	Obs.	Mean	Std. Dev.	Median
Union election statistics				
Vote for union	1784	0.44	0.21	0.39
Passage	1784	0.30	0.46	0.00
Takeover statistics (bids received by firms in our sample)				
Number of bids in 3Yrs	1,784	0.07	0.28	0.00
Offer premium	98	0.45	0.26	0.43
Run-up + Ann. Ret.	75	0.31	0.25	0.29
Trans. Value (MM)	87	280	256	185
Takeover statistics (all bids for US public targets from 1978 to 2009)				
Offer premium	8,092	0.43	0.35	0.35
Run-up + Ann. Ret.	5,636	0.29	0.26	0.26
Trans. Value (MM)	25,442	108	177	32

Table 2
Difference in observable characteristics between unionized and non-unionized firms

This table shows differences in observable characteristics between firms that participate in union elections and win versus those that lose by a small margin (vote shares within the interval of [48%, 52%]). Union election results are from the National Labor Relations Board (NLRB) over 1980 to 2005. Firm characteristics are from Compustat, measured at one year prior to the union election close date. Size is firm's market equity. ROA is the return on assets. Leverage is the book debt to asset ratio, Q is the ratio of market-to-book value of assets, where market assets are defined as total assets plus market value of common stock minus book common equity and deferred taxes. Cash is cash and short-term investments. PPE is property, plant, and equipment. BLOCK is a dummy variable equal to 1 if (at least) one institutional investor holds more than 5% of the company stock and 0 otherwise. Industry bid equals to 1 if, based on the Fama-French 48-industry classifications, there was a takeover in a firm's industry in the prior year.

	Win = 1	Win = 0	Difference	P-Value
Ln(Size)	6.017	5.273	0.744	0.116
ROA	0.041	0.024	0.017	0.541
Leverage	0.432	0.394	0.038	0.590
Q	1.193	1.293	-0.010	0.442
Cash/Asset	0.074	0.070	0.004	0.862
PPE/Asset	0.401	0.350	0.051	0.300
BLOCK	0.581	0.529	0.051	0.684
Industry Bid	0.806	0.764	0.042	0.688

Table 3
Regression discontinuity: Nonparametric local linear regression

This table presents local linear regression results using the optimal bandwidth following Imbens and Kalyanaraman (2012). Results using triangular kernels are reported. The dependent variables are the number of bids received within 2 or 3 years past union election, bid offer premium, target firm announcement return, and transaction value. Union election data are from the National Labor Relations Board (NLRB) over 1978 to 2004. Takeover data are from the SDC database over 1978 to 2009.

	Average Number of Bids Received		Announcement Return	Offer Premium	Transaction Value (MM)
	<u>N=2</u>	<u>N=3</u>			
Unionization	-0.068*** (-2.66)	-0.065** (-1.99)	-0.414** (-1.97)	-0.254** (-2.12)	-385.1** (-2.07)

Table 4
Regression discontinuity: Global polynomial

This table presents RDD results from estimating a polynomial model specified in Equation (2). The dependent variables are the number of bids received within 2 and 3 years past union election, bid offer premium, target firm announcement return, and transaction value. The independent variables are unionization dummy, total votes for unionization and the cross effect between them. Union election data are from the National Labor Relations Board (NLRB) over 1978 to 2004. Takeover data are from the SDC database over 1978 to 2009.

	Average Number of Bids Received		Announcement Return plus runup	Offer Premium	Transaction Value (MM)
	N=2	N=3			
Unionization	-0.075* (-1.88)	-0.077* (-1.67)	-0.426** (-2.36)	-0.046 (-0.20)	-368.3 (-1.43)
Constant	0.076*** (2.76)	0.093*** (2.78)	0.351*** (3.23)	0.557*** (4.65)	593.1*** (4.97)
Poly. Order	3	3	3	3	3
Observations	1784	1784	75	88	78

Table 5
Right-to-work law

This table presents local linear regression results using the optimal bandwidth following Imbens and Kalyanaraman (2012) for firms located in states with right-to-work laws versus in states without right-to-work laws. Results using a triangular kernel are reported. The dependent variables are the number of bids received within 2 or 3 years past union election, bid offer premium, target firm announcement return, and transaction value. Union election data are from the National Labor Relations Board (NLRB) over 1978 to 2004. Takeover data are from the SDC database over 1978 to 2009.

State with Right-to-work law

	Average Number of Bids Received		Announcement Return	Offer Premium	Transaction Value (MM)
	<u>N=2</u>	<u>N=3</u>			
Unionization	-0.019 (-1.17)	-0.031 (-0.48)	-0.086 (-0.72)	-0.045 (-0.34)	-652.4*** (-4.78)

State without Right-to-work law

	Average Number of Bids Received		Announcement Return	Offer Premium	Transaction Value (MM)
	<u>N=2</u>	<u>N=3</u>			
Unionization	-0.081** (-2.10)	-0.055** (-1.71)	-0.549** (-2.09)	-0.298* (-1.65)	-516.1*** (-2.58)