Debt Covenant Violations and Employee Safety

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February 2, 2023

Abstract

We study the impact of creditor control rights on rank-and-file employees. Using a regression discontinuity design, we provide evidence that workplace safety deteriorates when creditors gain bargaining power in the event of a debt covenant violation. The frequency of workplace injuries and illnesses increases more for firms with severe financing constraints and a less active labor union. These results are robust to entropy balancing and a host of alternative specifications. In sum, our results provide compelling evidence on how increased interference and cost-cutting pressures by creditors can impair the working conditions of employees.

JEL classification: G32, G38, L1, M41

Keywords: Debt Contracting, Covenant Violation, Employee Safety, Creditor Control Rights

*We thank the Tippie College of Business, University of Iowa for financial support. We appreciate helpful comments and suggestions from Dan Collins, Dain Donelson, Cristi Gleason, Adrienne Rhodes and workshop participants at the University of Iowa and Villanova University.

I. Introduction

The effect of financial policy and creditor monitoring power on corporate operating decisions is multi-faceted. Prior literature mainly focuses on the positive aspects. For example, prior research finds that increased creditor intervention following a covenant violation, results in a reduction in investment distortions and improvements in innovative output (Chava and Roberts 2008; Chava, Nanda, and Xiao 2015; Nini, Smith, and Sufi 2012). In this paper, we focus our attention on the potential negative impact of creditor control rights on one of the most important stakeholders, the rank-and-file employees.[1] Through our analysis, we provide causal evidence of creditor influence on borrowers' workplace safety when creditors gain rights to accelerate, restructure, or terminate a loan contract.

Financial covenants are designed to mitigate agency problems between lenders and borrowers. According to the provisions in a debt contract, the borrower retains control rights as long as the corresponding accounting number remains above the covenant threshold. However, when the borrower breaches this threshold, regardless of the amount, there is a transfer of bargaining power to the creditors. Creditors use this bargaining power, also referred to as "creditor control rights", to influence managerial decisions and participate in a firm's governance, either directly or indirectly. Creditors can use the threat of accelerating the loan to take a number of actions such as increasing the interest rate on the loan, reducing the maturity period of the loan, imposing financial constraints, or directly intervening in the operating decisions of the firm, which can have real effects on the operations of the firm and its employees. For instance, following a covenant violation, firms may be forced by creditors to lay off employees and increase employee workload in order to improve net cash flows and provide assurance to the creditors who are concerned about the value of their claims. Alternatively, as with other forms of investment, spending on employee safety is financed out of either internal cash flow or externally raised capital. When a firm breaches a financial

[1] Flammer and Kacperczyk (2016) shows that the rank-and-file employees are often the main contributors to a firm's productivity and innovation.

covenant, it might under-invest in safety because of the financial constraints imposed by creditors. The impact of a reduction in the number of employees and investment cuts in workplace safety can have major consequences on employee health and well-being.

The discrete nature of covenant violations generates a plausibly exogenous source of variation in the distance to the covenant and allows us to use a regression discontinuity design to help establish causality. Employee health and safety violations are identified using a novel dataset, Violation Tracker, which we use to examine whether there is an increase in employee health and safety violations when creditor control rights increase. We document a statistically significant increase in the number of accidents and the amount of penalties suffered by the firm in the year following a covenant violation. Our baseline results indicate that covenant violations lead to a 22% increase in the number of accidents in the next four quarters. Similarly, we observe an increase of 83% in the dollar value of total penalties suffered by the firms who violate debt covenants. This finding is robust to a host of control variables in the regression specification, including industry and year-quarter fixed effects, measures of firm growth, profitability, financial health, and the distance to default. To mitigate the concerns that the results are affected by systematic differences in observable covariates between the firms that violate and those that do not violate debt covenants, we use entropy balancing to improve the similarity of the covariate distribution between the two groups (Hainmueller 2012). Our results continue to hold after we ensure covariate balance in our regressions.

We use various settings to examine cross-sectional variation in the relation between covenant violations and workplace safety. We find that the increase in employee health and safety violations after a covenant violation varies systematically with several different ex-ante proxies for financial constraints, information asymmetry between borrowers and lenders and employee bargaining power. First, we find that the relation is stronger in firms that suffer from financial constraints. There is a significant positive relationship between the number of accidents and covenant violations, but only for those firms that do not have credit ratings or for those firms that have a very high leverage ratio.

Next, we find that the relation between covenant violations and workplace safety is weaker when the firm has high union membership. This result is consistent with studies that document that a strong labor union ensures reasonable workloads and workplace safety (Kaufman 2005; Morantz 2013). Our findings suggest that unions mitigate the extent to which creditor intervention impacts workplace safety. These cross-sectional tests offer additional validation of our identification strategy and lend further support to the causal interpretation of our findings. In sum, our results provide robust evidence of the negative impact of the pressure created by creditor control on workplace safety for the rank-and-file employees.

Prior research on the impact of creditor intervention on firm operations, focuses on the positive effects of creditor monitoring (Chava and Roberts 2008; Chava, Nanda, and Xiao 2015; Ferreira, Ferreira, and Mariano 2018). We provide evidence on the potential negative impact of the cost-cutting pressures that the creditors impose on the firm. We also contribute to the recent literature on workplace safety by providing evidence that creditor intervention following covenant violations is also an important determinant of workplace injuries and illnesses. Prior research provides evidence on the various determinants of employee health and safety violations such as cashflow constraints (Cohn and Wardlaw 2016), financial reporting pressures (Caskey and Ozel 2017), presence of institutional investors (Li and Raghunandan 2019), etc. Our paper empirically identifies a specific mechanism through which financial policy affects employee health and safety—transfer of control rights.

The paper proceeds as follows. Section II provides a review of the relevant literature and develops the hypotheses. Section III discusses sample selection and variable measurement. Section IV presents the research design and the main results of our analysis. Section V presents the cross-sectional tests and robustness tests, and section VI concludes.

II. Literature Review and Hypotheses development

Debt Covenant Violations and Creditor Control Rights

Agency conflicts between shareholders and debtholders imply that the former will tend to disclose private information related to default risk or claim seniority, opportunistically (Jensen and Meckling 1976). Financial contracts and corporate governance structures are designed to mitigate those agency conflicts. Indeed, the requirement of financial transparency embedded in accounting-based covenants, along with restrictions related to financial performance and capital structure, lowers the costs of debt contracting by ameliorating adverse selection and moral hazard risk for lenders (Reisel 2014). If a firm's financial variables stipulated in the covenants fall below the required thresholds, the firm is considered to have violated the covenants and be in default. Extant research reports that financial covenant violations are not uncommon incidents. In fact, about 40% of all firms, who carry debt on their balance sheet, violate a financial covenant at some point without, in the majority of the cases, triggering bankruptcy. As Smith (1993) puts it:

" the lender's reaction to a default falls along a continuum, from most to least costly: (1) grant a permanent waiver without renegotiation, (2) grant a temporary waiver without renegotiation, (3) offer no waiver and no renegotiation, (4) renegotiate and provide the borrower with a waiver, (5) renegotiation fails, no waiver is granted, and the firm seeks alternative financing or enters bankruptcy."

Despite the fourth and fifth categories resulting in significantly higher default costs, Beneish and Press (1993) show that covenant violations affect a firm's financing costs, even if borrowers receive a waiver.

A growing body of literature provides evidence consistent with creditor influence on corporate decision making when borrowers violate debt covenants (Chava and Roberts 2008; Nini, Smith, and Sufi 2009; Balsam, Gu, and Mao 2018; Gao, Khan, and Tan 2017; Falato and Liang 2016). Chava and Roberts (2008) document a reduction in capital expenditures in the

quarters following a covenant violation especially among firms with more severe agency and information problems. Along similar lines, Nini, Smith, and Sufi (2012) find that covenant violations are followed by a decline in acquisitions and capital expenditures. However, it is not evident whether the ex-post reduction in investment due to covenant violations is value increasing. For example, it is possible that creditors might be myopic in that they prioritize short-term increases in cash flow and therefore might demand an excessive reduction in operating costs and capital investments. Consistent with this line of argumentation, Gao, Khan, and Tan (2017) show that a debt covenant violation triggers significant information asymmetry and uncertainty on the part of shareholders and auditors as reflected in higher bid–ask spreads, return volatility and audit fees. On the other hand, it is possible that banks use their bargaining power to intervene in managerial decision making and thereby help in eliminating investments that are inefficient and wasteful. For example, Chava, Nanda, and Xiao (2015) find that following a loan covenant violation and transfer of control rights to lenders, firms tend to decrease R&D expenditures without affecting innovation output, thus improving the efficiency of their R&D investment.

Note that the lenders' influence on corporate operating decisions might be direct or indirect. For example, Ferreira, Ferreira, and Mariano (2018) find that a violation leads to a 24% increase in the number of independent directors and the new directors are more likely to have links to the creditors and are more likely to adopt creditor-friendly policies. Recent papers also provide evidence of an increase in CEO turnover and a reduction in CEO compensation in the year following a covenant violation (Balsam, Gu, and Mao 2018; Ozelge and Saunders 2012; Nini, Smith, and Sufi 2012). At the same time, even if lenders lack direct knowledge of the firm's operations, they could require an overall reduction in cost and investment level, while giving the firm substantial discretion on the specific reductions to be made.

Cost Minimization and Employee Welfare

A safe workplace with generous fringe benefits is instrumental in retaining talented workers and enhancing productivity (Edmans 2011). Deficient workplace practices can lead to direct and indirect costs for the firm. Direct costs include regulatory penalties, litigation, arbitration payouts, workers' compensation premiums, and even jail time and court-ordered shutdowns (Kniesner and Leeth 2014). Indirect costs include reputation loss and reduced employee morale and a decline in productivity and eventually firm value (Wei 2007; Li and Raghunandan 2019).

Still, extant literature shows that firms might sometimes resort to reducing employee count as well as investment in employee health and safety programs to appease other stakeholders. Along these lines, Graham, Harvey, and Rajgopal (2005) report that a large proportion of surveyed managers admitted they resort to reducing maintenance and employee training expenses to meet earnings benchmarks. This reduction in discretionary expenses, can decrease workplace safety and result in health and safety violations by firms. Indeed, Caskey and Ozel (2017) document an increase in employee health violations when a firm tries to meet or beat earnings expectations.

Similarly, recent studies document employment cuts and decreases in CSR activities by firms in the year following a covenant violation (He, Zhang, and Zhong 2018; Falato and Liang 2016). However, less is known about how these restructuring initiatives affect the working conditions or workplace safety for those rank-and-file employees who continue to work in these organizations after the creditors take control. In this study, we exploit the discrete nature of the covenant violation, which generates a potentially exogenous source of variation in the distance to the covenant threshold and examine the effect of creditor monitoring on investment in workplace safety.

Covenant Violations and Workplace Safety

As mentioned above, in the event of a covenant violation, provisions specified in the loan contract give creditors the right to accelerate, restructure or terminate the loan. A large body of evidence shows that creditors use the threat of acceleration and an increase in bargaining power to influence firm policies through a wide range of actions (Chava and Roberts 2008; Nini, Smith, and Sufi 2012; Ferreira, Ferreira, and Mariano 2018). These actions that are taken by the lender to protect the value of their claims, can affect workplace safety through two different mechanisms—tighter borrowing constraints and reduction in operating costs.

First, creditors can effectively tighten borrowing constraints by renegotiating loans on less favorable terms to borrowers. For instance, creditors can use their acceleration rights to extract amendment fees, reduce unused credit availability, reduce covenant slack and increase interest rates and collateral requirements. Consistent with tighter borrowing constraints, Roberts and Sufi (2009) documents that there is a significant reduction in net debt issuance following a covenant violation especially among firms with high leverage or no credit rating. To the extent that covenant violations lead to an increase in borrowing constraints, firms that experience a covenant violation will reduce investments, including investment in employee safety.

Second, in order to avoid stricter credit terms and to ensure continued access to credit after a covenant violation, firms may decide to reduce operating costs by cutting jobs in order to reassure creditors about the efficiency of their operations. Consistent with the cost reduction channel, Falato and Liang (2016) documents a 10% reduction in the number of employees, in the year following a debt covenant violation. This reduction in labor force may overburden the remaining employees, eventually leading to accidents and employee health violations.

Based on the above discussion, our first hypothesis stated in the alternative form is as follows:

H1a: The number of employee health and safety violations should increase in the year

following a debt covenant violation.

H1b: The total value of penalties for employee health and safety violations should increase in the year following a debt covenant violation.

While the previous section focuses on identifying the average effect of covenant violations on workplace safety, we expect cross-sectional variation in this effect. In particular, because covenants are designed to mitigate agency problems between the borrower and the lender, the ramifications of a covenant violation should covary with the severity of this problem. Moreover, to the extent financial constraints are driven by underlying information or agency problems, firms that face financial constraints will experience a greater effect on workplace safety relative to unconstrained firms.

To ensure the robustness of our results, we use different proxies to test the above conjecture. Our first proxy is the presence of a credit rating. Since most firms with a credit rating have publicly traded debt, banks can learn from the information impounded in bond prices, consistent with the feedback effect documented by Chen, Goldstein, and Jiang (2007). Moreover, unrated firms may simply be more risky and financially constrained because they do not have access to the bond markets, thereby increasing agency problems (Jensen and Meckling 1976). Related to the first measure, our second proxy is the level of financial leverage. Firms that have a huge amount of existing debt, cannot borrow additional funds for future investments even when those investments can increase the value of the firm (Lamont 1995). Based on the above reasoning we predict that unrated firms and firms with high leverage will experience greater issues with workplace safety after a covenant violation, relative to other firms.

H2: The effect of creditor control on workplace safety is greater for firms that do not have credit ratings or for firms that have a high leverage ratio relative to other firms in the sample.

Next, we examine how employee bargaining power moderates the relation between workplace safety and creditor control rights. We use union coverage or membership as a proxy for

employee bargaining power (Hirsch 2008). A strong labor union can ensure that employee working conditions are safe and fair. It can also deter the firms' management from overexerting their employees and therefore we expect the effect of creditor control on workplace safety to be less severe for firms that have high union coverage relative to other firms in the sample.

H3: The effect of creditor control on workplace safety is less severe for firms that have high union coverage relative to other firms

III. Sample Selection and Variable Measurement

Our sample consists of observations at the intersection of Compustat, Dealscan and the Violation Tracker database for our sample period of 2000-2017. Our sample period begins in 2000, which is the first year when Violation Tracker started collecting data on health and safety violations in US public firms.

We start with the quarterly data in the Compustat database, excluding financial firms (SIC codes 6000-6999). In the event of a debt covenant violation the borrower must promptly notify the creditor and the transfer of control rights takes place almost immediately. Consistent with prior research we use quarterly instead of annual frequency of accounting data because quarterly data helps us to accurately identify the time period when the covenant violation takes place.

The Dealscan database consists of unique loan contracts identified as packages. A package typically consists of one or more facilities such as term loan, revolving credit, line of credit, and so forth. Contractual terms such as covenants including performance pricing, dividend restrictions and collateral requirements are listed at the package level and apply to all the facilities within a package. Other attributes such as interest rates and maturity vary at the facility level.

We merge private loan contracts in the Dealscan database with borrowers' financial

data from Compustat using the Compustat-Dealscan link file provided by Michael Roberts on his website (Chava and Roberts 2008). We then create our sample containing firm-quarter observations in which firms are bound by either a current ratio or a net worth covenant. Since covenants generally apply to all loans in a package, we define the time period over which the firm is bound by the covenant as starting with the earliest facility start date in the package and ending with the latest facility end date. A firm is in violation of a covenant if the value of its accounting variable breaches the covenant threshold, that is, when either the current ratio or the net worth falls below the corresponding threshold. We focus on the net worth covenants and the current ratio covenants because as documented by prior research, these covenants are used more frequently and the accounting measures used for these covenants are standardized and unambiguous. To mitigate the impact of outliers, we winsorize all continuous variables at the 1% and 99% levels.

While covenant violations appear to be straightforward conceptually, the measurement of the covenant thresholds poses several measurement issues. Consistent with Chava and Roberts (2008) we deal with the measurement issues as follows: 1) When firms enter into multiple deals that overlap (i.e., one deal matures after the start of another deal), we define the relevant covenant to be the tightest unless it corresponds to a refinancing deal, in which case we define the relevant covenant to be that specified by the refinancing regardless of whether it is tightest. 2) When there are dynamic covenants that change over the life of the loan but for which information on the covenant dynamics is incomplete, we linearly interpolate the covenant thresholds over the life of the loan.

We obtain data on all enforcement actions of the Occupational Safety and Health Administration of the U.S. Department of Labor from the Violation Tracker database. OSHA is authorized by the Occupational Safety Health Act of 1970 (OSH Act) to ensure that employers provide safe working conditions that are free of hazards, by setting and enforcing standards. Enforcement actions are the result of imminent danger situations, severe injuries and illnesses, worker complaints, referrals of other agencies or targeted inspections. The Vi-

olation Tracker database provides information about the date of the enforcement action, location, parent company name and stock ticker for publicly listed firms and the penalty amount.

We merge the Violation Tracker dataset to our Dealscan-Compustat merged data set. Consistent with prior research (Heese and Pérez-Cavazos 2019; Chircop, Tarsalewska, and Trzeciakiewicz 2019), we assume that if there are no reported offenses for a firm in a particular quarter, then the frequency of health and safety violations and the value of penalties for that firm in that quarter is equal to zero. We drop all observations with missing values for relevant variables. The above procedure yields 23,930 firm quarter observations for 2049 unique firms.

Table 1 Panel A provides summary statistics for the final sample of 23930 firm-quarter observations for 2049 unique non-financial firms that are bound by either a current ratio or a net worth covenant over the period 2000 to 2017. Consistent with prior research, the number of firm-quarter observations classified to be in violation of debt covenant is 21% (Falato and Liang 2016). The average firm in our sample has 0.31 employee health and safety violations ($ACCIDENTS$) and an average penalty of $ 5,591 in quarter t through $t+3$. Firms in our sample have a mean (median) market value of $1,035M ($254M), Market-to-Book ratio of 2.13 (1.46), return on assets of 0.03 (0.03), and a leverage ratio of 0.20 (0.17). About 24% of the sample firms have credit ratings. In Panel B, we present summary statistics for the discontinuity sample. The mean number of accidents for firms that violate covenants is higher than that of firms that do not violate covenants (0.38 vs 0.16). Other firm characteristics such as return on assets, leverage ratio, ratings and asset turnover ratio are comparable across the two groups.

IV. Research Design and Empirical Analysis

Our empirical specification follows Chava and Roberts (2008) and exploits their insight that the "tightness" of loan covenants, that is, the distance between the covenant threshold

and the actual accounting measure, can be used to estimate the causal effect of creditor control. In particular, we consider covenant violations as the treatment and non violations as the control in a Regression Discontinuity Design. We can do so because the treatment effect is a discontinuous function of the distance between the underlying accounting variable and the covenant threshold. Our baseline empirical model is:

$$ACCIDENT_{it,t+n} = \alpha_0 + \beta_1 COV\_VIOLATION_{i,t-1} + \beta_2 X_{i,t-1} + \gamma_t + \lambda_j + \epsilon_{it}, \quad (1)$$

where the dependent variable $ACCIDENT_{it,t+n}$ represents our measures for employee health and safety violations by firm i in $n+1$ quarters after a debt covenant violation. We capture the incidence of health and safety violations using the number of violations and the severity of these violations using the value of penalties mandated for identified violations. Our treatment variable, $COV\_VIOLATION_{i,t-1}$ is an indicator variable that equals one when net worth, tangible net worth or current ratio falls below the corresponding loan covenant threshold for the firm i in quarter $t-1$. $X_{i,t-1}$ is a vector of control variables measured in quarter $t-1$, γ_t represents the year-quarter fixed effect, λ_j represents the industry fixed effect, and ϵ_{it} represents the random error term. The parameter of interest is β_1, which represents the impact of a covenant violation on employee health and safety violations (i.e., the treatment effect).

Consistent with (Caskey and Ozel 2017) we include several control variables that are known to be correlated with workplace safety and covenant violations. ($SIZE$) is the natural logarithm of total assets. ($LEVERAGE$) is the ratio of total book value of debt to book value of total assets. ($RATINGS$) is an indicator variable that equals one for firm quarter observations with non-missing credit ratings, zero otherwise. (ROA) is the return on assets calculated as the ratio of operating income before depreciation to book value of total assets. ($ASSET\_TURNOVER$) is the ratio of total gross sales to book value of total assets. (MB) is the ratio of market value of equity to book value of equity. ($TANGIBILITY$)

is the ratio of net property, plant and equipment to the lagged book value of total assets. ($CAPEX$) is the ratio of the current quarter capital expenditure to lagged book value of total assets. (REV_EMP) is revenue per employee and is calculated as the ratio of total sales to total number of employees in the year, similarly ($PROD\_EMP$) is production per employee measured as the sum of cost of goods sold and inventory divided by total number of employees in the year. Note that we use the total number of employees in a year as a proxy for the number of employees in a quarter because the Compustat variable (EMP) is available only at the yearly frequency, nonetheless, it allows us to control for the labor intensity of the firm. Following prior research, we include the distance from technical default ($DISTANCE\_DEFAULT$) as a control to isolate the treatment effect at the point of discontinuity and address the concern that the distance to the covenant threshold may contain information about financial constraints not captured by the other controls.

Table 2 presents results from estimating equation (1). In Panel A, columns (1 and 2), the dependent variable is $ACC_{t,t+3}$, calculated as the number of health and safety violations experienced by a firm i in quarter t through $t+3$. In Column (3 and 4) the dependent variable is $ln(ACC)_{t,t+3}$, calculated as the natural logarithm of the number of health and safety violations. The results show that there is a significant increase in the number of health and safety violations after a covenant violation ($\beta_1 = 0.070, t = 4.95$). The results are similar across all specifications and imply that in the four quarters following a covenant violation, the number of accidents increases by 22% .

Because the discontinuity is the source of identifying information, we also estimate equation (1) on the subsample of firm-quarter observations that are close to the point of discontinuity. We follow Chava and Roberts (2008) and define the "Discontinuity Sample" as those firm-quarter observations for which the absolute value of the relative distance between the accounting variable (current ratio or net worth) and the corresponding covenant threshold is less than +- 20%. [2]

[2]See Chava and Roberts (2008) and Falato and Liang (2016) for the discussion on the optimal bandwidth that minimizes MSE, to create the discontinuity sample.

We start by graphically presenting the number of accidents within a narrow window (+- 20%) around the covenant threshold. In Figure 1 we plot the natural logarithm of the number of accidents in four quarters (vertical axis) against the relative (percent) distance from the covenant threshold (horizontal axis). The figure shows a clear discontinuity in the number of accidents around the covenant threshold. This is consistent with the full sample results in Panel A, that covenant violation is associated with a significant increase in health and safety violations.

In Panel B, we estimate equation (1) for the discontinuity sample. All the specifications in Columns (1) through (4) replicate those in Panel A. The estimation results show that the effect of covenant violations on employee health and safety violations remains statistically significant in the subsample of firms-quarters within +- 20% around the covenant threshold ($\beta_1 = 0.077, t = 3.22$). In terms of economic significance, the estimated coefficient in Column (1) suggests that covenant violations are associated with a 25% increase in the number of accidents in the next four quarters relative to firms that do not experience a covenant violation.

Given our results that the number of accidents increases after a firm experiences a covenant violation, we examine the severity of these accidents in the next set of regressions. Table 3 Panel A presents the results for these tests. Specifically, in Column (1) and Column (2) we present the results for equation (1) where the dependent variable is $ln(PENALTY)_{t,t+3}$, calculated as the natural logarithm of one plus the total value of penalties suffered by a firm i in quarter t through $t+3$, while in Column (3) and Column (4) the dependent variable is $Q(PENALTY)_{t,t+3}$, a categorical variable created from the transformation of the dollar value of penalties into deciles. The coefficient on $COV\_VIOLATION$ is positive and significant ($\beta_1 = 0.144, t = 4.99$) across all specifications, indicating that over the four quarters following a covenant violation the penalties associated with employee health and safety violations increase significantly. In terms of economic significance average penalty amounts increase by about 83% over the four quarters following a covenant violation.

In Panel B we replicate the analysis in Panel A for the discontinuity sample. The results for this sample are similar to the full sample results and the effect of covenant violations on the amount of penalties remains similar to the earlier estimates. These tests together show the robustness of our findings and establish the causal effect of covenant violations on the subsequent employee health and safety violations. Overall our results are consistent with the fact that covenant violations have a non-trivial effect on workplace safety.

V. Cross-sectional Tests

Financial Constraints

In this section, we examine whether the effect of creditor control on workplace safety is greater for firms that face financial constraints. We partition the discontinuity sample into two subsets based on the presence or absence of a credit rating. $RATINGS$ is an indicator variable that equals one if the firm-quarter observation has a non-missing credit rating, zero otherwise. Table 4 Panel A presents the results for the cross-sectional analysis. In Columns (1 and 2), the dependent variable is the natural logarithm of one plus the total number of health and safety violations over four quarters. Column (1) contains a subsample of firms which do not have a credit rating (Ratings = 0) and Column (2) contains a subsample of firms that have a credit rating (Ratings = 1). In Column (1) the coefficient on ($COV\_VIOLATION$) is positive and significant ($\beta_1 = 0.023, t = 3.19$), in contrast, in Column (2) the coefficient on ($COV\_VIOLATION$) is not significant ($\beta_1 = 0.015, t = 1.28$). This result is consistent with the argument that the effect of covenant violations on workplace safety is greater for firms without a credit rating compared to other firms in the sample.

In Columns (3 and 4), the dependent variable is the natural logarithm of one plus the total value of penalties over four quarters. We observe the same pattern in Columns (3 and 4). The amount of penalties increases in the four quarters following a covenant violation for firms without a credit rating but not for firms that have a credit rating, which is consistent

with the fact that firms with credit ratings have access to the public debt market and hence have more bargaining power and therefore they are less affected by the financial constraints posed by lenders after a covenant violation relative to firms that do not have credit ratings.

In table 4 Panel B, I partition the sample based on financial leverage calculated as total debt divided by total assets at the beginning of the quarter. $LEVR$ is an indicator that equals one if the firm has above median financial leverage, zero otherwise. As expected, firms with high leverage experience an increase in the number of accidents ($\beta_1 = 0.043, t = 3.12$) and the total penalty amount ($\beta_1 = 0.228, t = 3.08$) in the four quarters following a covenant violation. We do not observe any such effect on firms that have low levels of financial leverage. This result is consistent with the debt overhang argument. Firms that have higher levels of debt face difficulty in raising additional capital and therefore are more affected by creditor intervention in the event of a covenant violation. These results provide support to H2 by showing that the negative effect of creditor control on workplace safety is more pronounced for firms that face financial constraints.

Employee Bargaining Power

In this section, We examine whether employee bargaining power moderates the relation between creditor control and workplace safety. I partition the discontinuity sample based on the percentage of employees covered by labor unions. $UNION$ is an indicator variable that equals one if the firm's employee membership in the labor unions is high; zero otherwise. Table 5 presents the results. Consistent with our expectations, we observe that there is no significant relation between creditor control and workplace safety for firms that are in the highest quartile of employee union membership ($\beta_1 = 0.010, t = 1.57$). However, we observe a significant increase in employee related health and safety violations ($\beta_1 = 0.021, t = 2.91$) and associated penalties ($\beta_1 = 0.113, t = 2.85$) over the four quarters following a covenant violation for other firms in the sample. These results suggest that active labor unions mitigate the extent to which creditor intervention impacts workplace safety.

In sum, the results from our cross-sectional tests bolster our main hypothesis that creditor intervention has a negative impact on workplace safety for the rank-and-file employees and these effects are more severe for firms that face financial constraints and less severe for firms that have high unionization.

VI. Robustness Tests and Additional Analyses

Entropy Balancing

A regression discontinuity design (RDD) enables the estimation of the average treatment effect in environments where randomization is not feasible. The main assumption in the RDD design is that the observations lying closely on either side of the threshold are relatively similar and therefore an RDD helps elicit the causal effects of the interventions. However, to further alleviate the concerns that firms that violate covenants are different from firms that do not violate covenants, we use entropy balancing. Entropy balancing works by re-weighting the observations in the control group to ensure that different moments of covariates are balanced between treatment and control groups while keeping weights as close as possible to their original values (Hainmueller 2012). We consider the firms that violate covenants as the treatment group and firms that do not violate covenants as the control group.

Table 6 panel A and B provide the summary statistics before and after entropy balancing. As shown in these tables, after we incorporate the new weighting scheme, the statistics are almost similar between the firms that violate covenants and firms that do not violate covenants. Table 6 Panel C presents the results after incorporating entropy balancing. The dependent variable in Column(1) is the natural logarithm of one plus the total number of employee-related health and safety violations for firm i in quarter t through $t+3$. In Column (2) the dependent variable is the natural logarithm of one plus the total value of penalties for employee-related health and safety violations for firm i in quarter t through $t+3$ and in Column (3) the dependent variable is a categorical variable dividing the sample into deciles

based on the total value of penalties for employee-related health and safety violations in quarter t through $t+3$. The results are qualitatively similar to the results in our main tests, which provides confidence in the robustness of our results. However, we acknowledge that covariate balance can only be achieved for observed characteristics (Shipman, Swanquist, and Whited 2016).

Total Case Rate

In this section, we use an alternative dataset i.e., the establishment level data from the OSHA survey of employee injuries and illness conducted under the OSHA Data Initiative program (ODI). The limitation with this dataset is that the ODI program was active only during the years 1996 to 2011 and therefore considerably shortens the sample period. Moreover, the ODI survey covers larger establishments from industries that OSHA classifies as high-hazard. Industries classified as low hazard are exempt from ODI.[3] In these tests the dependent variable is the total case rate TCR, which is calculated by OSHA as the total number of cases divided by the number of hours worked by all employees in the establishment by 200,000. Table 7 Panel A presents the results for the full sample. In Column(1) we include industry fixed effects and in Column (2) we include industry fixed effects and year-quarter fixed effects. As expected, there is a positive and significant coefficient for $COV\_VIOLATION$ in both the specifications. In panel B we replicate the same analyses in the discontinuity sample. Results in the discontinuity sample are qualitatively similar and provide more support to our hypothesis that in the event of a covenant violation, financial restrictions and cost reduction pressures imposed by creditors can deteriorate workplace safety.

[3]Please refer to (Caskey and Ozel 2017) for a detailed list of industries classified as the high-hazard and low-hazard groups. The authors also note that there could be some degree of underreporting of accidents and record keeping errors in the ODI survey data.

VII. Conclusion

Our paper identifies a specific mechanism through which financing frictions affect workplace safety—transfer of control rights to creditors. Using a regression discontinuity design, we find that the frequency of workplace illnesses and injuries and the dollar value of penalties suffered by the firm increase sharply after a covenant violation. This effect is greater among firms that have more severe financial constraints. Additionally, we also find that the effect of creditor intervention on workplace safety is weaker for firms with a strong labor union. These results are robust to entropy balancing and a host of alternative specifications. Overall, we provide compelling evidence on how creditor control rights influence the working conditions of rank-and-file employees.

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APPENDIX A
Variable Definitions

Variable	Description
Dependent Variables	
$ACC_{t,t+3}$	Total number of employee-related health and safety violations for firm i in quarter t through $t+3$.
$ln(ACC)_{t,t+3}$	Natural logarithm of one plus the total number of employee-related health and safety violations for firm i in quarter t through $t+3$.
PENALTIES	Total value of penalties for employee-related health and safety violations for firm i in quarter t through $t+3$.
$ln(PENALTY)_{t,t+3}$	Natural logarithm of one plus the total value of penalties for employee-related health and safety violations for firm i in quarter t through $t+3$.
$Q(PENALTY)_{t,t+3}$	Categorical variable dividing the sample into deciles based on the total value of penalties for employee-related health and safety violations in quarter t through $t+3$.
Independent Variable	
COV_VIOLATION	Indicator variable that equals one when net worth, tangible net worth or current ratio falls below the corresponding loan covenant threshold for firm i in quarter $t-1$, zero otherwise.
Control Variables	
SIZE	Natural log of total assets .
MB	Market value of equity divided by book value of equity.
ROA	Return on assets, calculated as the operating income before depreciation divided by total assets.
LEVERAGE	Total long term debt divided by total assets.
RATINGS	Indicator variable that equals one for firm quarter observations with non-missing credit ratings, zero otherwise .
ASSET_TURNOVER	Current quarter sales divided by beginning total assets.
CAPEX	Current quarter capital expenditure divided by beginning total assets.
TANGIBILITY	Net property, plant, and equipment divided by beginning total assets.

APPENDIX A (continued)

Variable	Description
REV_EMP	Revenue per employee, calculated as total sales for firm i divided by total number of employees.
PROD_EMP	Production per employee, calculated as sum of cost of goods sold and inventory for firm i divided by total number of employees.
DISTANCE_DEFAULT	Distance from technical default with respect to the three covenants.
Partitioning Variables	
LEVR	Indicator variable that equals one if the firm reports above median leverage ratio, zero otherwise.
UNION	Indicator variable that equals one if the firm's union membership is in the highest quartile, zero otherwise.
GUIDANCE	Indicator variable that equals one if the firm has issued a management forecast in the last 12 months, zero otherwise.

TABLE 1
Descriptive Statistics

This table provides descriptive statistics. Panel A provides statistics on key variables for the entire sample and Panel B for the discontinuity sample. All variables are defined in Appendix A.

Panel A: Full Sample

	N	Mean	P25	Median	P99	SD
PENALTIES	23,930	5591.31	0.00	0.00	72000.00	94802.78
ACCIDENTS	23,930	0.31	0.00	0.00	6.00	4.68
COV_VIOLATION	23,930	0.21	0.00	0.00	1.00	0.40
MB	23,930	2.13	0.90	1.46	14.36	2.23
MVE	23,885	1035.02	60.63	254.88	15929.95	2328.25
TOTAL ASSETS	23,930	1225.23	103.16	320.13	18939.00	2765.56
ROA	23,930	0.03	0.01	0.03	0.12	0.04
LEVERAGE	23,930	0.20	0.03	0.17	0.68	0.18
RATINGS	23,930	0.24	0.00	0.00	1.00	0.43
ASSET_TURNOVER	23,930	0.31	0.15	0.27	1.15	0.22
CAPEX	23,930	0.05	0.01	0.02	0.40	0.07
TANGIBILITY	23,930	0.37	0.12	0.27	1.04	0.29
REV_EMP	23,930	138.48	33.05	55.39	1748.57	249.92
PROD_EMP	23,930	82.17	18.55	33.16	1301.29	173.63

Panel B: Discontinuity Sample

	Cov_Violation=1			Cov_Violation=0		
	N	Mean	Median	N	Mean	Median
PENALTIES	1,253	6,135.80	0.00	3,260	2546.04	0.00
ACCIDENTS	1,253	0.38	0.00	3,260	0.16	0.00
MB	1,253	1.85	1.28	3,260	1.62	1.17
MVE	1,249	757.48	127.32	3,256	616.91	166.38
TOTAL ASSETS	1,253	1121.84	238.52	3,260	933.57	274.90
ROA	1,253	0.02	0.02	3,260	0.02	0.02
LEVERAGE	1,253	0.24	0.22	3,260	0.20	0.18
RATINGS	1,253	0.24	0.00	3,260	0.23	0.00
ASSET_TURNOVER	1,253	0.32	0.26	3,260	0.33	0.29
CAPEX	1,253	0.06	0.02	3,260	0.04	0.02
TANGIBILITY	1,253	0.43	0.36	3,260	0.35	0.26
REV_EMP	1,253	186.19	60.77	3,260	107.96	48.43
PROD_EMP	1,253	110.29	39.58	3,260	69.06	30.85

TABLE 2
Loan Covenant Violations and Workplace Safety

Panel A: Full Sample - Accident Frequency

	$ACC_{t,t+3}$	$ACC_{t,t+3}$	$ln(ACC)_{t,t+3}$	$ln(ACC)_{t,t+3}$
COV_VIOLATION	0.070***	0.075***	0.025***	0.025***
	(4.95)	(5.25)	(5.10)	(5.12)
MB	0.002*	0.006***	0.002***	0.002***
	(1.84)	(4.73)	(4.35)	(4.85)
SIZE	0.087***	0.075***	0.031***	0.026***
	(15.95)	(14.58)	(16.34)	(14.79)
ROA	-0.056	-0.162**	-0.088***	-0.053**
	(-0.83)	(-2.27)	(-3.67)	(-2.12)
RATINGS	-0.026*	0.006	-0.010*	0.002
	(-1.64)	(0.41)	(-1.86)	(0.40)
ASSET_TURNOVER	0.117***	0.160***	0.050***	0.054***
	(6.37)	(7.43)	(6.89)	(7.36)
CAPEX	-0.330***	-0.138***	-0.055***	-0.048***
	(-7.34)	(-2.86)	(-3.72)	(-2.86)
TANGIBILITY	-0.022	-0.040*	-0.007	-0.013
	(-1.17)	(-1.66)	(-0.84)	(-1.61)
REV_EMP	-0.000***	-0.000***	-0.000***	-0.000***
	(-8.85)	(-7.56)	(-6.90)	(-7.70)
PROD_EMP	0.000	-0.000	-0.000	-0.000
	(0.23)	(-0.32)	(-0.34)	(-0.40)
DISTANCE_DEFAULT	0.009	0.011**	0.003*	0.004**
	(1.59)	(2.06)	(1.75)	(2.18)
Year Quarter FE	No	Yes	No	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.04	0.06	0.05	0.06
Observations	23,930	23,930	23,930	23,930

In this table we examine the effect of covenant violations on workplace safety. The sample consists of firm-quarter observations of non-financial firms that have effective covenants restricting the current ratio, net worth, or tangible net worth. In Columns (1) and (2) the dependent variable is $ACC_{t,t+3}$, the frequency of accidents in quarter t through quarter $t+3$ and in Columns (3) and (4) the dependent variable is $ln(ACC)_{t,t+3}$ the natural logarithm of one plus the number of accidents in quarter t through quarter $t+3$. The independent variable is $COV\_VIOLATION$, an indicator variable that equals one when net worth, tangible net worth or current ratio falls below the corresponding loan covenant threshold for firm i in quarter $t-1$, zero otherwise. Control variables are defined in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. The table reports t-statistics (in parentheses below the point estimates.) based on standard errors robust to heteroskedasticity and within-firm serial correlation. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel B: Discontinuity sample - Accident Frequency

	$ACC_{t,t+3}$	$ACC_{t,t+3}$	$ln(ACC)_{t,t+3}$	$ln(ACC)_{t,t+3}$
COV_VIOLATION	0.077***	0.067***	0.025***	0.022***
	(3.22)	(2.95)	(3.16)	(2.89)
MB	0.009***	0.007**	0.003***	0.002**
	(3.23)	(2.38)	(3.13)	(2.52)
SIZE	0.084***	0.073***	0.031***	0.025***
	(6.07)	(5.86)	(6.26)	(5.94)
ROA	-0.112	-0.208	-0.070	-0.061
	(-0.65)	(-1.11)	(-1.16)	(-0.91)
LEVERAGE	-0.039	0.019	-0.012	0.004
	(-0.91)	(0.39)	(-0.71)	(0.27)
RATINGS	-0.004	0.031	-0.000	0.011
	(-0.11)	(0.98)	(-0.01)	(1.01)
ASSET_TURNOVER	0.092***	0.112***	0.040***	0.038***
	(2.91)	(3.24)	(3.61)	(3.20)
CAPEX	-0.433***	-0.139	-0.065**	-0.043
	(-4.18)	(-1.22)	(-2.20)	(-1.09)
TANGIBILITY	0.018	0.062	0.026	0.019
	(0.54)	(1.36)	(1.63)	(1.21)
REV_EMP	-0.000***	-0.000**	-0.000***	-0.000**
	(-5.56)	(-2.53)	(-4.10)	(-2.54)
PROD_EMP	0.000	-0.000	0.000	-0.000
	(0.06)	(-0.09)	(0.02)	(-0.15)
Year Quarter FE	No	Yes	No	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.04	0.08	0.06	0.07
Observations	4,513	4,513	4,513	4,513

In this table we examine the effect of covenant violations on workplace safety. The sample consists of firm-quarter observations of non-financial firms that have effective covenants restricting the current ratio, net worth, or tangible net worth and the default distance with respect to these covenants is within a narrow bandwidth. In Columns (1) and (2) the dependent variable is $ACC_{t,t+3}$, the frequency of accidents in quarter t through quarter $t+3$ and in Columns (3) and (4) the dependent variable is $ln(ACC)_{t,t+3}$ the natural logarithm of one plus the number of accidents in quarter t through quarter $t+3$. The independent variable is $COV\_VIOLATION$, an indicator variable that equals one when net worth, tangible net worth or current ratio falls below the corresponding loan covenant threshold for firm i in quarter $t-1$, zero otherwise. Control variables are defined in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. The table reports t-statistics (in parentheses below the point estimates.) based on standard errors robust to heteroskedasticity and within-firm serial correlation. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

TABLE 3

Loan Covenant Violation and OSHA Penalties

Panel A: Full Sample

	$ln(PENALTY)_{t,t+3}$	$ln(PENALTY)_{t,t+3}$	$Q(PENALTY)$	$Q(PENALTY)$
COV_VIOLATION	0.144***	0.144***	0.082***	0.083***
	(4.99)	(5.00)	(5.44)	(5.55)
MB	0.011***	0.013***	0.004***	0.004***
	(4.42)	(4.93)	(3.60)	(3.99)
SIZE	0.184***	0.153***	0.084***	0.066***
	(16.44)	(14.83)	(13.80)	(12.66)
ROA	-0.509***	-0.304**	-0.294***	-0.165***
	(-3.53)	(-2.03)	(-5.02)	(-2.67)
RATINGS	-0.059*	0.014	-0.023	0.020
	(-1.79)	(0.43)	(-1.40)	(1.37)
ASSET_TURNOVER	0.299***	0.320***	0.145***	0.157***
	(6.88)	(7.32)	(7.19)	(7.76)
CAPEX	-0.317***	-0.295***	-0.144***	-0.113**
	(-3.45)	(-2.82)	(-3.85)	(-2.51)
TANGIBILITY	-0.041	-0.078	-0.009	-0.031
	(-0.84)	(-1.56)	(-0.39)	(-1.32)
REV_EMP	-0.000***	-0.000***	-0.000***	-0.000***
	(-7.05)	(-7.81)	(-6.42)	(-6.96)
PROD_EMP	-0.000	-0.000	0.000	-0.000
	(-0.39)	(-0.43)	(0.07)	(-0.26)
DISTANCE_DEFAULT	0.020*	0.025**	0.007	0.009
	(1.83)	(2.27)	(1.28)	(1.63)
Year Quarter FE	No	Yes	No	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.05	0.06	0.04	0.06
Observations	23,930	23,930	23,930	23,930

In this table we examine the effect of covenant violations on the value of penalties associated with workplace safety. The sample consists of firm-quarter observations of non-financial firms that have effective covenants restricting the current ratio, net worth, or tangible net worth. In Column (1) and Column (2) the dependent variable is $ln(PENALTY)_{t,t+3}$, calculated as the natural logarithm of one plus the total value of penalties suffered by a firm i in quarter t through $t+3$, while in Column (3) and Column (4) the dependent variable is $Q(PENALTY)_{t,t+3}$, a categorical variable created from the transformation of the dollar value of penalties into deciles. The independent variable is $COV\_VIOLATION$, an indicator variable that equals one when net worth, tangible net worth or current ratio falls below the corresponding loan covenant threshold for firm i in quarter $t-1$, zero otherwise. Control variables are defined in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. The table reports t-statistics (in parentheses below the point estimates.) based on standard errors robust to heteroskedasticity and within-firm serial correlation. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel B: Discontinuity sample

	$ln(PENALTY)_{t,t+3}$	$ln(PENALTY)_{t,t+3}$	$Q(PENALTY)$	$Q(PENALTY)$
COV_VIOLATION	0.148***	0.130***	0.086***	0.075***
	(3.10)	(2.84)	(3.33)	(3.08)
MB	0.018***	0.015***	0.005**	0.005*
	(3.20)	(2.60)	(2.07)	(1.69)
SIZE	0.181***	0.148***	0.083***	0.066***
	(6.31)	(5.98)	(5.51)	(5.40)
ROA	-0.386	-0.330	-0.352***	-0.305**
	(-1.06)	(-0.81)	(-3.21)	(-2.34)
LEVERAGE	-0.079	0.019	-0.021	0.013
	(-0.78)	(0.18)	(-0.55)	(0.33)
RATINGS	0.005	0.069	-0.003	0.038
	(0.07)	(1.03)	(-0.08)	(1.28)
ASSET_TURNOVER	0.241***	0.230***	0.111***	0.098***
	(3.54)	(3.15)	(4.00)	(3.04)
CAPEX	-0.379**	-0.248	-0.216***	-0.175
	(-2.11)	(-1.04)	(-2.99)	(-1.51)
TANGIBILITY	0.146	0.104	0.062	0.041
	(1.50)	(1.10)	(1.48)	(1.00)
REV_EMP	-0.000***	-0.000**	-0.000***	-0.000**
	(-4.01)	(-2.55)	(-3.61)	(-2.32)
PROD_EMP	0.000	-0.000	-0.000	0.000
	(0.05)	(-0.19)	(-0.89)	(0.23)
Year Quarter FE	No	Yes	No	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.06	0.07	0.05	0.08
Observations	4,513	4,513	4,513	4,513

In this table we examine the effect of covenant violations on the value of penalties associated with workplace safety. The sample consists of firm-quarter observations of non-financial firms that have effective covenants restricting the current ratio, net worth, or tangible net worth and the default distance with respect to these covenants is within a narrow bandwidth. In Column (1) and Column (2) the dependent variable is $ln(PENALTY)_{t,t+3}$, calculated as the natural logarithm of one plus the total value of penalties suffered by a firm i in quarter t through $t+3$, while in Column (3) and Column (4) the dependent variable is $Q(PENALTY)_{t,t+3}$, a categorical variable created from the transformation of the dollar value of penalties into deciles. The independent variable is $COV\_VIOLATION$, an indicator variable that equals one when net worth, tangible net worth or current ratio falls below the corresponding loan covenant threshold for firm i in quarter $t-1$, zero otherwise. Control variables are defined in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. The table reports t-statistics (in parentheses below the point estimates.) based on standard errors robust to heteroskedasticity and within-firm serial correlation. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

TABLE 4
Cross-sectional Analysis - Financial Constraints

Panel A: Ratings

	$ln(ACC)_{t,t+3}$ (Ratings=0)	$ln(ACC)_{t,t+3}$ (Ratings=1)	$ln(PENALTY)_{t,t+3}$ (Ratings=0)	$ln(PENALTY)_{t,t+3}$ (Ratings=1)
COV_VIOLATION	0.023***	0.015	0.129***	0.108
	(3.19)	(1.28)	(3.15)	(1.18)
MB	0.001*	-0.014**	0.008*	-0.071**
	(1.88)	(-2.16)	(1.86)	(-2.03)
SIZE	0.012***	0.096***	0.066***	0.525***
	(3.56)	(4.50)	(3.57)	(4.59)
ROA	-0.001	0.249	0.004	1.396
	(-0.02)	(0.76)	(0.01)	(0.76)
LEVERAGE	0.031*	0.048	0.171*	0.205
	(1.93)	(0.62)	(1.87)	(0.46)
ASSET_TURNOVER	0.032***	0.200***	0.174***	1.108***
	(2.84)	(3.58)	(2.78)	(3.48)
CAPEX	-0.022	0.091	-0.086	0.527
	(-0.49)	(0.62)	(-0.33)	(0.66)
TANGIBILITY	0.028*	-0.115*	0.146	-0.651*
	(1.71)	(-1.91)	(1.58)	(-1.88)
REV_EMP	-0.000	-0.000***	-0.000	-0.001***
	(-1.02)	(-2.98)	(-1.07)	(-2.92)
PROD_EMP	-0.000	-0.000	-0.000	-0.000
	(-0.87)	(-0.30)	(-0.83)	(-0.43)
Year Quarter FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.08	0.15	0.08	0.14
Observations	3,487	1,080	3,487	1,080

Using a regression discontinuity design, this table presents the results of cross-sectional tests based on the presence of credit ratings. $RATINGS$ is an indicator variable that equals one for firm quarter observations with non-missing credit ratings, zero otherwise. The sample consists of firm-quarter observations of non-financial firms that have effective covenants restricting the current ratio, net worth, or tangible net worth and the default distance with respect to these covenants is within a narrow bandwidth. In Columns (1) and (2) the dependent variable is $ln(ACC)_{t,t+3}$, the natural logarithm of one plus the number of accidents in quarter t through quarter $t+3$ and in Columns (3) and (4) the dependent variable is is $ln(PENALTY)_{t,t+3}$, calculated as the natural logarithm of one plus the total value of penalties suffered by a firm i in quarter t through $t+3$. The independent variable is $COV\_VIOLATION$, an indicator variable that equals one when net worth, tangible net worth or current ratio falls below the corresponding loan covenant threshold for firm i in quarter $t-1$, zero otherwise. Control variables are defined in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. The table reports t-statistics (in parentheses below the point estimates.) based on standard errors robust to heteroskedasticity and within-firm serial correlation. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel B: Leverage

	$ln(ACC)_{t,t+3}$ (Levr=0)	$ln(ACC)_{t,t+3}$ (Levr=1)	$ln(PENALTY)_{t,t+3}$ (Levr=0)	$ln(PENALTY)_{t,t+3}$ (Levr=1)
COV_VIOLATION	0.009	0.043***	0.048	0.228***
	(0.98)	(3.12)	(0.93)	(3.08)
MB	0.003**	-0.001	0.017**	-0.004
	(2.25)	(-0.55)	(2.26)	(-0.43)
SIZE	0.005	0.049***	0.027	0.269***
	(1.49)	(5.61)	(1.45)	(5.70)
ROA	0.052	-0.165	0.286	-0.833
	(0.60)	(-1.32)	(0.54)	(-1.20)
ASSET_TURNOVER	0.016	0.067***	0.099	0.360***
	(1.00)	(3.25)	(1.02)	(3.28)
RATINGS	0.089***	-0.047***	0.518***	-0.260***
	(2.83)	(-3.51)	(2.84)	(-3.48)
CAPEX	0.047	-0.011	0.305	-0.060
	(0.58)	(-0.19)	(0.64)	(-0.18)
TANGIBILITY	0.010	0.015	0.080	0.041
	(0.57)	(0.57)	(0.78)	(0.27)
REV_EMP	-0.000	-0.000**	-0.000	-0.000**
	(-0.64)	(-2.30)	(-0.67)	(-2.29)
PROD_EMP	-0.000	-0.000	-0.000	-0.000
	(-0.07)	(-0.54)	(-0.10)	(-0.59)
Year Quarter FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.09	0.12	0.08	0.12
Observations	2,380	2,215	2,380	2,215

Using a regression discontinuity design, this table presents the results of cross-sectional tests based on the level of financial leverage. $LEVR$ is an indicator variable that equals one if the firm reports above median leverage ratio, zero otherwise. The sample consists of firm-quarter observations of non-financial firms that have effective covenants restricting the current ratio, net worth, or tangible net worth and the default distance with respect to these covenants is within a narrow bandwidth. In Columns (1) and (2) the dependent variable is $ln(ACC)_{t,t+3}$, the natural logarithm of one plus the number of accidents in quarter t through quarter $t+3$ and in Columns (3) and (4) the dependent variable is is $ln(PENALTY)_{t,t+3}$, calculated as the natural logarithm of one plus the total value of penalties suffered by a firm i in quarter t through $t+3$. The independent variable is $COV\_VIOLATION$, an indicator variable that equals one when net worth, tangible net worth or current ratio falls below the corresponding loan covenant threshold for firm i in quarter $t-1$, zero otherwise. Control variables are defined in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. The table reports t-statistics (in parentheses below the point estimates.) based on standard errors robust to heteroskedasticity and within-firm serial correlation. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

TABLE 5
Cross-sectional Analysis - Labor Union

	$ln(ACC)_{t,t+3}$ (Union=0)	$ln(ACC)_{t,t+3}$ (Union=1)	$ln(PENALTY)_{t,t+3}$ (Union=0)	$ln(PENALTY)_{t,t+3}$ (Union=1)
COV_VIOLATION	0.021***	0.010	0.113***	0.002
	(2.91)	(1.57)	(2.85)	(1.42)
MB	0.002***	-0.023***	0.012***	-0.121***
	(2.62)	(-2.80)	(2.64)	(-2.77)
SIZE	0.014***	0.083***	0.077***	0.448***
	(3.80)	(4.73)	(3.84)	(4.69)
ROA	-0.026	0.457	-0.173	3.010
	(-0.60)	(0.96)	(-0.72)	(1.06)
ASSET_TURNOVER	0.028***	0.235***	0.153***	1.352***
	(2.83)	(3.53)	(2.74)	(3.49)
CAPEX	-0.066**	0.443	-0.393**	2.681*
	(-2.19)	(1.58)	(-2.24)	(1.65)
TANGIBILITY	0.042**	-0.087	0.220**	-0.520
	(2.32)	(-1.56)	(2.24)	(-1.62)
RATINGS	-0.017*	0.039	-0.084*	0.212
	(-1.93)	(1.27)	(-1.65)	(1.21)
REV_EMP	-0.000*	-0.000	-0.000*	-0.001
	(-1.73)	(-1.06)	(-1.72)	(-1.11)
PROD_EMP	0.000	0.000	-0.000	0.000
	(0.05)	(0.01)	(-0.08)	(0.05)
Year Quarter FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.07	0.18	0.06	0.18
Observations	3,578	1,017	3,578	1,017

Using a regression discontinuity design, this table presents the results of cross-sectional tests based on the strength of the labor union measured by the employee union membership. $UNION$ is an indicator variable that equals one if the firm's union membership is in the highest quartile, zero otherwise. The sample consists of firm-quarter observations of non-financial firms that have effective covenants restricting the current ratio, net worth, or tangible net worth and the default distance with respect to these covenants is within a narrow bandwidth. In Columns (1) and (2) the dependent variable is $ln(ACC)_{t,t+3}$, the natural logarithm of one plus the number of accidents in quarter t through quarter $t+3$ and in Columns (3) and (4) the dependent variable is is $ln(PENALTY)_{t,t+3}$, calculated as the natural logarithm of one plus the total value of penalties suffered by a firm i in quarter t through $t+3$. The independent variable is $COV\_VIOLATION$, an indicator variable that equals one when net worth, tangible net worth or current ratio falls below the corresponding loan covenant threshold for firm i in quarter $t-1$, zero otherwise. Control variables are defined in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. The table reports t-statistics (in parentheses below the point estimates.) based on standard errors robust to heteroskedasticity and within-firm serial correlation. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

TABLE 6

Summary Statistics before and after Entropy Balancing

Panel A: Pre-Matching

	Treatment			Control		
	Mean	Variance	Skewness	Mean	Variance	Skewness
MB	1.846	4.681	3.675	1.618	2.865	4.015
SIZE	5.553	2.78	.3052	5.655	2.312	0.145
ROA	0.022	0.0013	-1.188	0.020	0.001	-1.44
ASSET_TURNOVER	0.317	0.065	1.576	0.332	0.050	1.288
CAPEX	0.058	0.007	2.409	0.039	0.003	3.434
TANGIBILITY	0.426	0.092	0.478	0.346	0.070	0.738
LEVERAGE	0.236	0.034	0.503	0.196	0.028	0.689
REV_EMP	186.2	95358	2.969	108	41557	5.290
PROD_EMP	110.3	51436	3.99	69.06	21069	6.132

Panel B: Post-Matching

	Treatment			Control		
	Mean	Variance	Skewness	Mean	Variance	Skewness
MB	1.846	4.681	3.675	1.846	4.681	3.675
SIZE	5.553	2.780	0.305	5.554	2.779	0.305
ROA	0.022	0.001	-1.188	0.022	0.001	-1.188
ASSET_TURNOVER	0.317	0.065	1.576	0.317	0.065	1.576
CAPEX	0.058	0.007	2.409	0.058	0.007	2.409
TANGIBILITY	0.426	0.092	0.478	0.426	0.092	0.478
LEVERAGE	0.236	0.034	0.503	0.236	0.034	0.503
REV_EMP	186.2	95358	2.969	186.2	95340	2.969
PROD_EMP	110.3	51436	3.99	110.3	51426	3.99

Panel C: Loan Covenant Violations and Workplace safety: Entropy Balancing

	$ln(ACC)_{t,t+3}$	$ln(PENALTY)_{t,t+3}$	Q(PENALTY)
COV_VIOLATION	0.013**	0.087**	0.059***
	(2.22)	(2.24)	(2.73)
MB	0.002*	0.011*	0.005
	(1.85)	(1.84)	(1.46)
SIZE	0.028***	0.183***	0.090***
	(5.81)	(5.81)	(5.14)
ROA	-0.000	-0.022	-0.207
	(-0.00)	(-0.04)	(-1.26)
LEVERAGE	0.006	0.043	0.004
	(0.36)	(0.36)	(0.07)
RATINGS	-0.012	-0.076	-0.011
	(-1.09)	(-1.08)	(-0.35)
ASSET_TURNOVER	0.040***	0.261***	0.139***
	(3.25)	(3.26)	(2.96)
CAPEX	-0.022	-0.152	-0.107
	(-0.52)	(-0.54)	(-0.68)
TANGIBILITY	0.028	0.183	0.098*
	(1.51)	(1.52)	(1.75)
REV_EMP	-0.000***	-0.000***	-0.000***
	(-2.79)	(-2.79)	(-2.66)
PROD_EMP	-0.000	-0.000	0.000
	(-0.16)	(-0.16)	(0.12)
Year Quarter FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Adjusted R^2	0.10	0.11	0.12
Observations	4,567	4,567	4,567

In this table we replicate the main results after incorporating Entropy Balancing. The sample consists of firm-quarter observations of non-financial firms that have effective covenants restricting the current ratio, net worth, or tangible net worth and the default distance with respect to these covenants is within a narrow bandwidth. The dependent variable in Column(1) is $ln(ACC)_{t,t+3}$, the natural logarithm of one plus the total number of employee-related health and safety violations for firm i in quarter t through $t+3$. In Column (2) the dependent variable is $ln(PENALTY)_{t,t+3}$, the natural logarithm of one plus the total value of penalties for employee-related health and safety violations for firm i in quarter t through $t+3$ and in Column (3) the dependent variable is $Q(PENALTY)_{t,t+3}$, a categorical variable dividing the sample into deciles based on the total value of penalties for employee-related health and safety violations in quarter t through $t+3$. The independent variable is $COV\_VIOLATION$, an indicator variable that equals one when net worth, tangible net worth or current ratio falls below the corresponding loan covenant threshold for firm i in quarter $t-1$, zero otherwise. Control variables are defined in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. The table reports t-statistics (in parentheses below the point estimates.) based on standard errors robust to heteroskedasticity and within-firm serial correlation. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

TABLE 7
Loan Covenant Violations and Total Case Rates

Panel A: Establishment level Full Sample

	(TCR)	(TCR)
COV_VIOLATION	0.686***	0.353***
	(7.36)	(3.91)
MB	0.037**	0.006
	(2.46)	(0.42)
SIZE	1.147***	0.965***
	(42.78)	(35.22)
ROA	-3.763***	-4.828***
	(-4.07)	(-5.36)
RATINGS	0.335***	0.211*
	(2.68)	(1.75)
ASSET_TURNOVER	5.891***	4.853***
	(28.15)	(23.46)
CAPEX	2.715***	0.678
	(4.68)	(1.16)
TANGIBILITY	1.999***	2.021***
	(10.89)	(11.31)
REV_EMP	-0.003***	-0.003***
	(-16.53)	(-13.75)
PROD_EMP	-0.003***	-0.002***
	(-8.20)	(-6.07)
DISTANCE_DEFAULT	-0.207***	-0.279***
	(-6.21)	(-8.38)
Year Quarter FE	No	Yes
Industry FE	Yes	Yes
Adjusted R^2	0.25	0.30
Observations	22,634	22,634

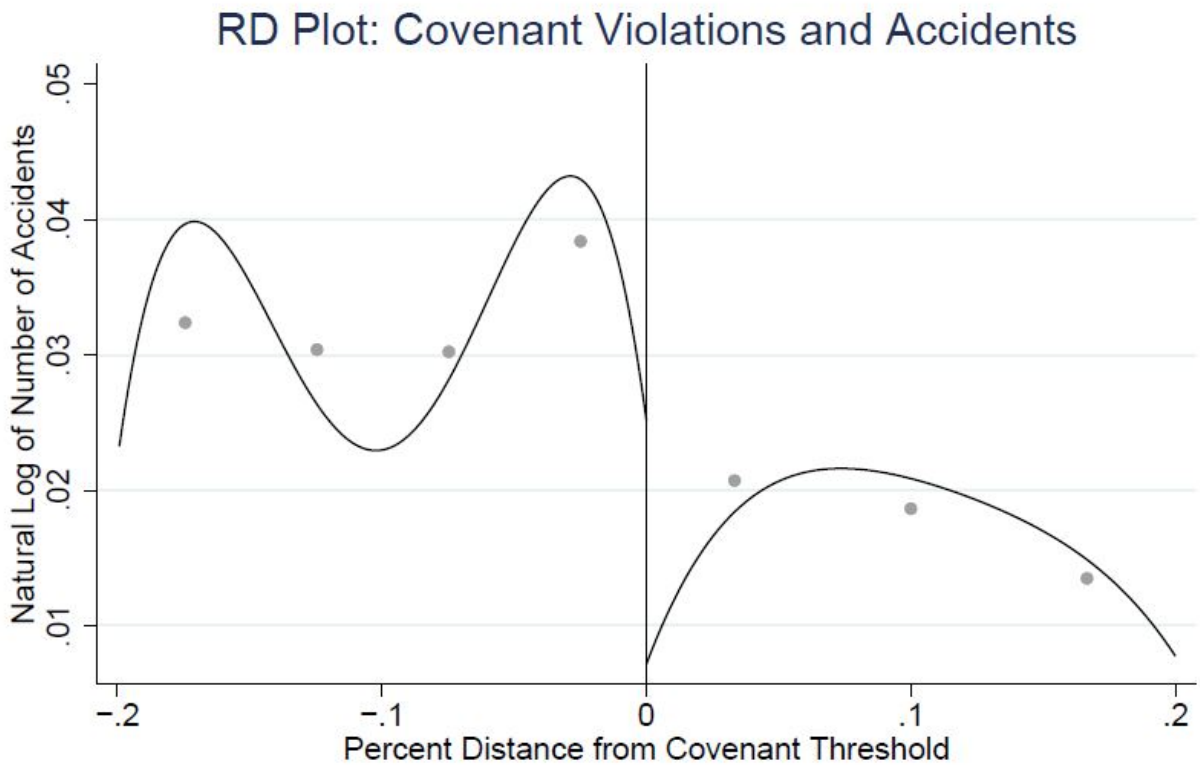
Using establishment level survey data, in this table we examine the effect of covenant violations on total case rates TCR, defined as the total number of accidents divided by the number of hours worked by all employees in the establishment by 200,000. The independent variable is $COV\_VIOLATION$, an indicator variable that equals one when net worth, tangible net worth or current ratio falls below the corresponding loan covenant threshold for firm i in quarter $t-1$, zero otherwise. Control variables are defined in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. The table reports t-statistics (in parentheses below the point estimates.) based on standard errors robust to heteroskedasticity and within-firm serial correlation. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel B: Establishment level Discontinuity Sample

	(TCR)	(TCR)
COV_VIOLATION	0.259*	0.637***
	(1.66)	(4.04)
MB	-0.186***	-0.152***
	(-5.34)	(-5.04)
SIZE	0.775***	0.543***
	(13.48)	(8.79)
ROA	6.802***	3.586*
	(3.31)	(1.85)
RATINGS	-0.624**	-0.165
	(-2.34)	(-0.71)
ASSET_TURNOVER	4.079***	1.389***
	(10.36)	(3.93)
CAPEX	-0.248	-4.365***
	(-0.20)	(-3.85)
TANGIBILITY	0.797**	0.683**
	(2.36)	(2.31)
REV_EMP	-0.004***	-0.004***
	(-8.00)	(-8.29)
PROD_EMP	0.000	0.000
	(0.36)	(0.19)
Year Quarter FE	No	Yes
Industry FE	Yes	No
Adjusted R^2	0.39	0.41
Observations	4,330	4,330

Using establishment level survey data and a regression discontinuity design, this table presents the effect of covenant violations on total case rates TCR, defined as the total number of accidents divided by the number of hours worked by all employees in the establishment by 200,000. The independent variable is $COV\_VIOLATION$, an indicator variable that equals one when net worth, tangible net worth or current ratio falls below the corresponding loan covenant threshold for firm i in quarter $t-1$, zero otherwise. Control variables are defined in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. The table reports t-statistics (in parentheses below the point estimates.) based on standard errors robust to heteroskedasticity and within-firm serial correlation. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

FIGURE 1



This figure plots the natural logarithm of the number of accidents in four quarters (vertical axis) against the relative (percent) distance from the covenant threshold (horizontal axis) within a 20% bandwidth of distance to default. Observations to the left of the zero-line correspond to covenant violations. Each dot is the average of the log of the number of accidents within the derived bin width, with each bin containing multiple underlying observations. Solid lines are fitted values from polynomial regressions on either side of the discontinuity.