Public Environmental Enforcement and Private Lender Monitoring:

Evidence from Environmental Covenants

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Abstract

In this study, we examine the interplay between public environmental enforcement and private lender monitoring and its effects on borrowers' environmental activities. To capture lender environmental monitoring, we use environmental covenants in loan agreements that require borrowers to take environmental remedial actions, disclose adverse environmental events, or conduct environmental audits. We predict and find that, in the presence of higher regulatory enforcement intensity, loan agreements are more likely to include environmental covenants when loans are secured by real property versus non-real property and when borrowers belong to more polluting industries. We further find that after loan initiations, borrowers with environmental covenants in loan contracts have lower toxic chemical releases when they are located in states with higher regulatory enforcement intensity. Taken together, our findings suggest that public environmental enforcement reinforces lenders' environmental monitoring that has positive externalities in shaping borrowers' environmental activities.

Keywords: Public Environmental Enforcement; Private Lender Monitoring; Environmental Covenants; Debt Contracting

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1. Introduction

Public enforcement of environmental regulations is a major channel through which firms internalize the negative externalities of environmental pollution (Krueger et al. 2020). For instance, firms change their environmental activities, employment, and productivity in response to environmental enforcement (Greenstone 2002; Stafford 2003; Earnhart 2004; Shimshack and Ward 2005; Walker 2011; Lim 2016; Cohen and Shimshack 2017; Duflo et al. 2018; Blundell et al. 2020; Kim and Xu 2021). However, given the resource constraints and potential regulatory capture, regulatory enforcement cannot fully address or prevent environmental externalities. Private monitoring may therefore have a role to play in addressing environmental concerns (Shimshack 2014), and yet there is little evidence on private monitoring of environmental activities and whether it is a complement or substitute for public environmental enforcement. We fill this important void by studying how the interplay between public enforcement and private lender monitoring shapes corporate environmental behaviors.

We focus on private lenders in that they have been under increasing pressure to engage in environmentally-friendly lending in recent years, and more importantly, loan contracts allow us to observe private lenders' monitoring of borrowers' environmental behaviors directly. Specifically, we examine the determinants and consequences of affirmative covenants on borrowers' environmental activities in loan contracts (hereafter, environmental covenants), under-explored but the most direct lender monitoring mechanisms.

Lender monitoring of environmental risks via environmental covenants depends on borrowers' environmental activities and regulatory enforcement. While it appears intuitive to argue that lender monitoring is most needed when public enforcement fails to pursue noncompliances, public enforcement may strengthen private lender monitoring incentives due to the increased environmental risks that may concern lenders. First, as most prior research contends, borrowers' polluting activities increase credit risks for lenders through their increased exposure to potential environmental liabilities, particularly when regulatory enforcement is stringent (Kim and Xu 2021). Environmental liabilities, including legal penalties, obligations to perform a cleanup, or obligations to refrain from polluting in the future required by the regulators or sanctioned by the

court (Bledsoe and Hamilton 2010), can significantly deteriorate borrowers' financial conditions, resulting in bankruptcy and potentially diluting lenders' claims (Ohlrogge 2020).

Second, lenders face financial risks associated with the use of real property as loan collateral, which is underexplored in prior research.¹ Compared to non-real property collateral, real property collateral is subject to higher risks of ground and water toxic contamination. A real property may be contaminated by its current operator, past operators, or other operators in the nearby area. Contamination of the collateralized real property may lead to a significant reduction in collateral value, making the loan under-secured. Banks may also be concerned about the potential sanctioned liabilities associated with the real property collateral. If lenders participate in management of a contaminated property, which typically occurs after foreclosure, they may be held liable by the Environmental Protection Agency (EPA) for cleanup costs. The potential legal liability associated with contaminated property is particularly concerning to lenders when public environmental enforcement is stringent. Because environmental liabilities from both borrowers' polluting activities and real property collateral are likely to increase with regulatory enforcement intensity, we posit that bank monitoring of borrowers' environmental risks increases with regulatory enforcement intensity.

We examine the impact of regulatory enforcement intensity on lender environmental monitoring by exploiting variations in regulatory monitoring and enforcement activities across states and through time. While environmental laws are mostly set at the federal level by Congress and further developed by the federal EPA, state environmental departments and local authorities carry out most of the monitoring and enforcement responsibility (Konisky 2007; Shimshack 2014). Following Konisky (2007) and Seltzer et al. (2020), we use the number of environmental inspections and enforcement actions per manufacturing facility in a state-year to construct the measure of regulatory enforcement intensity.

We use environmental covenants to identify private lenders' environmental monitoring. There are three major types of environmental covenants that lenders can employ to address environmental risks: 1) environmental *action* covenants that require borrowers to take actions to remedy or prevent environmental damages, 2) environmental *disclosure* covenants that require borrowers to disclose material environmental matters to lenders, and 3) environmental *audit*

¹ Real property includes the land itself as well as buildings and other improvements permanently attached to the land, such as fixtures.

covenants that require borrowers to hire professionals to conduct environmental inspections.² Measures required by environmental action covenants potentially prevent or mitigate damages of environmental law violations and reduce environmental liabilities. On the other hand, environmental disclosure and audit covenants help lenders obtain timely information and allow them to assess and address environmental risks in a timely fashion.

Using data extracted from loan agreements from 1997 to 2016, we find that 42% of the loan facilities in our sample include at least one environmental covenant, suggesting that environmental covenants are prevalent in loan contracts yet not ubiquitous. Among the three types of covenants, disclosure covenants are the most common (39%), followed by action covenants (18%) and audit covenants (8%). The relatively lower frequency of audit covenants is consistent with the notion that hiring independent professionals to conduct an environmental assessment on a regular basis or at lenders' request is more costly to borrowers.

We first examine the determinants of environmental covenants in loan agreements using a sample of 2,019 loan facilities representing 480 firms that file TRI reports (i.e., Form R) with the EPA. We measure a borrower's exposure to environmental enforcement by calculating the proportion of the borrower's plants located in states with regulatory enforcement intensity above the yearly sample median. We find that, in the presence of high regulatory enforcement intensity, loan agreements are more likely to include environmental covenants for borrowers that belong to highly polluting industries and for loans secured by real property. These findings are consistent with the notion that regulatory enforcement intensifies lenders' concerns about general and collateral-specific environmental liabilities and increases the propensity of lenders to monitor borrowers' environmental activities.

We next examine the consequences of environmental covenants and whether these consequences depend on regulatory enforcement. Specifically, we investigate whether borrowers with environmental covenants in their loan contracts show improvements in environmental performance after loan initiations in comparison to those without, and whether such improvements vary with regulatory intensity. We focus on toxic chemical releases as an environmental outcome because the plant-chemical level toxic release data allow us to exploit the granular variation in

² Lenders may include environmental compliance covenants that require borrowers to comply with environmental laws. We do not examine environmental compliance covenants because loan contracts usually include a general affirmative covenant requiring borrowers to comply with all laws.

firms' actual polluting activities and control for heterogeneity at the plant-chemical and chemical-year level. We find that environmental covenants significantly reduce toxic release emissions only for plants that are located in states with high regulatory enforcement intensity. These findings together suggest that lender monitoring is effective in reducing borrowers' polluting activities when public enforcement is strong. In addition, both the determinants and consequences analyses suggest the complementarity of public enforcement and private monitoring in environmental protection.

While self-selection may explain the improvement of environmental performance following the use of environmental covenants, this alternative is unlikely to explain our cross-sectional results that highlight the influence of state enforcement intensity on the effectiveness of environmental covenants. Nevertheless, to further address the concern of selection bias, we show that our findings are robust to a propensity score-matched sample that matches borrowers with environmental covenants with those without environmental covenants but with similar observable characteristics. In addition, we find that the effects of environmental covenants on toxic emission reduction continue to hold in the sample of borrowers who did not undertake abatement investments before loan initiations, suggesting that our results are unlikely driven by borrowers' environmental commitment before loan initiations.

To mitigate the concern that our regulatory intensity measure captures confounding omitted variables, we exploit close congressional elections to isolate exogenous changes in regulatory intensity (e.g., Heitz et al. 2021). We define close elections as those in which the winning candidate's margin of victory is less than 5% (Akey 2015; Heitz et al. 2021). To the extent that Democrats tend to impose stricter environmental enforcement than Republicans (Innes and Mitra 2015; Fredrickson et al. 2018), we expect and validate that states with Democratic candidates winning the majority of the close congressional election seats experience an increase in regulatory intensity in the post-election period. We further find that borrowers with environmental covenants and have plants located in states where Democratic candidates win the majority of the close congressional election seats experience significant reductions in total toxic emissions subsequent to loan initiations in response to the increase in regulatory intensity.

To strengthen our inference, we examine whether borrowers invest in abatements after loan initiations. We find that after loan initiations, borrowers using environmental covenants and located in high enforcement states are more likely to engage in pollution prevention activities that

involve product modifications. Our finding of pollution-mitigating mechanisms further suggests that we are not capturing the omitted variables and corroborates the positive externality of lender monitoring.

To further examine the costs and benefits of including environmental covenants and shed light on borrowers' trade-offs, we analyze the relation between environmental covenants and loan spreads. After controlling for the simultaneity between the environmental covenant decision and loan pricing (Bradley and Roberts 2015; Akins et al. 2020), we find that the inclusion of environmental covenants is associated with a decrease in loan spreads. This result suggests that while the environmental covenants impose operation constraints, borrowers benefit from lower loan price and that such trade-off may affect the use of covenants.

Finally, to sharpen our identification of the effectiveness of environmental covenants, we compare environmental covenants with other lender monitoring mechanisms, including general covenants and financial covenants. We find that the effects of environmental covenants are robust after controlling for general covenants and financial covenants. More importantly, we fail to find evidence that general covenants or financial covenants reduce borrowers' toxic releases, whether borrowers are located in states with high enforcement intensity or not. These results support the unique role that environmental covenants play in lender environmental monitoring.

This paper makes three contributions. First, we extend the literature on environmental regulations by documenting the interplay between public enforcement and private monitoring in affecting corporate environmental activities. Most of the existing literature overlooks the role of private monitoring and the interaction between the two mechanisms, although private monitoring has a potential to serve as a critical complement, given regulatory constraints, to improve social welfare and curb pollutions. One exception is the strand of literature focusing on the interplay between public enforcement and private enforcement through citizen lawsuits (Heyes and Rickman 1999; Langpap 2007; Langpap and Shimshack 2010). Taking a different angle, we focus on a private contracting channel instead of a legal private enforcement channel. Our evidence on this important private contracting channel suggests that while private lenders may be ultimately concerned about credit and financial risks, their monitoring of borrowers' environmental activities is intensified by public sentiment-driven regulatory enforcement. That is, to the extent that voters influence environmental policies and regulatory actions (Bergquist and Warshaw 2020;

Stoutenborough 2020), our study provides a nuanced insight on how public environmental sentiment and preference may affect environmental protection via private lender monitoring.

Second, our study contributes to the emerging literature on responsible lending. Prior studies mainly focus on loan pricing and financial and general covenants without considering lenders' direct environmental monitoring mechanisms (Chava 2014; Kim et al. 2018). We fill the gap by examining environmental covenants in loan agreements, the most direct monitoring mechanisms that could affect borrowers' environmental activities. A concurrent study (Amiram et al. 2021) examines how banks' adoption of the Equator Principles affects borrowers' environmental commitment proxied by the word counts of environmental covenants. Unlike Amiram et al. (2021), we study how public regulatory enforcement affects private lender monitoring through environmental covenants. In additional analyses, we show that the use and the consequences of environmental covenants are not limited to banks adopting the Equator Principles.³

Our study also adds to the growing literature that examines the determinants of firm environmental behaviors. Prior research has studied the environmental impacts of various firm characteristics, such as financial constraints (Kim and Xu 2021), ownership structure (Shive and Forster 2020), parent company environmental liability exposure (Akey and Appel 2021), and environmental auditors (Duflo et al. 2013) or insurers (Boomhower 2019). In addition, a few recent studies have taken steps in understanding how stakeholders, such as shareholders (Dimson et al. 2015; Dyck et al. 2019; Akey and Appel 2020; Krueger et al. 2020), customers (Schiller 2018; Dai et al. 2020), and environmental activists (Naaraayanan et al. 2020), actively engage in corporate ESG practices. Our paper advances this stream of literature by studying the active monitoring role lenders play in shaping borrowers' environmental activities and how lender monitoring is affected by public environmental enforcement.

³ Another related study is Ohlrogge (2020) who examines how a court ruling in the dischargeability of environmental liabilities affects firms' access to loan credit and the anecdotal use of environmental audit covenants. Our paper extends Ohlrogge (2020) in several ways. First, we provide the first comprehensive large-sample evidence on various types of environmental covenants beyond the least prevalent audit covenants described in his anecdotal evidence. Second, we explore the interplay between public enforcement and private lender monitoring, whereas Ohlrogge (2020) focuses on the change in dischargeability of environmental liabilities. Third, our paper speaks to the real consequences of environmental covenants, whereas Ohlrogge (2020) is silent on this.

2. Institutional Background

2.1 *Environmental Risks in Lending*

The current U.S. environmental regulatory regime adopts a “polluter pays” principle to compel firms to internalize the environmental externalities and costs to public health. The EPA works with state and local authorities to impose legal obligations on responsible parties who pollute the environment. Environmental obligations include obligations to pay penalties, perform environmental cleanup, or refrain from polluting in the future (Bledsoe and Hamilton 2010). Environmental liabilities are economically significant. For example, Kim and Xu (2020) show that about 57% of investigations by environmental regulatory agencies resulted in legal liabilities, with an average of \$6.75 million per case. They also find that cleanup obligations are the most significant environmental liabilities, with an average of \$21 million for firms with cleanup obligations, followed by the compliance cost averaged \$14 million for those with compliance obligations.⁴ In cases where the contamination is extensive or in a highly-populated area, cleanup costs can reach hundreds of millions or even billions of dollars (Ohlrogge 2020).

2.1.1 *Credit Risks Arising from Borrowers’ Polluting Activities*

Lenders are exposed to credit risks stemming from borrowers’ polluting activities.⁵ Prior studies show that firms with more polluting activities bear higher environmental liabilities (Kim and Xu 2021), which increase borrowers’ credit risks. Despite protection from bankruptcy laws, some environmental obligations survive bankruptcy, affect borrowers’ credit risks, and potentially dilute lenders’ claims. First of all, firms still have obligations to comply with environmental laws after filing for bankruptcy. Actions by a governmental unit to enforce environmental laws, other than actions to enforce a money judgment, are generally not subject to the automatic stay principle.⁶ Therefore, if a debtor causes environmental damages during bankruptcy, environmental agencies can still pursue injunctive relief that refrains the debtor from polluting the environment.

⁴ For comparison, the average penalty is \$270,000.

⁵ Polluting activities may also lower a borrower’s creditworthiness by disrupting its supply chain. Recent research shows that environmental policies can propagate from customers to suppliers (Schiller 2018; Dai et al. 2020). A firm with more polluting activities will have a lower comparative advantage if its customers demand more environmentally friendly products. Therefore, borrowers with more polluting activities may find it more challenging to survive in a market with a growing emphasis on corporate social responsibility. Lenders also face social risks for lending to polluting borrowers arising from various stakeholders’ explicit demand for environmentally friendly lending. In this paper, we focus on lenders’ financial incentives related to environmental liabilities.

⁶ A money judgment is a judgment against the debtor for money payment.

Second, non-dischargeable cleanup environmental obligations will carry over to the post-reorganization firm.⁷ A basic rule is that a cleanup obligation is dischargeable if the EPA could perform the cleanup itself and sue for response costs (Bledsoe and Hamilton 2010). Non-dischargeable environmental claims carry over to the post-reorganization firm, making the firm less valuable than it otherwise would be. Therefore, both secured and unsecured lenders may suffer a loss from these non-dischargeable claims. Unsecured lenders further face potential claim dilution from dischargeable environmental liabilities. The priority of dischargeable environmental claims depends on whether the claim arose before or after the debtor filed its bankruptcy petition. Pre-petition environmental claims are considered to have the same priority as other unsecured claims. Post-petition environmental claims incurred to preserve the estate are considered administrative expenses, of which priority is above unsecured claims and below secured claims.

2.1.2 Financial Risks Associated with Real Property Collateral

In addition to the credit risks arising from borrowers' polluting activities, lenders face a nuanced environmental risk: the financial risk when loans are secured by real property versus non-real property, such as inventory and accounts receivable. First, lenders may find the loan undersecured if the secured real property is contaminated. Moreover, under some circumstances, lenders may be held liable by environmental regulators to clean up the contamination on the secured real property. Although the 1996 Lender Liability Act exempts lenders from environmental liabilities when they are not the owner or operator of the real property, lenders may still be held as a liable party if their activities on the property constitute participation in management, which is more likely after borrowers file for Chapter 7 bankruptcy.⁸

Environmental risks associated with a real property also depend on the property's location (e.g., the existence of polluting activities nearby) and the historical usage of the property. For

⁷ In general, monetary environmental penalties are dischargeable and obligations to refrain from continued pollution are not dischargeable in bankruptcy.

⁸ The *U.S. v. Fleet Factors Corp* case is a high-profile example of lenders being held liable for environmental costs due to participation in management. Fleet (the creditor), a factoring company, had agreed to advance funds to Swainsboro Print Works (SPW, the debtor) through a factoring agreement in 1976. As collateral for these funds, Fleet took a security interest in SPW's textile facility, including its equipment, inventory, and fixtures (real property). In 1981, SPW adjudicated a bankruptcy under Chapter 7. In 1982, Fleet foreclosed on some security interest in some inventory and equipment and contracted with Baldwin Industrial Liquidators to auction off the collateral. Fleet later allegedly contracted with Nix Riggers to remove the unsold equipment on the facility. In 1984, the EPA inspected the facility, found contamination, and incurred nearly \$400,000 to clean up the contamination. The court held that the Fleet's activities at the facility rose to the level of participation in management and concluded that Fleet was one of the liable parties for the contaminated facility. <https://law.justia.com/cases/federal/district-courts/FSupp/819/1079/1965300/>.

example, a real property can be polluted by hazardous contaminants of underground water released by a gas station located nearby. Similarly, if a land once belonged to a gas station, it has high environmental risks even though its current operation is completely environmentally friendly. Moreover, the environmental risks associated with the same property can change over time because of the regulators' or the public's evolving environmental preferences. Therefore, an environmental risk assessment of a real property by environmental professionals often involves a comprehensive evaluation of the pollution history of the property as well as the environmental conditions in the surrounding area.

Anecdotes show that lenders closely monitor their environmental risk exposure to real property collateral. For example, Barclay contends that having commercial land collateral provides a direct source of environmental risk.⁹ Similarly, FDIC emphasizes the potential adverse effect of environmental contamination on real property collateral in its guideline for banks' environmental risk programs.¹⁰

2.2 Regulatory Enforcement and Lenders' Environmental Monitoring

Regulatory enforcement is critical to the success of environment protection. Without enforcement, environmental regulations are not binding forces (Shimshack 2014). Environmental laws are mostly set at the federal level, while the enforcement of environmental laws is typically carried out by state and local authorities. Due to differences in resources, political environment, and environmental preferences across states, there exist significant cross-state variations in regulatory enforcement (Konisky 2007; Shimshack 2014; Grooms 2015; Innes and Mitra 2015).

Several studies have exploited these regional or state variations to examine the effects of regulatory enforcement. Greenstone (2002) uses the classification of nonattainment and attainment areas under the Clean Air Act to measure the level of regulatory scrutiny. The author finds that nonattainment counties experienced slower industry activity growth than attainment counties, suggesting that environmental scrutiny deters the growth of polluters. Using the same setting, Kim and Xu (2020) find that strong regulatory enforcement weakens the effects of financial constraints on firms' toxic emissions. Additionally, Konisky (2007) develops a state-year level regulatory measure by aggregating the state inspection and enforcement cases on multiple statutes. Similarly,

⁹ <https://home.barclays/citizenship/the-way-we-do-business/environmental-risks-in-lending/>

¹⁰ <https://www.fdic.gov/regulations/laws/rules/5000-4900.html>

Seltzer et al. (2020) find that corporate bond pricing is affected by a firm's environmental performance and regulatory enforcement.

Lenders' environmental monitoring incentives are likely affected by regulatory enforcement. On the one hand, stringent public enforcement may lower the demand for private monitoring incentives by improving borrowers' environmental performance. On the other hand, lenders' environmental monitoring incentives can be strengthened by regulatory enforcement intensity. When borrowers are located in states with high regulatory intensity, environmental risks arising from either borrowers' polluting activities or real property collateral are more likely to result in environmental liabilities that may dilute lenders' claims or be imposed on lenders directly. The benefits of monitoring borrowers' environmental behaviors thus increase with regulatory enforcement. In addition, public enforcement facilitates lender monitoring, thereby reducing the costs of monitoring. For example, public enforcement exposes and helps lenders be aware of borrower polluting activities that need remedial actions.

Moreover, anecdotal evidence suggests that courts may also make rulings intentionally to increase lenders' environmental monitoring efforts. For example, in the *United States v. Fleet Factors Corp.* (Fleet Factors II) case, Fleet Factors was held as a liable party for its borrowers' environmental contamination. This suggests that, as part of public enforcement, the legal system considers private lender monitoring an important complement to environment protection. The court explained its rationale as follows:

*"Our ruling today should encourage potential creditors to investigate thoroughly the waste treatment systems and policies of potential debtors.... Similarly, creditors' awareness that they are potentially liable under CERCLA will encourage them to monitor the hazardous waste treatment systems and policies of their debtors and insist upon compliance with acceptable treatment standards as a prerequisite to continued and future financial support...."*¹¹

2.3 Environmental Covenants as Monitoring Mechanisms

Lenders can use environmental covenants to mitigate environmental risks (e.g., credit risks and financial risks mentioned in Section 2.1) in lending. Prior research examines the effect of environmental risks on the use of financial and general covenants. For example, Kim et al. (2018) find that carbon-intensive firms tend to have more general covenants but not financial covenants in loan contracts. Chava (2004) finds weak evidence that polluting firms are more likely to violate

¹¹ <https://elr.info/sites/default/files/articles/21.10464.htm>

financial covenants. While their findings suggest that general or financial covenants can be employed to address the indirect credit risk associated with environmental liabilities, the mechanism through which general or financial covenants affect firm environmental activities is ambiguous. Unlike general or financial covenants, environmental covenants are designed directly to address environmental issues.

There are three major types of environmental covenants that lenders can use to manage environmental risks associated with the loan – environmental action covenants, environmental disclosure covenants, and environmental audit covenants. Environmental action covenants require borrowers to take preventive actions to avoid material environmental damages or to take remedial actions when material environmental damages occur. Effective remedy actions can reduce the probability of environmental violations as well as the damages of an environmental violation. Timely actions also reflect borrowers’ willingness to cooperate with regulators, which may further reduce borrowers’ environmental liabilities.

Environmental disclosure and audit covenants serve to provide timely information for lenders to assess environmental risks. Environmental disclosure covenants require borrowers to notify lenders about any material adverse environmental events in a timely fashion when they occur. Timely information allows lenders to evaluate and react to borrowers’ environmental damages accordingly. For example, lenders may renegotiate with borrowers to better protect their own interest once they discover that the real property collateral is contaminated or that environmental damages threaten borrowers’ creditworthiness. Lenders may also call back the loan or freeze the line of credit when the damages are severe.¹² In addition, lenders can protect their claims from non-dischargeable liabilities by requiring borrowers to perform due diligence and notify potential environmental claimants before the borrowers file for bankruptcy.

Environmental audit covenants take one step further. These covenants require borrowers to hire independent professionals to conduct an environmental assessment and help lenders proactively obtain information on potential environmental risks. Moreover, in real property transactions, professional inspections further help a secured lender and a borrower meet the EPA’s All Appropriate Inquiry requirements and qualify as a *bona fide* prospective purchaser of real

¹² For example, in a loan agreement between Catchmark Timber Operating Partnership, L.P. and its lenders, the Event of Default clause requires the loan party to cause or permit its subsidiaries to default in due performance upon the non-performance of environmental covenants. See <https://www.sec.gov/Archives/edgar/data/1341141/000119312514457083/d843067dex101.htm>.

property, thereby offering the lender an exemption from environmental liabilities for pollution caused by prior owners.

Considering the threat of potential environmental liabilities to banks' financial health, FDIC also instructs banks to have proper monitoring mechanisms and loan documentation to avoid incurring environmental liabilities. Specifically, FDIC advises banks to use environmental covenants that allow banks to be proactive in gauging the environmental risks dynamically and to respond to heightened risks quickly. Such examples include the right to recall the loan when hazardous contamination is discovered in the real property collateral or when they are concerned with borrowers' environmental risks:

*“The environmental risk assessment should continue during the life of the loan by monitoring the borrower and the real property collateral for potential environmental concerns. Loan documents should...require that the borrower... disclose information about the environmental status of the real property collateral and grant the institution the right to acquire additional information about potential hazardous contamination by inspecting the collateral for environmental concerns. The loan documents might also provide that the institution has the right to call the loan, refuse to extend funds under a line of credit, or foreclose if the hazardous contamination is discovered in the real property collateral.”*¹³

2.3.1 Borrower Trade-off on Environmental Covenants

Borrowers also trade off the costs and benefits of environmental covenants. For example, environmental audit covenants that give lenders proactive rights to demand inspections are costly for borrowers. In particular, when an inspection finds substantial contamination risks, lenders may require borrowers to take abatement actions or negotiate stricter contract terms. Despite the appeal of addressing environmental issues, borrowers may be unwilling to invest in pollution abatements, especially when they are financially constrained and have myopic managers (Kim and Xu 2021). In addition, if contamination is discovered following the inspection, borrowers may face criminal charges for “knowing violations” if they continue contamination. Similarly, action and disclosure covenants can also be costly due to borrowers' financial constraints and potential knowing violations.

¹³ <https://www.fdic.gov/regulations/laws/rules/5000-4900.html>

3. Data and Research Design

3.1 Sample Construction

Our analyses focus on a set of private loan agreements collected from SEC filings. To extract loan agreements and match them to DealScan loans, we start with a sample of loans issued after 1997 from DealScan that can be matched to firms in Compustat.¹⁴ For matched loans, we then search 10-K, 10-Q, and 8-K SEC filings for loan agreements using a list of keywords extended from prior studies (Nini et al. 2009; Beatty et al. 2019). To ensure accurate matching between loan agreements and DealScan loans, we only keep credit agreements signed within 30 days of the loan initiation date (Jiang 2021). When extracting environmental covenant data from loan agreements, we first restrict our search to loan agreements that contain the keyword “environmental” or “hazard.”¹⁵ We next search whether any text patterns that we identified as environmental covenants appear within 35,000 characters (i.e., a typical length of an affirmative covenant section) from the beginning of the affirmative covenant section.^{16, 17} See Appendix B for all lists of keywords.

3.2 Research Design

To analyze the relation between environmental covenants and lenders’ environmental risk arising from borrowers’ polluting activities and real property collateral and whether state regulatory intensity strengthens the relation, we investigate the determinants of environmental covenants using the following OLS model:

$$\begin{aligned} \text{EnvironmentCov}_{i,j,t} = & \beta_0 + \beta_1 \text{High Polluting Industry}_{i,t-1} \times \text{State Enfi}_{i,t-1} + \beta_2 \text{Real Property} \\ & \text{Collateral}_{i,j,t} \times \text{State Enfi}_{i,t-1} + \beta_3 \text{Non-Real Property Collateral}_{i,j,t} \times \text{State} \\ & \text{Enfi}_{i,t-1} + \beta_4 \text{High Polluting Industry}_{i,t-1} + \beta_5 \text{Real Property Collateral}_{i,j,t} + \beta_6 \\ & \text{Non-Real Property Collateral}_{i,j,t} + \beta_7 \text{State Enfi}_{i,t-1} + \beta_8 \log(\text{Total Asset})_{i,t-1} + \\ & \beta_9 \text{ROA}_{i,t-1} + \beta_{10} \text{Leverage}_{i,t-1} + \beta_{11} \text{Cash/Liabilities}_{i,t-1} + \beta_{12} \text{Tangible}_{i,t-1} + \\ & \beta_{13} \text{Tobin's } Q_{i,t-1} + \beta_{14} \text{Sd(Operating Cash Flow)}_{i,t-1} + \beta_{15} \text{AltmanZ}_{i,t-1} + \beta_{16} \\ & \text{Dividend}_{i,t-1} + \beta_{17} \text{Institutional Ownership}_{i,t-1} + \beta_{18} \text{Log(Loan Size)}_{i,j,t} + \beta_{19} \end{aligned}$$

¹⁴ We start from 1997 to keep lenders’ potential liability to environmental risks constant because Lender Liability Act was passed in 1996.

¹⁵ Amiram et al. (2021) create two measures of environmental covenants. The first measure captures the number of words in an environmental covenant. The second measure is the frequency of the expression “environment” in loan contracts. We do not use “environment” as a keyword because “environment” may refer to non-environmental discussions, such as business or economic environment.

¹⁶ Another mechanism that can influence borrowers’ environmental behaviors is allowing borrowers to add back environmental expenses in contractual EBITDA. However, we find that only very few contracts (less than 0.5%) include considerations on environmental costs/liabilities in EBITDA.

¹⁷ Lenders’ monitoring incentives may be affected by the presence of an insurance covenant. We do not consider the effect of insurance covenants because Nini (2020) finds that 98% of loan contracts contain insurance covenants.

$$\text{Log}(\text{Maturity})_{i,j,t} + \beta_{20} \text{Revolver}_{i,j,t} + \beta_{21} \text{Log}(\text{N Lenders})_{i,j,t} + \text{Industry FE} + \text{Year FE} + \text{Loan Purpose FE} + \text{Lead Lender FE} + \varepsilon \quad (1)$$

where i, j, t indicates borrower i , loan facility j , and year t . $\text{EnvironmentCov}_{i,j,t}$ is an indicator variable that captures the existence of any environmental covenants included in loan facility j of borrower firm i at time t . In additional analyses, we further examine environmental covenant intensity (EnvironmentCovN) based on the number of environmental covenants.

3.2.1 Borrowers' Polluting Activities

We use total toxic releases to measure polluting activities. The EPA's Toxic Release Inventory (TRI) database tracks emissions of toxic chemicals by industrial facilities. Chemicals covered in TRI include those causing cancer, other chronic, or other significant adverse human health or environmental effects.¹⁸ Industries included in the TRI list typically engage in manufacturing, metal mining, electric power generation, chemical manufacturing, and hazardous treatment. TRI monitors facilities' compliance with reporting requirements and issues civil and potentially criminal penalties associated with misreporting. As a result, the probability of misreporting is relatively low. However, there are still some concerns over the quality of TRI data, such as the changing lists of toxic chemicals. Despite these concerns, the TRI database provides the most granular data on corporate pollution and has been widely used in prior research (Naaraayanan et al. 2020; Akey and Appel 2021; Kim and Xu 2021). We drop observations with zero ground, water, and air emissions following prior research (Akey and Appel 2021; Kim and Xu 2021).

To mitigate the concern that borrowers' polluting activities are endogenous to lender monitoring, we use industry membership to capture borrowers' polluting activities. Specifically, we create a time-varying high polluting industry indicator (*High Polluting Industry*) that equals one if a borrower belongs to an industry with the average log total toxic releases scaled by sales above the quartile of all TRI reporting firms covered in Compustat in the same year.¹⁹ To construct this indicator, we use the Fama French 48 industry classification.

¹⁸ The current TRI program mandates industrial facilities that have at least ten full-time employees, are in TRI-listed industries, use TRI-listed chemicals, and emit TRI-listed chemicals exceeding certain thresholds to report their chemical releases data to TRI. TRI program's primary objective is to make information about the industrial management of toxic chemicals public.

¹⁹ In Internet Appendix Table 1, we show that our main results still hold if we use a time-invariant high polluting industry measure.

3.2.2 Real Property Collateral

DealScan provides data on whether a loan includes collateral and its types. However, data on collateral types in DealScan are largely incomplete. Therefore, we extract real property data from loan agreements and construct *Real Property Collateral* that equals one for a loan facility that DealScan indicates using collateral and the extracted loan agreement indicates using real property collateral, and zero otherwise. We also include *Non-Real Property Collateral* that indicates if a loan facility includes collateral that is not real property.

3.2.3 State Regulatory Enforcement Intensity

To measure state-level regulatory enforcement intensity, we normalize the total number of inspections and enforcement actions in a state by the total number of TRI reporting facilities following Seltzer et al. (2020).²⁰ State regulators use inspections to evaluate an entity's compliance with regulations and issue enforcement actions if they detect violations of environmental regulations. While environmental regulations are mostly set at the federal level (Shimshack 2014), one caveat of our study is that our enforcement measure may also capture variation across states in residual environmental regulations. To potentially address this concern, we control for state fixed effect assuming that enforcement intensity has more variation through time than state regulations.

We obtain regulatory inspection and enforcement data from Integrated Compliance Information System for Federal Civil Enforcement Case Data (ICIS FE&C), which is part of EPA's Enforcement and Compliance History Online (ECHO) database. We use data on inspections and formal administrative and judicial enforcement actions taken by the EPA under all environmental statutes.²¹ Administrative cases take place before state or federal governing bodies. In contrast, judicial cases generally take place in courts, such as a breach of contract suit or other civil actions.

Figure 1 presents the total number of inspection and enforcement cases across states throughout the sample period. We observe significant variations in regulatory intensity across states. On average, larger states such as Texas, California, and New York tend to have a higher number of regulatory actions as they have a greater number of manufacturing plants. We also

²⁰ As an alternative specification, we deflate the aggregate number of inspections and enforcement actions by the number of establishments reported by Census. No inferences are affected.

²¹ As shown in Internet Appendix Table 4, our main results continue to hold if we include informal enforcement actions such as notice of violations.

observe that for each state, there exist significant time-series variations. Many states experienced a spike in regulatory intensity around 2006, consistent with the observation in Shimshack (2014).

Considering that a borrower may have plants located in multiple states, we use the proportion of the borrower's plants located in states with regulatory intensity that is above the yearly sample median to measure the borrower's exposure to high regulatory enforcement (*State Enf*) when investigating the determinants of environmental covenants. We also exclude borrowers' own inspection or enforcement actions when aggregating the state-level enforcement intensity.²²

3.2.4 Control Variables

We include two sets of control variables. The first set of controls captures borrower characteristics before loan initiation. Specifically, we control for firm size ($\text{Log}(\text{Total Assets})$), profitability (*ROA*), leverage ratio (*Leverage*), tangibility (*Tangible*), growth opportunities (*Tobins'Q*), and volatility ($\text{Sd}(\text{Operating Cash Flow})$). Prior research shows that firms are more likely to cut environmental investments when they have weaker financial positions (Kim and Xu 2020). Therefore, we further control *Cash/Liabilities*, *AltmanZ*, and dividend payout (*Dividend*) to capture firms' financial positions. We also include *Institutional Ownership* to control for the effects of institutional investors on firm environmental activities documented in prior research (e.g., Dimson et al. 2015; Dyck et al. 2019; Akey and Appel 2020; Krueger et al. 2020). Our second set of controls captures loan characteristics, including loan size ($\text{Log}(\text{Loan Size})$), loan maturity ($\text{Log}(\text{Maturity})$), whether a loan is a revolver (*Revolver*), and the number of lenders ($\text{Log}(N \text{ lenders})$).

Finally, we control for industry fixed effects using the Fama-French 48 industry classification, year fixed effects, loan purpose fixed effects, and lead lender fixed effects in our main analyses. In additional analyses, we further include main state fixed effects, with the main state being the state where most of the borrower's plants are located.²³ Because of the multiple fixed effects, we use OLS as our main specification model.²⁴ After removing observations with missing data, our sample includes 2,019 loan facilities from 1997 to 2016. We report

²² Our main results still hold if we do not exclude borrowers' own inspection and enforcement actions.

²³ If a borrower has the same number of plants in multiple states, main state is the state in which the borrower faces the strongest regulatory intensity.

²⁴ In robustness tests, we also conduct the main analyses with the probit model, and our findings continue to hold.

heteroskedasticity-robust standard errors in all regressions for the analyses on the determinants of environmental covenants.²⁵

4. Main Results

4.1 Descriptive Statistics

Table 1 Panel A reports the descriptive statistics of our main variables. We find that 42% of the loans within our sample contain at least one environmental covenant. Among the three types of environmental covenants, environmental disclosure covenants are the most prevalent (39% of the sample), followed by environmental action covenants (18%). We only find 8% of our sample includes environmental audit covenants, suggesting that environmental audit covenants are perhaps the most costly to borrowers. Moreover, 33% of the borrowers belong to high polluting industries. About 18% of loan facilities are secured by real property, and 35% of loan facilities are secured by other assets. 48% of borrowers' plants are located in states with high regulatory intensity. Table 1 Panel B presents the industry distribution of environmental covenants. We find that environmental covenants are most widely used in precious metals, food products, shipping containers, and textiles industries.

Table 2 presents the correlation table. We find that the correlation between real property collateral and the inclusion of any environmental covenants is 0.33, significant at the 1% level. As a comparison, the correlation between non-real property collateral and the inclusion of environmental covenants is much smaller (correlation = 0.07). We do not find a significant relation between the high polluting industry and the inclusion of any environmental covenants.

4.2 The Determinants of Environmental Covenants

Table 3 presents results for the determinants of environmental covenants. In Column 1, while we do not find a significant coefficient on *High Polluting Industry*, we find the interaction term between *High Polluting Industry* and *State Enf* positive and significant. High polluting borrowers with all plants located in states with high regulatory intensity are 17.8% more likely to include environmental covenants than high polluting borrowers with no plants located in states with high regulatory intensity. These results suggest that borrowers being in a polluting industry itself does not raise lenders' concern of environmental risks. However, such environmental risks

²⁵ The small sample does not allow us to cluster standard errors by year, industry, or firm. We do not have enough clusters or enough observations within a cluster. Our sample covers 20 years, 36 industries, and 480 firms. On average, we have about four observations for each borrower.

intensify when borrowers face high regulatory scrutiny. This result is consistent with the finding in Seltzer et al. (2020) that polluting firms only have lower credit ratings when they face strict regulatory enforcement.

We further find that the coefficient on *Real Property Collateral* is positive and significant at the 1% level and that the interaction term between *Real Property Collateral* and *State Enf* is positive and significant at the 5% level. On average, conditional on having real property collateral, lenders are 19.7% more likely to include environmental covenants for borrowers with all plants located in states with high regulatory intensity than for borrowers with no plants located in states with high regulatory intensity. In comparison, the coefficient on *Non-Real Property Collateral* is much smaller than *Real Property Collateral* (the difference is significant with a p-value < 0.01), and the interaction term between *Non-Real Property Collateral* and *State Enf* is insignificant. To the extent that both types of collaterals capture non-environmental financial risks of the borrower and non-real property collateral is less associated with environmental risks than real property collateral, these findings support that real property collateral imposes significant environmental risks to lenders. In Column 2, we further include main state fixed effects to control for time-invariant state-level factors and find similar results. The results in Table 3 suggest that, when designing environmental covenants, lenders are concerned about potential credit and financial risks due to environmental liabilities arising from regulatory enforcement on borrowers. This also suggests that private lender monitoring appears to complement rather than substitute for public enforcement.

4.3 The Consequences of Environmental Covenants

In this section, we further examine whether environmental covenants shape borrowers' environmental activities and how regulatory enforcement intensity affects the effectiveness of environmental covenants. We use total toxic releases to capture borrowers' actual environmental activities. To test how regulatory intensity interacts with the effectiveness of environmental covenants in affecting borrowers' toxic releases, we estimate the following OLS model at the plant-chemical level:

$$\begin{aligned} \text{Log}(1 + \text{Toxic Release}_{c,p,i,j,t}) = & \beta_0 + \beta_1 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_2 \\ & \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} + \beta_3 \text{EnvironmentCov}_{i,j,t} \times \text{State Enf}_{i,p,t} \\ & + \beta_4 \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_5 \text{EnvironmentCov}_{i,j,t} + \beta_6 \text{Post}_{i,j,t} + \beta_7 \\ & \text{State Enf}_{i,p,t} + \text{Controls} + \text{Plant-Chemical FE} + \text{Chemical-Year FE} \\ & + \varepsilon \end{aligned} \quad (2)$$

where c, p, i, j, t indicates chemical c , plant p , borrower i , loan facility j , and year t , respectively. *Toxic Release* is the amount of total releases scaled by sales of the previous year.²⁶ $Post_{i,j,t}$ is an indicator that takes the value of one in the years after loan initiation. $State\ Enfi_{p,t}$ is the regulatory enforcement intensity faced by plant p of borrower i in year t . β_1 captures the effect of regulatory intensity on the effectiveness of environmental covenants. β_2 captures the effect of environmental covenants on toxic releases after loan initiations without considering state regulatory intensity. We include the same set of controls as in Model (1). We further control for time-invariant heterogeneity at the plant-chemical level and time-varying heterogeneity at the chemical-year level, by adding plant-chemical and chemical-year fixed effects, respectively.²⁷ We cluster standard errors by borrower. We restrict our sample to three years before and three years after the loan initiation and require that a plant reports to TRI in both pre and post-periods for a given chemical. Table 4 presents the descriptive statistics for the main variables at the plant-chemical level. We find that most of the chemical releases are emitted on-site versus off-site, consistent with the notion that off-site treatment by professionals is more costly for the firms even though it can be more environmentally friendly. The plants in our sample, on average, release 89,000 pounds of toxic emissions for each chemical (untabulated), which are of comparable magnitude to the 91,000 pounds documented in Akey and Appel (2021).

Table 5, Column 1 presents regression results of the model (2). We find that β_1 is -0.043, significant at the 1% level, suggesting that plants located in high enforcement states experience a decline in chemical emissions when the borrowers use environmental covenants.²⁸ The effect of regulatory intensity on the effectiveness of environmental covenants is economically significant. For a plant located in a state with an average regulatory intensity level (0.61), having environmental covenants reduces total toxic emission after loan initiation by 2.3% relative to the

²⁶ Results are robust if we use the cost of goods sold or total assets as a scaler. See Internet Appendix Table 2 Panel B. Furthermore, following Akey and Appel (2020), we construct normalized production level. We do not observe any significant changes in borrower's production level around loan originations, suggesting that the reductions in total releases are not driven by decreased production (untabulated).

²⁷ The high R-squared in plant-chemical level regression models is mainly driven by the plant-chemical fixed effect. We do not include the industry fixed effect because the plant-chemical fixed effect includes an industry component. Nevertheless, in robustness tests (Internet Appendix Table 2 Panel A), we find that our main results still hold if we include industry-year fixed effects. No inferences are affected if we instead use an indicator version of State Reg which is equal to one if State Reg is in the top quintile in a given year (Internet Appendix Table 2 Panel A).

²⁸ The insignificant coefficient on $EnvironmentCov_{i,j,t} \times Post_{i,j,t}$ seems to suggest that environmental covenants are not effective in addressing pollution in the absence of regulatory enforcement.

sample mean $((0.003-0.043*0.61)/1.01)$.²⁹ Plant-chemical level fixed effects control for most of the variation in plant location, but for completeness we also include state level fixed effects in Column 2 and find similar results. In addition to the aggregate toxic releases, we further examine on-site releases and off-site releases separately. We find that the effect of environmental covenants on reducing toxic emissions in states with high regulatory intensity mainly comes from on-site releases (see Internet Appendix Table 3). Considering that on-site releases are more likely to cause environmental contaminations than off-site releases that are handled by professionals subject to higher environmental standards (Ohlrogge 2020), these results suggest that lender monitoring reinforced by public enforcement creates positive externalities to corporate environmental protection.

To validate the parallel trend assumption and rule out the potential concern that borrowers using environmental covenants are inherently different, we investigate the coefficient dynamics of the triple interaction term around loan initiations. We replace *Post* in Equation (2) with indicators for each year in the three years before and after the loan initiation. In Table 6, we find that the coefficient of the triple interaction term is statistically insignificant from zero before loan initiations, consistent with the parallel trend assumption. The coefficient turns negative and significant for years after loan initiations, lending further support to the effects of environmental covenants on toxic emission reduction in the presence of high regulatory intensity.

To further address self-selection of environmental covenants and the concern of omitted variables, we conduct our outcome analyses based on a propensity score matched sample. For a loan facility with environmental covenants, we match a loan facility without environmental covenants and originated in the same year using the closest propensity score from Model (1), with a caliper distance of 0.05 and with replacements. As a result, 444 loan facilities with environmental covenants are matched with ones without environmental covenants. Table 7 Panel A shows that our matching achieves a strong covariate balance. In Table 7 Panel B, we find qualitatively similar results using the propensity score-matched sample, suggesting that our main findings are unlikely driven by self-selection and confounding observable variables.

²⁹ Amiram et al. (2021) only examine the use of environmental covenants by banks that adopt the Equator Principles (EP banks). However, we observe a prevalent use of environmental covenants in both EP banks and non-EP banks. On average, 40.68% of loans initiated by EP banks and 42.86% of loans initiated by non-EP banks include environmental covenants. We also find that the effects of public enforcement on the effectiveness of environmental covenants are not limited to EP banks (untabulated).

4.4 Close Elections as an Exogenous Shock to Regulatory Intensity

To address the potential endogeneity of regulatory enforcement, in this section, we exploit close congressional elections won by Democratic candidates to identify an exogenous increase in environmental regulatory intensity (Helland 1998). Innes and Mitra (2015) find that congressional Republicans significantly depress environmental enforcement for local polluting facilities in the first year after their election compared to congressional Democrats. To the extent that close elections are affected by random factors, such as weather, close elections create exogenous variations in congressional seats (Akey 2015; Heitz et al. 2021).

We collect data on U.S. Senate and House Elections from the MIT Election Data and Science Lab. We restrict our analyses to general elections in which the winner is either Republican or Democrat. Following prior research (Akey 2015; Heitz et al. 2021), we define close elections as the elections in which the winning candidate's margin of victory is less than 5%. In each election cycle, there may be multiple congressional close elections within a state. We thus construct a state-year level variable, *Democrat Majority*, which equals one when Democratic candidates win the majority of seats in close congressional elections in the state and zero otherwise. Before we use this instrument to proxy for regulatory enforcement, we conduct a validation test on whether close election captured by *Democrat Majority* affects regulatory enforcement. In Internet Appendix Table 5 Panel A, we find that *Democrat Majority* significantly increases the probability of a state having high (above the median) environmental regulatory intensity in the year after close elections.

We next test the effects of environmental covenants within the plants located in close-election states. Table 8 shows that after loan initiations, borrowers with environmental covenants in loan contracts reduce total toxic emissions when they are located in close-election states with the majority of congressional seats won by Democratic candidates.³⁰ The results are robust if we only include elections where candidates are not incumbents who likely win in close elections (Innes and Mitra 2015). We also find that the effects of environmental risks on the inclusion of environmental covenants are stronger when borrowers have more plants located in close-election states with the majority of congressional seats won by Democratic candidates (Internet Appendix

³⁰ Considering that some states may have consecutive close elections and our outcome tests cover a three-year window before and after loan initiations, we further exclude states with consecutive close elections in the post-loan initiation periods. In untabulated analyses, we continue to find a significant and negative coefficient on $\text{EnvironmentCov} \times \text{Post} \times \text{Democrat Majority}$.

Table 5 Panel B).³¹ Overall, these findings suggest that the effects of public enforcement on lender monitoring are unlikely driven by omitted time-varying state-level variables.

5. Supplementary Analyses

5.1 Investments in Abatement Technology

To shed light on the mechanism through which borrowers reduce chemical releases, we further examine abatement investments after loan initiation. Plants reporting to the TRI database are required to document source reduction activities that limit the amount of hazardous substances. We focus on four activities known to be effective in reducing hazardous emissions: raw material modifications, cleaning and degreasing, product modifications, and surface preparation and finishing.³² In addition, we examine the two most common types of abatement activities, good operating practices and process modifications (Akey and Appel 2021). In Table 9, we find that borrowers with environmental covenants and located in states with high regulatory intensity are more likely to engage in product modifications,³³ but not other types of emission reduction activities. This finding further corroborates the notion that lender monitoring affects borrowers' pollution prevention efforts.

5.2 Environmental Covenants and Loan Spreads

Our analyses so far show that lenders benefit from environmental covenants. What is less obvious is why borrowers are willing to accept environmental covenants. In this section, we explore whether the inclusion of environmental covenants reduces loan spreads. An empirical challenge is that environmental covenant design and loan pricing are simultaneously determined. To address this simultaneity, we adopt a three-stage Heckman model following prior research (Lee 1978; Bradley and Roberts 2015; Akins et al. 2020).

We first estimate a Probit model with Model (1) and obtain the linear predictor ($\hat{\psi}$) on the probability of environmental covenant inclusion from this estimated model. We then use $\hat{\psi}$ to compute the inverse Mills ratio (IMR) defined as $\frac{p.d.f(\hat{\psi})}{(1-c.d.f.(\hat{\psi}))}$ ($IMR_{NoEnvironCov}$) for loans without

³¹ In untabulated tests, we estimate the same regression using the propensity score matched sample and find similar inferences.

³² <https://www.epa.gov/toxics-release-inventory-tri-program/measuring-impact-source-reduction>

³³ Product modifications refer to the initiatives that change the end product through design, composition, formulation, or packaging changes and full final product replacement.

environmental covenants and $-\frac{p.d.f(\hat{\psi})}{c.d.f(\hat{\psi})}(IMR_{EnvronCov})$ for loans with environmental covenants, where p.d.f and c.d.f represent the standard normal density and cumulative standard normal distribution, respectively. We then estimate the structural pricing Model (3) and (4):

$$LogYield_{NoEnvironCov} = \beta_0 + \beta X + IMR_{NoEnvironCov} \quad (3)$$

$$LogYield_{EnvironCov} = \beta_0 + \beta X + IMR_{EnvironCov} \quad (4)$$

X is a vector of characteristics that affect loan pricing, including all variables on the right-hand side in Model (1) except for the number of lenders and lead bank fixed effects.³⁴ We then obtain the difference in predicted selection-adjusted loan yields ($Log\widehat{Yield}_{NoEnvironCov} - Log\widehat{Yield}_{EnvironCov}$) from regressions with Model (3) and (4). Finally, we include $Log\widehat{Yield}_{NoEnvironCov} - Log\widehat{Yield}_{EnvironCov}$ in the following equation:

$$EnvironmentCov = \beta_0 + \delta(Log\widehat{Yield}_{NoEnvironCov} - Log\widehat{Yield}_{EnvironCov}) + \beta Z \quad (5)$$

Z is a vector of firm and syndicate characteristics. That is, we include all variables on the right-hand side in Model (1) except for loan characteristics (Akins et al. 2020). Regression results of Model (5) are reported in Table 10. We find a positive and significant δ , suggesting that the inclusion of environmental covenants is associated with lower predicted loan spreads. This finding suggests that borrowers benefit from environmental covenants through a lower loan price.

5.3 The Effects of Financial and General Covenants

To better understand the unique role of environmental covenants in lenders' environmental monitoring, we further investigate the effects of financial and general covenants on environmental performance, which have been the focus of prior studies. In Table 11, we find no evidence that the inclusion of either general covenants or financial covenants reduces toxic releases after loan initiations. These results suggest that environmental covenants address environmental risks differently than general and financial covenants. We also find that the inferences from the analysis of the determinants of environmental covenants continue to hold after controlling for the inclusion of general and financial covenants (untabulated), further suggesting that environmental covenants do not simply reflect a borrower's general financial risks.

³⁴ We exclude these syndicate characteristics following the identification strategy in Bradley and Roberts (2015) and Akins et al. (2020). The underlying logic is that syndicate characteristics should affect loan pricing only through the covenant decision because of the competitive lending environment.

5.4 Robustness Checks

We conduct several robustness checks to bolster our main analyses. First, we examine the number of environmental covenants (*EnvironmentCovN*) to capture the intensity of lender monitoring. Table 12 reports the effect of environmental covenant intensity on subsequent toxic releases. Consistent with our main findings, we find that borrowers with more environmental covenants have lower total releases when facing high regulatory intensity.

Second, to further rule out the alternative explanation that borrowers making abatement investments before loan initiations are more likely to accept environmental covenants, in addition to our PSM analysis, we also control for abatement investments before loan initiations. The results continue to hold. In an additional analysis, we further exclude borrowers who undertook abatement activities that are effective in reducing emissions in the pre-loan origination periods. Our findings continue to hold (Internet Appendix Table 6).

Third, we construct an alternative regulatory enforcement that captures the average amount of enforcement costs in a state instead of the number of enforcement actions. We find that our main results still hold with this alternative measure, suggesting the findings are not driven by measurements (Internet Appendix Table 4). Finally, to address the concern that state enforcement reflects the polluting activities in the state, we also control for state-level chemical releases (Internet Appendix Table 7). Our findings are robust to this additional control.

6. Conclusion

In this study, we provide novel evidence on the interplay between public environmental enforcement and private lender monitoring. To capture private lender monitoring, we extract environmental covenants from loan agreements, which represent direct mechanisms through which lenders monitor environmentally-related credit and financial risks in lending. We predict and find that lenders use environmental covenants to mitigate credit and financial risks arising from borrowers' polluting activities and real property collaterals, particularly when borrowers are located in states with high regulatory enforcement intensity. These findings suggest that public enforcement increases the benefits of lender monitoring of borrowers' environmental activities. They also suggest that public enforcement and private monitoring are complementary in reducing corporate pollution.

We further study how the effects of environmental covenants on borrowers' environmental activities vary with regulatory enforcement intensity. We document that environmental covenants

are more effective in inducing borrowers to reduce total toxic releases when borrowers face stronger regulatory enforcement. This finding, along with the borrowers' increased abatement investments, suggests that lenders shape borrowers' environmental activities through environmental covenants by motivating borrowers to adopt more environmentally friendly practices. Further, lender monitoring is more effective when public enforcement is stronger.

Our study carries important policy implications. The incentive of lenders to monitor borrowers is enhanced by public environmental enforcement. Our results suggest that while lenders may be ultimately concerned about borrowers' credit risk and their financial losses caused by environmental liabilities, to the extent that regulatory enforcement reflects the public sentiment about environmental protection, this public sentiment can be met by a joint monitoring effort by lenders and state regulatory agencies. Thus, this study broadens the literature of environmental regulations by documenting that private monitoring and public enforcement can have positive externalities complementarily.

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Appendix A: An Example of Environmental Covenants

The following excerpt is from the loan agreement filed on December 23, 2014 between Catchmark Timber Operating Partnership and its lenders.³⁵ This loan agreement contains an environmental compliance covenant (part a (i)), environmental action covenant (part a (ii), part d, and part e), environmental disclosure covenant (part a (iii) and (iv)), and environmental audit covenant (part b and part c)

Section 7.16 Environmental Covenants.

(a) Each Loan Party and each Subsidiary of any Loan Party will, and will cause all lessees and other Persons occupying any of the Real Property or their other properties to:

- (i) use and operate all of its facilities and properties in compliance with all Environmental Laws, keep all permits, approvals, certificates, licenses and other authorizations relating to environmental matters in effect and remain in compliance therewith, and handle all Hazardous Materials in compliance with all applicable Environmental Laws, except where the failure to do any of the foregoing, either individually or in the aggregate, could not reasonably be expected to result in a liability exceeding a Material Environmental Amount;
- (ii) take all such actions as are necessary and appropriate so that no liability with respect to the Environmental Laws may arise which, either individually or in the aggregate, could reasonably be expected to result in a liability exceeding a Material Environmental Amount;
- (iii) promptly notify the Administrative Agent and provide copies upon receipt of all material written claims, complaints, notices or inquiries relating to the condition of the Real Property or compliance with Environmental Laws, and shall cure and have dismissed with prejudice to the reasonable satisfaction of the Administrative Agent any actions and proceedings relating to compliance with or liability pursuant to Environmental Laws which, either individually or in the aggregate, could reasonably be expected to result in a liability exceeding a Material Environmental Amount; and
- (iv) provide such information and certifications which the Administrative Agent may reasonably request from time to time to evidence compliance with this Section.

(b) Prior to acquiring any ownership or leasehold interest in any additional real property after the Effective Date that could give rise to any Loan Party or any Subsidiary of any Loan Party being

³⁵ <https://www.sec.gov/Archives/edgar/data/1341141/000119312514457083/d843067dex101.htm>

found subject to potential liability under any Environmental Law, the Borrower will (i) obtain a written report by a reputable independent environmental consultant reasonably acceptable to the Administrative Agent (an "Environmental Consultant") as to its assessment of the presence or potential presence of significant levels of any Hazardous Material on, in, under or about such property, or of other conditions that could give rise to a potentially significant liability to any Loan Party or any Subsidiary of any Loan Party under violations of any Environmental Law relating to such transaction, and notify the Administrative Agent of such potential transaction, and (ii) afford the Administrative Agent a reasonable opportunity to review, to discuss such report with the Environmental Consultant who prepared it and a knowledgeable representative of the Borrower. The Administrative Agent shall have the right, but shall not have any duty, to obtain, review, or discuss any such report.

(c) If any Default or Event of Default has occurred and is continuing or if the Administrative Agent or any Lender has formed a reasonable belief that material violations of Environmental Laws may exist or Hazardous Materials may be present on the Real Property in amounts or under circumstances which could reasonably be expected to result in a liability exceeding a Material Environmental Amount, then, at the Administrative Agent's request, the each Loan Party and each Subsidiary of any Loan Party shall perform, or use commercially reasonable efforts to cause to be performed by any other responsible party, tests, including subsurface testing, soil and groundwater testing, and other tests which may physically invade the Real Property pursuant to a scope of work proposed by the Borrower and approved by the Administrative Agent (the "Environmental Tests"), as the Administrative Agent, in its reasonable discretion, determines is necessary to (i) investigate the condition of the Real Property, (ii) protect the security interest created under the Mortgages and the other Loan Documents and (iii) determine compliance in all material respects with all Environmental Laws, the provisions of the Loan Documents and other matters relating thereto. The Loan Parties and Subsidiaries of any Loan Party shall provide true and accurate copies of the results of the Environmental Tests to the Administrative Agent and the Lenders upon receipt of the results. In the event that (I) any Loan Party or any Subsidiary of any Loan Party fails to promptly initiate the Environmental Tests requested by the Administrative Agent, (II) any Loan Party or any Subsidiary of any Loan Party fails to provide to the Administrative Agent and the Lenders with the results of such Environmental Tests within 60 days of the request therefor or such additional time as the Administrative Agent shall agree in its sole discretion or (III) the

Administrative Agent or the Required Lenders are not reasonably satisfied with the results of such Environmental Tests, then the Administrative Agent may undertake to perform or cause to be performed, at the Borrower's expense, such Environmental Tests for the account of the Borrower and the other Loan Parties.

(d) Each Loan Party and each Subsidiary of any Loan Party shall, in accordance with prudent industry practice, from time to time perform any remediation, reclamation or similar action required under any applicable Environmental Law, any such actions with respect to the Real Property to include, but not be limited to, the investigation of the condition of the Real Property, the preparation of any feasibility studies, reports or remedial plans, and the performance of any cleanup, remediation, containment, operation, maintenance, monitoring or restoration work, whether on or off of the Real Property. Each plan of remediation shall be subject to the prior review of the Administrative Agent. All such work shall be performed by one or more Environmental Consultants. Each Loan Party and each Subsidiary of any Loan Party shall proceed continuously and diligently with such investigatory and remedial actions, provided that in all cases such actions shall (i) be in accordance with the remediation plan approved by an appropriate Governmental Authority and all applicable Environmental Laws and (ii) be performed in a good, safe and workmanlike manner so as to minimize, to the extent practicable, any impact on the business conducted at or the value of the Real Property. The Borrower shall pay all costs actually incurred in connection with such investigatory and remedial activities, including all power and utility costs, and any and all Taxes or fees that may be applicable to such activities. Each Loan Party and each Subsidiary of any Loan Party shall promptly provide to the Administrative Agent and the Lenders copies of testing reports and results generated in connection with such activities. Promptly upon completion of such investigation and remediation, each Loan Party and each Subsidiary of any Loan Party shall permanently close all monitoring wells and test holes in compliance with applicable Laws, remove all associated equipment and restore the Real Property to the maximum extent practicable, which shall include, without limitation, the repair of any surface damage. Within 30 days of demand therefor, the Borrower shall provide the Administrative Agent with a bond, letter of credit or similar financial assurance reasonably satisfactory to the Administrative Agent evidencing that the necessary funds are available to perform the obligations established by this clause, unless a bond or similar financial assurance at least in the amount required by the

Administrative Agent is in full force and effect and is available and is in fact used by the relevant Governmental Authority to pay such obligations.

(e) The Administrative Agent, whether or not the Administrative Agent has acquired possession or title to the Real Property, shall have the right to undertake any and all actions to remediate the Real Property which any Loan Party or any Subsidiary of any Loan Party shall fail to perform or cause to be performed in accordance with the requirements of this clause.

Appendix B: Keywords list

Part I: Keywords to search credit agreements

“CREDIT AGREEMENT”, “LOAN AGREEMENT”, “CREDIT FACILITY”, “LOAN AND SECURITY AGREEMENT”, “LOAN & SECURITY AGREEMENT”, “CREDIT AND GUARANTEE AGREEMENT”, “CREDIT & GUARANTEE AGREEMENT”, “CREDIT AND GUARANTY AGREEMENT”, “CREDIT & GUARANTY AGREEMENT”, “LOAN AND GUARANTEE AGREEMENT”, “LOAN & GUARANTEE AGREEMENT”, “LOAN AND GUARANTY AGREEMENT”, “LOAN & GUARANTY AGREEMENT”, “CREDIT AND SECURITY AGREEMENT”, “CREDIT & SECURITY AGREEMENT”, “LOAN AND SECURITY AGREEMENT”, “LOAN & SECURITY AGREEMENT”, “REVOLVING CREDIT”, “FINANCING AND SECURITY AGREEMENT”, “FINANCING & SECURITY AGREEMENT”, and “FACILITY AGREEMENT”.

The word list is in capital letters because the title of a credit agreement typically starts with capital letters.

Part II: Keywords to search environmental covenants

Affirmative covenants: “affirmative covenants”, “positive covenants”, “company covenants”, “covenants of the borrower”, “environmental covenants”, “reporting covenants”.

Environmental action covenants: “conduct/take/complete/implement/ + w/250 + remed/clean/remov/abate/dispos/eliminat/corrective + w/250+ environmental/hazard”.

Environmental disclosure covenants: “advise/notify/report/disclose/deliver/notice + w/500 + environmental/hazard”.

Environmental audit covenants: “conduct/provide/retain/hire/furnish +w/250 + environmental + w/250 + consultant/audit/engineering/consulting”.

The word lists in part II is case insensitive. Note that “+ w/n” means searching within n characters. For example, “advise + w/500+ environmental” locates a text where “environmental” appears within 500 characters after “advise”.

Part III: Keywords to search real property collateral

Real property collateral: “collateral+ w/100 + real + w/30 + property”, “real + w/30 + property + collateral”.

Appendix C: Variable Definitions

Variable	Definition (Data sources in parentheses)
Environmental Covenant Variables	
EnvironmentCov	Equals one if a loan contract includes at least one environmental covenant, and zero otherwise. (SEC filings)
EnvironmentCovN	The number of environmental covenants included in a loan agreement. (SEC filings)
EnvironmentCovAction	Equals one if a loan contract includes an environmental action covenant, and zero otherwise. (SEC filings)
EnvironmentCovDisclosure	Equals one if a loan contract includes an environmental disclosure covenant, and zero otherwise. (SEC filings)
EnvironmentCovAudit	Equals one if a loan contract includes an environmental audit covenant, and zero otherwise. (SEC filings)
Other Loan-level Variables	
Real Property Collateral	Equals one if a loan facility reports collateral in DealScan and the loan agreement includes real property collateral, and zero otherwise (DealScan, SEC filings)
Non-Real Property Collateral	Equals one if a loan facility reports collateral in DealScan and its loan agreement does not include real property collateral, and zero otherwise. (DealScan, SEC filings)
Log (Loan Size)	The natural logarithm of loan facility amount. (DealScan)
Log (Maturity)	The natural logarithm of loan maturity. (DealScan)
Log (N Lenders)	The natural logarithm of the number of lenders. (DealScan)
Log (Loan Spread)	The natural logarithm of loan spreads. (DealScan)
FinancialCov	Equals one if a loan facility includes financial covenants, and zero otherwise. (DealScan, SEC filings)
GeneralCov	Equals one if a loan facility includes general covenants, and zero otherwise. (DealScan, SEC filings)
Environmental Performance Variables	
High Polluting Industry	Equals one if a borrower belongs to an industry with the average total releases scaled by sales in the year before loan initiation in the top quartile of all the TRI reporting firms in the same year. (TRI)
Log(1+Toxic Release)	The natural logarithm of one plus total emission of the toxic chemical scaled by sales in the previous year. (TRI)
Log (1+On-site Release)	The natural logarithm of one plus on-site releases scaled by sales in the previous year. (TRI)
Log (1+Off-site Release)	The natural logarithm of one plus off-site releases scaled by sales in the previous year. (TRI)
I(Abatement Initiatives)	Equals one if a plant undertakes a certain category of pollution prevention efforts, which include product

modification, raw material modification, cleaning and degreasing, surface preparation and finishing, good operating practices, and process modification. (TRI P2)

Firm-level Variables	
Log (Total Asset)	The natural logarithm of total assets. (Compustat)
ROA	Operating income before depreciation scaled by the average of the total assets in the beginning and the ending period. (Compustat)
Leverage	Total liabilities divided by total assets. (Compustat)
Cash/Liabilities	Cash divided by total liabilities. (Compustat)
Tangible	Total property, plant, and equipment divided by total assets. (Compustat)
Tobin's Q	The book value of total liabilities plus the market value of equity, divided by total assets. (Compustat)
Sd(Operating Cash Flow)	The standard deviation of operating cash flows in the past five years. (Compustat)
AltmanZ	Altman's Z score = $3.3 \times (\text{Earnings before Interest and Taxes} / \text{Total Assets}) + 0.99 \times (\text{Sales} / \text{Total Assets}) + 0.6 \times (\text{Market Value of Equity} / \text{Total Liabilities}) + 1.2 \times (\text{Working Capital} / \text{Total Assets}) + 1.4 \times (\text{Retained Earnings} / \text{Total Assets})$. (Compustat)
Dividend	Equals one if a firm issues dividend and zero otherwise. (Compustat)
Institutional Ownership	The percentage of shares owned by institutional investors (Thomson Reuters)
State-level Variables	
State Enf (Determinant)	The proportion of borrower's plants located in states with high regulatory intensity. A state is classified having high regulatory intensity if the aggregate number of environmental inspections and enforcements (excluding the inspections and enforcements related to the borrower's plants) in the state deflated by the total number of TRI reporting facilities (excluding the borrower's plants) in the state is above the yearly median. (ECHO)
State Enf (Outcome)	The aggregate number of inspections and enforcement in the state (excluding the inspections and enforcements related to borrowers' plants in the state) deflated by the total number of TRI reporting facilities (excluding the borrowers' plants) in the state (ECHO).
State Pollution	The total toxic releases in the state (excluding toxic releases of borrowers' plants in the state), which is then deflated by the total number of TRI reporting facilities (excluding the borrowers' plants) in the state (TRI).

Democrat Majority

Equals one when Democratic candidates win the majority of seats in close congressional elections in the state and zero otherwise.

Figure 1: Distribution of State Regulatory Intensity

This map shows the state regulatory intensity across the United States. The state regulatory intensity is defined as the aggregate number of inspections and enforcement undertaken in the state in a given year. The darker colors indicate greater intensity.

Table 1: Descriptive Statistics for the Determinant Tests

This table Panel A presents descriptive statistics of main variables for the determinant tests. The unit observation is at the loan facility level. Panel B presents the industry distribution of environmental covenants.

Panel A: Descriptive Statistics

	N	Mean	Median	P25	P75	Sd	Min	Max
EnvironmentCov	2019	0.42	0.00	0.00	1.00	0.49	0.00	1.00
EnvironmentCovN	2019	0.65	0.00	0.00	1.00	0.89	0.00	3.00
EnvironmentCov Disclosure	2019	0.39	0.00	0.00	1.00	0.49	0.00	1.00
EnvironmentCov Audit	2019	0.08	0.00	0.00	0.00	0.27	0.00	1.00
EnvironmentCov Action	2019	0.18	0.00	0.00	0.00	0.38	0.00	1.00
State Enf	2019	0.48	0.50	0.22	0.71	0.34	0.00	1.00
High Polluting Industry	2019	0.33	0.00	0.00	1.00	0.47	0.00	1.00
Real Property Collateral	2019	0.18	0.00	0.00	0.00	0.38	0.00	1.00
Non-Real Property Collateral	2019	0.35	0.00	0.00	1.00	0.48	0.00	1.00
Log(Total Asset)	2019	7.86	7.83	6.83	8.87	1.46	3.23	12.18
ROA	2019	0.14	0.13	0.09	0.17	0.07	-0.63	0.57
Leverage	2019	0.26	0.23	0.16	0.32	0.15	0.04	1.86
Cash/Liabilities	2019	0.20	0.07	0.03	0.19	0.45	0.00	7.94
Tangible	2019	0.32	0.28	0.17	0.44	0.19	0.02	0.92
Tobin's Q	2019	1.46	1.28	1.05	1.65	0.64	0.46	7.19
Sd(Operating Cash Flow)	2019	0.04	0.03	0.02	0.05	0.03	0.00	0.38
AltmanZ	2019	3.04	2.62	1.75	3.81	2.28	-3.93	31.24
Dividend	2019	0.70	1.00	0.00	1.00	0.46	0.00	1.00
Institutional Ownership	2019	0.73	0.77	0.59	0.88	0.22	0.06	1.16
Log(Loan Spread)	2019	4.91	5.01	4.47	5.42	0.74	2.56	6.83
Log(Loan Size)	2019	5.71	5.78	5.01	6.55	1.24	0.69	10.02
Log(Maturity)	2019	3.79	4.09	3.58	4.09	0.59	0.69	4.68
Revolver	2019	0.65	1.00	0.00	1.00	0.48	0.00	1.00
Log(N Lenders)	2019	2.11	2.20	1.61	2.77	0.88	0.00	4.37
FinancialCov	2019	0.85	1.00	1.00	1.00	0.35	0.00	1.00
GeneralCov	2019	0.89	1.00	1.00	1.00	0.31	0.00	1.00

Panel B: The Industry Distribution of Environmental Covenants.

Fama-French industry	Pct EnvironmentCov =1	Number of Observations
Precious Metals	80%	5
Food Products	66%	77
Shipping Containers	58%	36
Textiles	58%	19
Shipbuilding, Railroad Equipment	57%	7
Business Services	57%	7
Wholesale	57%	93
Rubber and Plastic Products	54%	52
Electrical Equipment	54%	95
Transportation	50%	10
Recreation	50%	14
Non-Metallic and Industrial Metal Mining	50%	22
Steel Works Etc	50%	110
Electronic Equipment	49%	113
Chemicals	48%	200
Computers	48%	21

Aircraft	46%	48
Automobiles and Trucks	46%	151
Beer & Liquor	45%	29
Business Supplies	43%	107
Construction	43%	14
Communication	42%	12
Almost Nothing	41%	41
Machinery	38%	150
Measuring and Control Equipment	38%	37
Fabricated Products	37%	19
Construction Materials	32%	109
Consumer Goods	31%	71
Medical Equipment	30%	54
Pharmaceutical Products	29%	38
Coal	27%	15
Tobacco Products	25%	4
Petroleum and Natural Gas	24%	41
Utilities	17%	210
Defense	14%	7
Printing and Publishing	0%	4

Table 2: Correlation Table

This table presents the Pearson correlation among main variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) EnvironmentCov	1.00									
(2) EnvironmentCovN	0.86***	1.00								
(3) State Enf	0.03	0.05*	1.00							
(4) High Polluting Industry	-0.04	0.01	0.08***	1.00						
(5) Real Property Collateral	0.33***	0.32***	0.04	-0.05*	1.00					
(6) Non-Real Property Collateral	0.07***	0.08***	-0.02	-0.08***	-0.34***	1.00				
(7) Log(Total Asset)	-0.19***	-0.19***	0.06*	0.22***	-0.22***	-0.21***	1.00			
(8) ROA	-0.04	-0.04	0.02	-0.07**	-0.16***	-0.10***	-0.09***	1.00		
(9) Leverage	0.03	0.02	-0.06**	-0.21***	-0.04	0.06*	-0.07**	-0.00	1.00	
(10) Cash/Liabilities	-0.01	-0.01	0.02	-0.13***	0.04*	-0.00	-0.14***	0.15***	-0.16***	1.00
(11) Tangible	-0.12***	-0.07**	0.12***	0.50***	-0.03	-0.08***	0.19***	-0.10***	-0.15***	-0.21***
(12) Tobin's Q	-0.06**	-0.07**	0.02	-0.20***	-0.13***	-0.10***	-0.03	0.57***	0.11***	0.29***
(13) Sd(Operating Cash Flow)	0.12***	0.14***	0.03	-0.16***	0.10***	0.15***	-0.29***	0.08***	0.14***	0.12***
(14) AltmanZ	-0.02	-0.03	0.01	-0.25***	-0.07**	-0.03	-0.29***	0.53***	-0.04	0.69***
(15) Dividend	-0.19***	-0.21***	-0.03	0.20***	-0.22***	-0.20***	0.26***	0.08***	0.04	-0.08***
(16) Institutional Ownership	0.08***	0.08***	0.07**	-0.08***	0.02	0.01	0.19***	0.06**	-0.16***	0.10***
(17) Log(Loan Spread)	0.29***	0.29***	0.01	-0.02	0.35***	0.34***	-0.19***	-0.32***	-0.04	0.02
(18) Log(Loan Size)	-0.11***	-0.13***	0.06*	0.11***	-0.18***	-0.24***	0.73***	0.14***	-0.09***	-0.07**
(19) Log(Maturity)	0.16***	0.15***	0.01	-0.06*	0.15***	0.09***	-0.12***	0.03	-0.17***	0.02
(20) Revolver	-0.06**	-0.06**	-0.02	0.01	-0.08***	-0.04	-0.09***	-0.01	-0.07***	-0.01
(21) Log(N Lenders)	-0.07***	-0.10***	0.03	0.07***	-0.17***	-0.17***	0.50***	0.14***	-0.02	-0.13***
(22) FinancialCov	0.03	0.02	-0.04	-0.01	-0.04	-0.06*	-0.13***	0.08***	-0.01	0.01
(23) GeneralCov	-0.01	-0.01	-0.04	-0.02	-0.06**	-0.11***	-0.06**	0.07**	0.03	0.00

Table 2: Correlation Table Cont.

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
(11)	1.00												
(12)	-0.27***	1.00											
(13)	-0.05*	0.10***	1.00										
(14)	-0.31***	0.65***	0.15***	1.00									
(15)	0.19***	-0.02	-0.20***	-0.02	1.00								
(16)	-0.24***	0.09***	-0.10***	0.07**	-0.07**	1.00							
(17)	0.03	-0.29***	0.13***	-0.21***	-0.25***	0.01	1.00						
(18)	0.02	0.11***	-0.23***	-0.10***	0.22***	0.28***	-0.26***	1.00					
(19)	-0.08***	-0.09***	0.02	0.02	-0.12***	0.19***	0.16***	0.02	1.00				
(20)	0.03	-0.06**	0.01	0.04	0.04	0.01	-0.13***	0.01	0.35***	1.00			
(21)	0.02	0.04*	-0.20***	-0.09***	0.20***	0.19***	-0.26***	0.61***	0.10***	0.06**	1.00		
(22)	-0.01	0.01	-0.01	0.06**	0.03	-0.06*	-0.08***	-0.04	0.00	0.08***	0.12***	1.00	
(23)	0.03	0.06**	-0.03	0.08***	0.03	-0.05*	-0.17***	0.04	-0.03	0.08***	0.13***	0.65***	1.00

Note: ***, **, and * represent the 1%, 5% and 10% significance level, respectively.

Table 3: The Determinants of Environmental Covenants

This table presents results from OLS estimation of the following model:

$$\text{EnvironmentCov}_{i,j,t} = \beta_0 + \beta_1 \text{High Polluting Industry}_{i,t-1} \times \text{State Enf}_{i,t-1} + \beta_2 \text{Real Property Collateral}_{i,j,t} \times \text{State Enf}_{i,t-1} + \beta_3 \text{Non-Real Property Collateral}_{i,j,t} \times \text{State Enf}_{i,t-1} + \beta_4 \text{High Polluting Industry}_{i,t-1} + \beta_5 \text{Real Property Collateral}_{i,j,t} + \beta_6 \text{Non-Real Property Collateral}_{i,j,t} + \beta_7 \text{State Enf}_{i,t-1} + \text{Controls} + \text{Fixed Effects} + \varepsilon$$

EnvironmentCov equals one if a loan facility has environmental covenants included in its loan agreement and zero otherwise. *High Pollution Industry* equals to 1 if the borrower belongs to an industry with average total releases/sales higher than the quartile of all the firms reporting to the TRI and ECHO databases in the same year. *State Enf* is the proportion of borrower's plants located in states with high environmental regulation intensity. A state is classified having high environmental regulation intensity if the number of environmental inspection and environmental enforcement per plant in the state is above median of all the firms in all the industries reporting to the TRI and ECHO databases. *Real Property Collateral* equals one if a loan facility has real property collateral and zero otherwise. *Non-Real Property Collateral* equals if a loan facility has collateral that is not real property and zero otherwise. Detailed definition of the control variables can be found in Appendix C. Industry, Year, Loan Purpose, and Lead Lender FEs are included in all columns. Main State Fixed Effect is included in Column 2. *Main State* is the state in which the borrower has the most of its plants. If a borrower has equal number of plants in a few states, main state is the state with the highest environmental regulatory intensity. Standard errors are heteroskedasticity-robust. T-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Dependent Variable =	EnvironmentCov	
	(1)	(2)
High Polluting Industry × State Enf	0.178*** (2.720)	0.165** (2.533)
Real Property Collateral × State Enf	0.197** (2.376)	0.160* (1.897)
Non-Real Property Collateral × State Enf	-0.105 (-1.496)	-0.116* (-1.650)
High Polluting Industry	-0.0109 (-0.224)	0.00539 (0.109)
Real Property Collateral	0.320*** (5.687)	0.328*** (5.790)
Non-Real Property Collateral	0.160*** (3.624)	0.154*** (3.451)
State Enf	-0.0550 (-0.977)	-0.0882 (-1.445)
Log(Total Asset)	-0.0385*** (-2.621)	-0.0383*** (-2.591)
ROA	0.0892 (0.432)	0.0711 (0.335)
Leverage	0.0695 (0.805)	0.0974 (1.070)
Cash/Liabilities	-0.0817** (-2.026)	-0.100** (-2.375)
Tangible	-0.153* (-1.729)	-0.209** (-2.213)
Tobin's Q	-0.0524* (-1.907)	-0.0721** (-2.542)

Sd(Operating Cash Flow)	0.985*** (2.611)	0.977*** (2.586)
AltmanZ	0.00844 (0.799)	0.0126 (1.167)
Dividend	-0.0320 (-1.192)	-0.0524* (-1.878)
Institutional Ownership	0.170*** (2.795)	0.176*** (2.847)
Log(Loan Size)	0.0192 (1.290)	0.0158 (1.093)
Log(Maturity)	0.0794*** (3.857)	0.0830*** (3.995)
Revolver	-0.0640*** (-2.714)	-0.0532** (-2.281)
Log(N Lenders)	0.0342** (2.075)	0.0407** (2.547)
Constant	0.112 (0.801)	0.157 (1.073)
<hr/>		
P-value (Real Property Collateral = non-Real Property Collateral)	0.0039	0.0017
<hr/>		
Industry FE	YES	YES
Year FE	YES	YES
Loan Purpose FE	YES	YES
Lead Lender FE	YES	YES
Main State FE	NO	YES
<hr/>		
Observations	2,019	2,018
Adjusted R-squared	0.279	0.316
<hr/>		

Table 4: Descriptive Statistics for the Outcome Tests

This table reports descriptive statistics for the outcome tests. The unit observation is at the plant-chemical level.

	N	Mean	Median	P25	P75	Sd	Min	Max
EnvironmentCov	380368	0.38	0.00	0.00	1.00	0.49	0.00	1.0
EnvironmentCovN	380368	0.66	0.00	0.00	1.00	0.97	0.00	3.0
Post	380368	0.44	0.00	0.00	1.00	0.50	0.00	1.00
State Enf	380368	0.61	0.39	0.20	0.62	0.76	0.04	4.76
Log(1+Toxic Release)	380368	1.01	0.28	0.01	1.64	1.37	0.00	5.70
Log(1+On-site Release)	380368	0.85	0.13	0.01	1.32	1.29	0.00	5.53
Log(1+Off-site Release)	380368	0.18	0.00	0.00	0.00	0.62	0.00	3.75
Democrat Majority	380368	0.47	0.00	0.00	1.00	0.50	0.00	1.00
I(Product)	380368	0.00	0.00	0.00	0.00	0.07	0.00	1.00
I(Raw Material)	380368	0.01	0.00	0.00	0.00	0.09	0.00	1.00
I(Cleaning & Degreasing)	380368	0.00	0.00	0.00	0.00	0.07	0.00	1.00
I(Surface)	380368	0.01	0.00	0.00	0.00	0.08	0.00	1.00
I(Operating)	380368	0.04	0.00	0.00	0.00	0.20	0.00	1.00
I(Process)	380368	0.02	0.00	0.00	0.00	0.15	0.00	1.00
Real Property Collateral	380368	0.10	0.00	0.00	0.00	0.30	0.00	1.00
Non-Real Property Collateral	380368	0.25	0.00	0.00	1.00	0.43	0.00	1.00
Log(Total Asset)	380368	9.09	9.24	7.99	10.20	1.44	5.61	12.09
ROA	380368	0.13	0.12	0.09	0.16	0.06	0.01	0.34
Leverage	380368	0.22	0.20	0.16	0.27	0.09	0.07	0.54
Cash/Liabilities	380368	0.11	0.07	0.03	0.14	0.13	0.00	0.72
Tangible	380368	0.43	0.44	0.30	0.57	0.18	0.06	0.77
Tobin's Q	380368	1.34	1.22	1.02	1.51	0.47	0.73	3.35
Sd(Operating Cash Flow)	380368	0.03	0.02	0.01	0.04	0.02	0.00	0.12
AltmanZ	380368	2.44	2.16	1.28	3.24	1.39	0.45	6.89
Dividend	380368	0.73	0.77	0.63	0.86	0.18	0.15	1.09
Institutional Ownership	380368	0.84	1.00	1.00	1.00	0.36	0.00	1.00
Log(Loan Size)	380368	6.39	6.31	5.70	7.13	1.13	3.40	8.92
Log(Maturity)	380368	3.77	4.09	3.58	4.09	0.59	2.40	4.43
Revolver	380368	0.67	1.00	0.00	1.00	0.47	0.00	1.00
Log(N Lenders)	380368	2.44	2.56	1.95	3.09	0.78	0.00	3.69
FinancialCov	380368	0.80	1.00	1.00	1.00	0.40	0.00	1.00
GeneralCov	380368	0.82	1.00	1.00	1.00	0.38	0.00	1.00

Table 5: The Outcomes of Environmental Covenants

This table presents OLS estimates of the following model:

$$\begin{aligned} \text{Log}(1+\text{Toxic Release}_{c,p,i,j,t}) = & \beta_0 + \beta_1 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_2 \text{EnvironmentCov}_{i,j,t} \times \\ & \text{Post}_{i,j,t} + \beta_3 \text{EnvironmentCov}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_4 \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \\ & \beta_5 \text{EnvironmentCov}_{i,j,t} + \beta_6 \text{Post}_{i,j,t} + \beta_7 \text{State Enf}_{i,p,t} + \text{Controls} + \text{Fixed} \\ & \text{Effects} + \varepsilon \end{aligned}$$

The unit of observation is at the Plant-Chemical level. In Column (1), we control for Plant-Chemical and Chemical-Year fixed effects. In Column (2), we additionally control for State fixed effects. The dependent variables are the log of total releases scaled by sales. *EnvironmentCov* equals one if a loan facility has environmental covenants and zero otherwise. *Post* is an indicator variable equal to one for years after the loan initiation. *State Enf* is the total inspections and enforcement actions deflated by the total number of facilities in a state (adjusted for the borrowers' inspection and enforcement). The definition of the control variables can be found in Appendix C. Standard errors are clustered at the borrower level. T-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Dependent Variable =	Log(1+Toxic Release)	
	(1)	(2)
EnvironmentCov × Post × State Enf	-0.043 *** (-2.745)	-0.043 *** (-2.745)
EnvironmentCov × Post	0.003 (0.246)	0.003 (0.246)
EnvironmentCov × State Enf	0.014 (1.162)	0.014 (1.162)
Post × State Enf	0.004 (0.954)	0.004 (0.954)
EnvironmentCov	0.045 ** (2.395)	0.045 ** (2.395)
Post	-0.010 (-1.344)	-0.010 (-1.343)
State Enf	-0.031 *** (-2.765)	-0.031 *** (-2.765)
Real Property Collateral	-0.034 (-1.510)	-0.034 (-1.510)
Non-Real Property Collateral	-0.011 (-0.619)	-0.011 (-0.619)
Log(Total Asset)	-0.237 *** (-7.395)	-0.237 *** (-7.395)
ROA	0.712 *** (4.304)	0.712 *** (4.303)
Leverage	-0.175 ** (-2.541)	-0.175 ** (-2.541)
Cash/Liabilities	0.039 (0.803)	0.039 (0.803)
Tangible	-0.050 (-0.582)	-0.050 (-0.582)
Tobin's Q	-0.015 (-0.703)	-0.015 (-0.703)
Sd(Operating Cash Flow)	0.387 (1.043)	0.387 (1.043)
AltmanZ	-0.066 *** (-6.762)	-0.066 *** (-6.762)

Dividend	0.015 (0.610)	0.015 (0.610)
Institutional Ownership	-0.001 (-0.009)	-0.001 (-0.009)
Log(Loan Size)	-0.001 (-0.324)	-0.001 (-0.324)
Log(Maturity)	0.001 (0.128)	0.001 (0.128)
Revolver	0.010 * (1.800)	0.010 * (1.800)
Log(N Lenders)	-0.007 (-1.116)	-0.007 (-1.115)
Plant-Chemical FE	YES	YES
Chemical-Year FE	YES	YES
State FE		YES
Observations	380,368	380,368
Adjusted R-squared	0.911	0.911

Table 6: The Dynamic Effects of Environmental Covenants

This table shows the coefficient dynamics for total releases around the origination of loans having *EnvironmentCov*. We use the baseline regression specification (2) but replaces *Post* with indicators for each year around the loan originations. The unit of observation is at the Plant-Chemical level. The dependent variables are the log of total releases scaled by sales. *EnvironmentCov* equals one if a loan facility has environmental covenants and zero otherwise. *Window k* is an indicator variable equal to one for year *k* around the loan initiation, where the negative (positive) integer *k* indicates years prior (post) to the loan initiation. *State Enf* is the total inspections and enforcement actions deflated by the total number of facilities in a state (adjusted for the borrowers' inspection and enforcement). Standard errors are clustered at the borrower level. T-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

<i>Dependent Variable =</i>	Log(1+Toxic Release) (1)
EnvironmentCov × Window -3 × State Enf	0.037 (1.51)
EnvironmentCov × Window -2 × State Enf	0.017 (1.18)
EnvironmentCov × Window -1 × State Enf	0.007 (0.715)
EnvironmentCov × Window 1 × State Enf	-0.021 * (-1.72)
EnvironmentCov × Window 2 × State Enf	-0.035 ** (-2.04)
EnvironmentCov × Window 3 × State Enf	-0.034 * (-1.84)
EnvironmentCov × State Enf	-0.0008 (-0.053)
EnvironmentCov × Window -3	-0.015 (-0.692)
EnvironmentCov × Window -2	-0.0002 (-0.010)
EnvironmentCov × Window -1	-0.0004 (-0.028)
EnvironmentCov × Window 1	0.007 (0.611)
EnvironmentCov × Window 2	-0.006 (-0.361)
EnvironmentCov × Window 3	-0.003 (-0.186)
EnvironmentCov	0.049 ** (2.49)
State Enf	-0.018 (-1.48)
Window Indicators × State Enf	YES
Window Indicators	YES
Controls	YES
Plant-Chemical FE	YES
Chemical-Year FE	YES
Observations	380,368
Adjusted R-squared	0.911

**Table 7: The Outcomes of Environmental Covenants
in a Propensity Score Matched Sample**

This table presents regression results of Model (2) based on the propensity score matched sample. For each loan, we estimate the predicted probability of being a loan with environmental covenants using the probit model (1). We then match each loan having environmental covenants with a loan without environmental covenants originated in the same year, with replacement, using a caliper distance of 0.05. Panel A shows the covariate balance between the unmatched and the matched samples. Panel B presents the estimation results of regressions that examine the consequences of environmental covenants using the matched sample. Standard errors are clustered at the borrower level. T-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Panel A: Covariate Balance

Sample:	Unmatched			Matched		
EnvironmentCov:	0	1	Difference	0	1	Difference
High Polluting Industry	0.35	0.31	0.04	0.35	0.33	0.02
State Enf	0.47	0.49	-0.02	0.50	0.48	0.02
Real Property Collateral	0.07	0.33	-0.26***	0.19	0.18	0.01
Non-Real Property Collateral	0.31	0.38	-0.07**	0.36	0.41	-0.04
Log(Total Assets)	8.12	7.54	0.58***	7.63	7.69	-0.06
ROA	0.14	0.13	0.01	0.13	0.13	0
Leverage	0.26	0.26	-0.01	0.26	0.26	0
Cash/Liabilities	0.20	0.20	0	0.20	0.21	-0.01
Tangible	0.34	0.29	0.05***	0.32	0.30	0.01
Tobin's Q	1.49	1.41	0.08**	1.42	1.47	-0.05
Sd(Operating Cash Flow)	0.04	0.04	-0.01***	0.04	0.04	0
AltmanZ	3.07	2.99	0.08	3.01	3.07	-0.06
Dividend	0.77	0.59	0.18***	0.69	0.66	0.03
Institutional Ownership	0.72	0.75	-0.03**	0.74	0.74	-0.01
Log(Loan Size)	5.85	5.56	0.3***	5.65	5.61	0.04
Log(Maturity)	3.72	3.91	-0.19***	3.85	3.88	-0.03
Revolver	0.68	0.62	0.06**	0.68	0.66	0.02
Log(N Lenders)	2.18	2.03	0.15***	2.03	2.04	-0.02

Panel B: Regression Results

Dependent Variable =	Log(1+Toxic Release)	
	(1)	(2)
EnvironmentCov × Post × State Enf	-0.048 ** (-2.39)	-0.048 ** (-2.39)
EnvironmentCov × Post	0.011 (0.653)	0.011 (0.653)
EnvironmentCov × State Enf	0.005 (0.265)	0.005 (0.265)
Post × State Enf	0.008 (1.34)	0.008 (1.34)
EnvironmentCov	0.095 *** (2.85)	0.095 *** (2.85)
Post	-0.0003 (-0.023)	-0.0003 (-0.023)
State Enf	-0.034 ** (-2.53)	-0.034 ** (-2.53)
Controls	YES	YES
Plant-Chemical FE	YES	YES
Chemical-Year FE	YES	YES
State FE		YES
Observations	173,556	173,556
Adjusted R-squared	0.910	0.910

Table 8: Close Elections as an Exogenous Shock to Regulatory Intensity

This table presents OLS estimates of the following model:

$$\begin{aligned} \text{Log}(1+\text{Toxic Release}_{c,p,i,j,t}) = & \beta_0 + \beta_1 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} \times \text{Democrat Majority}_{i,p,t} + \\ & \beta_2 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} + \beta_3 \text{EnvironmentCov}_{i,j,t} \times \text{Democrat} \\ & \text{Majority}_{i,p,t} + \beta_4 \text{Post}_{i,j,t} \times \text{Democrat Majority}_{i,p,t} + \beta_5 \text{EnvironmentCov}_{i,j,t} + \\ & \beta_6 \text{Post}_{i,j,t} + \beta_7 \text{Democrat Majority}_{i,p,t} + \text{Controls} + \text{Plant-Chemical FE} + \\ & \text{Chemical-Year FE} + \varepsilon \end{aligned}$$

The sample is restricted to the plants located in a state having close elections in a year prior to the loan origination. The unit of observation is at the Plant-Chemical level. The dependent variables are the log of total releases scaled by sales. *EnvironmentCov* equals one if a loan facility has environmental covenants and zero otherwise. *Post* is an indicator variable equal to one for years after the loan initiation. *Democrat Majority* equals one if a plant is located in a state where the majority of seats available in close elections are won by Democratic candidates and zero otherwise. T-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

<i>Dependent Variable =</i>	Log(1+Toxic Release) (1)
EnvironmentCov × Post × Democrat Majority	-0.088 ** (-2.129)
EnvironmentCov × Post	0.006 (0.185)
EnvironmentCov × Democrat Majority	0.020 (0.582)
Post × Democrat Majority	-0.007 (-0.384)
EnvironmentCov	0.022 (0.685)
Post	-0.010 (-0.647)
Democrat Majority	0.007 (0.263)
Controls	YES
Plant-Chemical FE	YES
Chemical-Year FE	YES
Observations	98,538
Adjusted R-squared	0.917

Table 9: The Effects of Environmental Covenants on Abatement Investments

This table provides OLS estimates from the following equation:

$$I(\text{Abatement Initiatives}) = \beta_0 + \beta_1 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_2 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} + \beta_3 \text{EnvironmentCov}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_4 \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_5 \text{EnvironmentCov}_{i,j,t} + \beta_6 \text{Post}_{i,j,t} + \beta_7 \text{State Enf}_{i,p,t} + \text{Controls} + \text{Plant-Chemical FE} + \text{Chemical-Year FE} + \varepsilon$$

The dependent variable is an indicator variable for each category of abatement initiatives undertaken to reduce the use of a certain chemical. *EnvironmentCov* equals one if a loan facility has environmental covenants and zero otherwise. *Post* is an indicator variable equal to one for years after the loan initiation. *State Enf* is the total inspections and enforcement actions deflated by the total number of facilities in a state (adjusted for the borrowers' inspection and enforcement). Standard errors are clustered at the borrower level. T-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

<i>Dependent Variable =</i>	I(Product)	I(Raw Material)	I(Cleaning & Degreasing)	I(Surface)	I(Operating)	I(Process)
	(1)	(2)	(3)	(4)	(5)	(6)
EnvironmentCov × Post × State Enf	0.002 ** (2.332)	-0.001 (-0.627)	0.002 (0.915)	0.000 (0.355)	-0.005 (-0.564)	-0.005 (-0.977)
EnvironmentCov × Post	-0.002 * (-1.818)	-0.000 (-0.184)	0.001 (0.835)	-0.000 (-0.034)	0.003 (0.505)	0.002 (0.382)
EnvironmentCov × State Enf	0.000 (0.307)	0.000 (0.214)	-0.002 (-0.801)	-0.000 (-0.756)	0.002 (0.335)	0.003 (0.902)
Post × State Enf	-0.002 ** (-1.980)	0.001 (0.875)	-0.001 (-0.501)	-0.001 (-1.491)	-0.006 (-0.978)	0.001 (0.715)
EnvironmentCov	0.001 (1.070)	0.003 (0.862)	-0.001 (-0.553)	0.001 (1.052)	0.005 (1.099)	-0.001 (-0.220)
Post	0.002 * (1.834)	0.000 (0.363)	-0.002 (-1.243)	0.002 (1.066)	0.003 (0.710)	0.001 (0.525)
State Enf	-0.002 (-1.639)	-0.001 (-0.346)	0.002 (1.139)	-0.002 ** (-2.041)	0.011 (1.269)	-0.006 ** (-2.390)
Controls	YES	YES	YES	YES	YES	YES
Plant-Chemical FE	YES	YES	YES	YES	YES	YES
Chemical-Year FE	YES	YES	YES	YES	YES	YES
Observations	380,368	380,368	380,368	380,368	380,368	380,368
Adjusted R-squared	0.367	0.359	0.416	0.498	0.581	0.422

Table 10: Environmental Covenants and Loan Pricing

This table presents results from the loan pricing test described in Section 5.2. $\widehat{LogYield}_{NoEnvironCov} - \widehat{LogYield}_{EnvironCov}$ is the counterfactual differences in log loan spread between loans without environmental covenants and loans with environmental covenants. *, **, *** represent the 10%, 5% and 1% significance level, respectively.

<i>Dependent Variable =</i>	EnvironmentCov (1)
$\widehat{LogYield}_{NoEnvironCov} - \widehat{LogYield}_{EnvironCov}$	0.482* (2.32)
High Polluting Industry $\times$ State Enf	0.768** (3.25)
Real Property Collateral $\times$ State Enf	0.750* (2.44)
Non-Real Property Collateral $\times$ State Enf	-0.294 (-1.24)
Real Property Collateral	0.935*** (4.92)
Non-Real Property Collateral	0.521*** (3.66)
High Polluting Industry	-0.048 (-0.29)
State Enf	-0.139 (-0.73)
Constant	-0.537 (-1.00)
Controls	YES
Industry FE	YES
Year FE	YES
Lead Lender FE	YES
Observations	1997
Pseudo R-squared	0.26

Table 11: The Effects of Financial Covenants and General Covenants

This table provides OLS estimates from the following equation:

$$\begin{aligned} \text{Log}(1+\text{Toxic Release}_{c,p,i,j,t}) = & \beta_0 + \beta_1 I(\text{Covenant})_{i,j,t} \times \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_2 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} \\ & \times \text{State Enf}_{i,p,t} + \beta_3 I(\text{Covenant})_{i,j,t} \times \text{Post}_{i,j,t} + \beta_4 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} \\ & + \beta_5 I(\text{Covenant})_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_6 \text{EnvironmentCov}_{i,j,t} \times \text{State Enf}_{i,p,t} + \\ & \beta_7 \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_8 I(\text{Covenant})_{i,j,t} + \beta_9 \text{EnvironmentCov}_{i,j,t} + \beta_{10} \\ & \text{Post}_{i,j,t} + \beta_{11} \text{State Enf}_{i,p,t} + \text{Controls} + \text{Plant-Chemical FE} + \text{Chemical-} \\ & \text{Year FE} + \varepsilon \end{aligned}$$

The unit of observation is at the Plant-Chemical level. The dependent variables are the log of total releases scaled by sales. In Column (1), $I(\text{Covenant})$ equals one if a loan facility has general covenants and zero otherwise. In Column (2), $I(\text{Covenant})$ equals one if a loan facility has financial covenants and zero otherwise. Post is an indicator variable equal to one for years after the loan initiation. State Enf is the total inspections and enforcement actions deflated by the total number of facilities in a state (adjusted for the borrowers' inspection and enforcement). Standard errors are clustered at the borrower level. T-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Dependent Variable = I(Covenant):	Log(1+Toxic Release)	
	GeneralCov (1)	FinancialCov (2)
I(Covenant) × Post × State Enf	-0.021 (-1.498)	-0.013 (-1.001)
EnvironmentCov × Post × State Enf	-0.042 *** (-2.728)	-0.043 *** (-2.729)
I(Covenant) × Post	-0.003 (-0.159)	-0.010 (-0.692)
EnvironmentCov × Post	0.003 (0.218)	0.003 (0.223)
I(Covenant) × State Enf	0.007 (0.753)	-0.001 (-0.165)
EnvironmentCov × State Enf	0.013 (1.069)	0.012 (1.028)
Post × State Enf	0.022 (1.643)	0.015 (1.320)
I(Covenant)	0.007 (0.616)	-0.008 (-0.709)
EnvironmentCov	0.046 ** (2.366)	0.045 ** (2.399)
Post	-0.007 (-0.457)	-0.000 (-0.004)
State Enf	-0.036 *** (-2.608)	-0.028 ** (-2.447)
Controls	YES	YES
Plant-Chemical FE	YES	YES
Chemical-Year FE	YES	YES
Observations	380,368	380,368
Adjusted R-squared	0.911	0.911

Table 12: Environmental Covenants Intensity

This table provides OLS estimates from the following equation:

$$\begin{aligned} \text{Log}(1+\text{Toxic Release}_{c,p,i,j,t}) = & \beta_0 + \beta_1 \text{EnvironmentCovN}_{i,j,t} \times \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_2 \text{EnvironmentCovN}_{i,j,t} \\ & \times \text{Post}_{i,j,t} + \beta_3 \text{EnvironmentCovN}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_4 \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} \\ & + \beta_5 \text{EnvironmentCovN}_{i,j,t} + \beta_6 \text{Post}_{i,j,t} + \beta_7 \text{State Enf}_{i,p,t} + \text{Controls} + \\ & \text{Plant-Chemical FE} + \text{Chemical-Year FE} + \varepsilon \end{aligned}$$

The unit of observation is at the Plant-Chemical level. The dependent variables are the log of total releases scaled by sales. *EnvironmentCovN* is the number of environmental covenants included in a loan agreement. *Post* is an indicator variable equal to one for years after the loan initiation. *State Enf* is the total inspections and enforcement actions deflated by the total number of facilities in a state (adjusted for the borrowers' inspection and enforcement). Standard errors are clustered at the borrower level. T-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

<i>Dependent Variable =</i>	Log(1+Toxic Release) (1)
EnvironmentCovN × Post × State Enf	-0.029 *** (-3.475)
EnvironmentCovN × Post	0.004 (0.499)
EnvironmentCovN × State Enf	0.007 (1.059)
Post × State Enf	0.008 * (1.847)
EnvironmentCovN	0.020 * (1.758)
Post	-0.011 (-1.582)
State Enf	-0.030 *** (-2.653)
Controls	YES
Plant-Chemical FE	YES
Chemical-Year FE	YES
Observations	380,368
Adjusted R-squared	0.911

Internet Appendix

IA Table 1: The Determinant Test with an Alternative High Polluting Industry Definition

This table presents results from OLS estimation of the following model:

$$EnvironmentCov_{i,j,t} = \beta_0 + \beta_1 High\ Polluting\ Industry_{i,t-1} \times State\ Enf_{i,t-1} + \beta_2 Real\ Property\ Collateral_{i,j,t} \times State\ Enf_{i,t-1} + \beta_3 Non-Real\ Property\ Collateral_{i,j,t} \times State\ Enf_{i,t-1} + \beta_4 High\ Polluting\ Industry_{i,t-1} + \beta_5 Real\ Property\ Collateral_{i,j,t} + \beta_6 Non-Real\ Property\ Collateral_{i,j,t} + \beta_7 State\ Enf_{i,t-1} + Controls + Fixed\ Effects + \varepsilon$$

EnvironmentCov equals one if a loan facility has environmental covenants included in its loan agreement and zero otherwise. *High Pollution Industry* equals to 1 if the borrower belongs to an industry with average total releases/sales higher than the top quartile of all the firms reporting to the TRI and ECHO databases throughout the sample period (1997-2016). *State Enf* is the proportion of borrower's plants located in states with high environmental regulation intensity. A state is classified having high environmental regulation intensity if the number of environmental inspection and environmental enforcement per plant in the state is above the median of all the firms in all the industries reporting to the TRI and ECHO databases. *Real Property Collateral* equals one if a loan facility has real property collateral and zero otherwise. *Non-Real Property Collateral* equals if a loan facility has collateral that is not real property and zero otherwise. Detailed definition of the control variables can be found in Appendix C Variable Definition. Industry, Year, Loan Purpose, and Lead Lender FEs are included in all columns. Standard errors are heteroskedasticity-robust. t-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

<i>Dependent Variable =</i>	EnvironmentCov (1)
High Polluting Industry × State Enf	0.252*** (3.864)
Real Property Collateral × State Enf	0.197** (2.399)
Non-Real Property Collateral × State Enf	-0.0984 (-1.414)
Real Property Collateral	0.318*** (5.685)
Non-Real Property Collateral	0.159*** (3.639)
State Enf	-0.0975* (-1.717)
Constant	0.124 (0.906)
Controls	YES
Industry FE	YES
Year FE	YES
Loan Purpose FE	YES
Lead Lender FE	YES
Observations	2,019
Adjusted R-squared	0.280

IA Table 2: The Outcome Tests with Alternative Specifications

This table presents OLS estimates of the following model:

$$\text{Log}(1+\text{Toxic Release}_{c,p,i,j,t}) = \beta_0 + \beta_1 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_2 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} + \beta_3 \text{EnvironmentCov}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_4 \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_5 \text{State Enf}_{i,p,t} + \beta_6 \text{EnvironmentCov}_{i,j,t} + \beta_7 \text{Post}_{i,j,t} + \text{Controls} + \text{FE} + \varepsilon$$

The unit of observation is at the Plant-Chemical level. In Panel A, the dependent variables are the log of total releases scaled by sales. In Panel A, Column (1), we control Plant-Chemical, Chemical-Year, and Industry-Year fixed effects. In Columns (2) to (4), we use an indicator version of *State Enf* which is equal to one if *State Enf* is in the top quintile in a given year and estimate the model with varying fixed effects. In Panel B, Column (1), we use total releases scaled by assets as dependent variables, whereas in Column (2), we use total releases scaled by the cost of goods sold as dependent variables. *EnvironmentCov* equals one if a loan facility has environmental covenants and zero otherwise. *Post* is an indicator variable equal to one for years after the loan initiation. Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Panel A: Controlling for Industry-Year Fixed Effects or Using Indicator Versions of *State Enf*

Dependent Variable =	Log(1+Toxic Release)			
	Continuous	Indicator - Quintile		
State Enf:	(1)	(2)	(3)	(4)
EnvironmentCov × Post × State Enf	-0.027 ** (-2.176)	-0.057 *** (-3.011)	-0.057 *** (-2.694)	-0.057 *** (-2.694)
EnvironmentCov × Post	0.004 (0.319)	-0.003 (-0.314)	-0.020 (-1.509)	-0.020 (-1.509)
EnvironmentCov × State Enf	0.006 (0.762)	0.053 ** (2.449)	0.047 * (1.955)	0.047 * (1.955)
Post × State Enf	0.002 (0.541)	0.005 (0.550)	0.002 (0.189)	0.002 (0.189)
EnvironmentCov	0.047 *** (2.729)	0.041 ** (2.587)	0.051 *** (2.911)	0.051 *** (2.911)
Post	-0.008 (-1.091)	-0.008 (-1.097)	-0.005 (-0.777)	-0.005 (-0.777)
State Enf	-0.006 (-0.684)	-0.006 (-0.390)	-0.019 (-0.866)	-0.019 (-0.866)
Controls	YES	YES	YES	YES
Plant-Chemical FE	YES	YES	YES	YES
Chemical-Year FE	YES	YES	YES	YES
Industry-Year	YES	YES		
State FE				YES
Observations	380,368	380,368	380,368	380,368
Adjusted R-squared	0.914	0.914	0.911	0.911

Panel B: Alternative Scalars for Total Releases

Dependent Variable =	Log(1 + Toxic Release/Asset)	Log(1 + Toxic Release/COGS)
	(1)	(2)
EnvironmentCov × Post × State Enf	-0.035 ** (-2.224)	-0.046 ** (-2.333)
EnvironmentCov × Post	-0.003 (-0.243)	0.001 (0.048)
EnvironmentCov × State Enf	0.009 (0.779)	0.019 (1.341)
Post × State Enf	0.004 (0.987)	0.003 (0.530)

EnvironmentCov	0.053 *** (2.757)	0.043 ** (2.315)
Post	-0.004 (-0.617)	-0.012 (-1.462)
State Enf	-0.019 (-1.575)	-0.033 *** (-2.850)
Controls	YES	YES
Plant-Chemical FE	YES	YES
Chemical-Year FE	YES	YES
Observations	380,368	380,368
Adjusted R-squared	0.904	0.911

IA Table 3: On-site Releases versus Off-site Releases

This table presents OLS estimates of the following model:

$$\begin{aligned} \text{Log}(1+\text{Toxic Release}_{c,p,i,j,t}) = & \beta_0 + \beta_1 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_2 \text{EnvironmentCov}_{i,j,t} \times \\ & \text{Post}_{i,j,t} + \beta_3 \text{EnvironmentCov}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_4 \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \\ & \beta_5 \text{State Enf}_{i,p,t} + \beta_6 \text{EnvironmentCov}_{i,j,t} + \beta_7 \text{Post}_{i,j,t} + \text{Controls} + \text{FE} + \varepsilon \end{aligned}$$

The unit of observation is at the Plant-Chemical level. In Column (1), the dependent variable is on-site releases scaled by sales, whereas in Column (2), the dependent variable is off-site releases scaled by sales. *EnvironmentCov* equals one if a loan facility has environmental covenants and zero otherwise. *Post* is an indicator variable equal to one for years after the loan initiation. *State Enf* is the total inspections and enforcement actions deflated by the total number of facilities in a state (adjusted for the borrowers' inspection and enforcement). Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

<i>Dependent Variable =</i>	Log(1+On-site Release) (1)	Log(1+Off-site Release) (2)
EnvironmentCov × Post × State Enf	-0.045 *** (-3.085)	0.004 (0.482)
EnvironmentCov × Post	0.007 (0.528)	-0.004 (-0.394)
EnvironmentCov × State Enf	0.007 (0.710)	0.000 (0.018)
Post × State Enf	0.005 (1.242)	-0.001 (-0.244)
EnvironmentCov	0.036 * (1.823)	0.015 (1.320)
Post	-0.011 (-1.473)	-0.000 (-0.074)
State Enf	-0.027 ** (-2.186)	0.012 (1.181)
Controls	YES	YES
Plant-Chemical FE	YES	YES
Chemical-Year FE	YES	YES
Observations	380,368	380,368
Adjusted R-squared	0.924	0.815

IA Table 4: Alternative Regulatory Intensity Measure

This table Panel A presents results from OLS estimation of the following model:

$$\text{EnvironmentCov}_{i,j,t} = \beta_0 + \beta_1 \text{High Polluting Industry}_{i,t-1} \times \text{State Enf}_{i,t-1} + \beta_2 \text{Real Property Collateral}_{i,j,t} \times \text{State Enf}_{i,t-1} + \beta_3 \text{Non-Real Property Collateral}_{i,j,t} \times \text{State Enf}_{i,t-1} + \beta_4 \text{High Polluting Industry}_{i,t-1} + \beta_5 \text{Real Property Collateral}_{i,j,t} + \beta_6 \text{Non-Real Property Collateral}_{i,j,t} + \beta_7 \text{State Enf}_{i,t-1} + \text{Controls} + \text{Fixed Effects} + \varepsilon$$

The unit of observation is at the loan-facility level. *State Enf* is the proportion of borrower's plants located in states with high environmental regulation intensity. In Column 1, a state is classified having high environmental regulation intensity if the number of environmental inspection, enforcement, and informal enforcement actions per plant (excluding the borrower) in the state is above the median of all the firms in all the industries reporting to the TRI and ECHO databases. In Column 2, a state is classified having high environmental regulation intensity if the total enforcement costs per plant (excluding the borrower) in the state is above the top quintile of all the firms in all the industries reporting to the TRI and ECHO databases. Detailed definition of the control variables can be found in Appendix C. Industry, Year, Loan Purpose, and Lead Lender FEs are included in all columns. Standard errors are heteroskedasticity-robust. t-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Panel A: The Determinants of Environmental Covenants

<i>Dependent Variable =</i> State Enf:	EnvironmentCov	
	Include Informal Enf (1)	Enf Cost (2)
High Polluting Industry × State Enf	0.197*** (3.042)	0.148* (1.837)
Real Property Collateral × State Enf	0.224*** (2.714)	0.244** (2.569)
Non-Real Property Collateral × State Enf	-0.0990 (-1.428)	0.0359 (0.384)
High Polluting Industry	-0.0217 (-0.444)	0.0429 (1.071)
Real Property Collateral	0.302*** (5.306)	0.364*** (8.598)
Non-Real Property Collateral	0.156*** (3.525)	0.105*** (3.221)
State Enf	-0.0723 (-1.323)	-0.114 (-1.643)
Constant	0.121 (0.866)	0.116 (0.840)
Controls	YES	YES
Industry FE	YES	YES
Year FE	YES	YES
Loan Purpose FE	YES	YES
Lead Lender FE	YES	YES
Observations	2,019	2,019
Adjusted R-squared	0.280	0.274

IA Table 4: Alternative Regulatory Intensity Measure (Continued)

Panel B presents OLS estimates of the following model:

$$\begin{aligned} \text{Log}(1+\text{Toxic Release}_{c,p,i,j,t}) = & \beta_0 + \beta_1 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_2 \text{EnvironmentCov}_{i,j,t} \times \\ & \text{Post}_{i,j,t} + \beta_3 \text{EnvironmentCov}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_4 \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \\ & \beta_5 \text{State Enf}_{i,p,t} + \beta_6 \text{EnvironmentCov}_{i,j,t} + \beta_7 \text{Post}_{i,j,t} + \text{Controls} + \text{FE} + \varepsilon \end{aligned}$$

The unit of observation is at the Plant-Chemical level. In Column 1, *State Enf* is defined as the total number of inspections, enforcement actions, informal enforcement actions, deflated by the total number of facilities in a state (excluding the borrower). In Column 2, *State Enf* is defined as the aggregate enforcement cost, deflated by the total number of facilities in a state (excluding the borrower). The dependent variables are the log of total releases scaled by sales. *EnvironmentCov* equals one if a loan facility has environmental covenants and zero otherwise. *Post* is an indicator variable equal to one for years after the loan initiation. Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Panel B: The Consequences of Environmental Covenants

Dependent Variable = State Enf:	Log(1+Toxic Release)	
	Incl. Informal Enf (1)	Enf Cost (2)
EnvironmentCov × Post × State Enf	-0.037 *** (-2.718)	-0.034 * (-1.905)
EnvironmentCov × Post	0.000 (0.029)	-0.018 (-1.447)
EnvironmentCov × State Enf	0.014 (1.240)	-0.009 (-0.710)
Post × State Enf	0.003 (0.832)	0.006 (0.597)
EnvironmentCov	0.045 ** (2.397)	0.057 *** (3.168)
Post	-0.009 (-1.290)	-0.009 (-1.281)
State Enf	-0.025 ** (-2.553)	0.002 (0.172)
Controls	YES	YES
Plant-Chemical FE	YES	YES
Chemical-Year FE	YES	YES
Observations	380,368	380,368
Adjusted R-squared	0.911	0.911

IA Table 5: Close Election as a Shock to State Regulatory Intensity

In this table, Panel A presents OLS estimates of the following model:

$$I(\text{State Enf} > \text{Median})_{\text{lead}1} = \beta_0 + \beta_1 \text{Democrat Majority} + \beta_2 I(\text{State Enf} > \text{Median}) + \text{FEs}$$

The unit of observation is at state-year level. *State Reg > Top Quintile* equals to one if a state's total number of environmental inspections and enforcements per TRI reporting facilities in the state is in the top quintile among all states in a given year. *Democrat Majority* equals one if Democratic candidates win the majority of seats in close congressional elections in the state in year t. Panel B presents results from OLS estimation of the following model:

$$\begin{aligned} \text{EnvironmentCov}_{i,j,t} = & \beta_0 + \beta_1 \text{High Polluting Industry}_{i,t-1} + \beta_2 \text{Real Property Collateral}_{i,j,t} + \\ & \beta_3 \text{High Polluting Industry}_{i,t-1} \times \text{Democrat Majority}_{i,t-1} + \beta_4 \text{Real Property} \\ & \text{Collateral}_{i,j,t} \times \text{Democrat Majority}_{i,t-1} + \beta_5 \text{Non-Real Property Collateral}_{i,j,t} \times \\ & \text{Democrat Majority}_{i,t-1} + \beta_6 \text{Non-Real Property Collateral}_{i,j,t} + \beta_7 \text{Democrat} \\ & \text{Majority}_{i,t-1} + \text{Controls} + \text{FE} + \varepsilon \end{aligned}$$

The sample is restricted to the loans of borrowers with plants located in states with close election in the year before loan initiation. *Democrat Majority* is the proportion of borrower's plants located in states where Democratic candidates win the majority of seats in close congressional elections in the year before loan initiation. Detailed definition of the variables can be found in Appendix C Variable Definition. Industry, Year, Loan Purpose, and Lead Lender FEs are included in all columns. Standard errors are heteroskedasticity-robust. t-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Panel A: Close Election Validation Tests

Dependent Variable =	<i>I(State Enf > Median)</i> _lead1	
	(1)	(2)
Democrat Majority	0.117** (2.548)	0.0805* (1.932)
<i>I(State Enf > Median)</i>		0.413*** (5.757)
Constant	0.540*** (18.15)	0.316*** (6.538)
State FE	YES	YES
Year FE	YES	YES
Observations	346	346
Adjusted R-squared	0.420	0.508

Panel B: Determinant Test - Close Election Sample

Dependent Variable =	EnvironmentCov (1)
High Polluting Industry × Democrat Majority	0.336*** (2.899)
Real Property Collateral × Democrat Majority	0.448** (2.059)
Non-Real Property Collateral × Democrat Majority	-0.0445 (-0.383)
High Polluting Industry	-0.0713 (-1.021)
Real Property Collateral	0.253*** (3.031)
Non-Real Property Collateral	0.181*** (3.084)
Democrat Majority	-0.298*** (-3.297)
Constant	0.0624

	(0.286)
Controls	YES
Industry FE	YES
Year FE	YES
Loan Purpose FE	YES
Lead Lender FE	YES
Observations	857
Adjusted R-squared	0.302

IA Table 6: Outcome Tests in the Sample Excluding Borrowers with Investment Abatements Before Loan Initiations

This table presents OLS estimates of the following model:

$$\begin{aligned} \text{Log}(1+\text{Toxic Release}_{c,p,i,j,t}) = & \beta_0 + \beta_1 \text{EnvironmentCov}_{i,j,t} \times \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_2 \text{EnvironmentCov}_{i,j,t} \times \\ & \text{Post}_{i,j,t} + \beta_3 \text{EnvironmentCov}_{i,j,t} \times \text{State Enf}_{i,p,t} + \beta_4 \text{Post}_{i,j,t} \times \text{State Enf}_{i,p,t} + \\ & \beta_5 \text{EnvironmentCov}_{i,j,t} + \beta_6 \text{Post}_{i,j,t} + \beta_7 \text{State Enf}_{i,p,t} + \text{Controls} + \text{Fixed} \\ & \text{Effects} + \varepsilon \end{aligned}$$

The sample is restricted to borrowers who did not undertake any effective abatement activities in the pre-loan origination periods. The unit of observation is at the Plant-Chemical level. The dependent variables are the log of total releases scaled by sales. *EnvironmentCov* equals one if a loan facility has environmental covenants and zero otherwise. *Post* is an indicator variable equal to one for years after the loan initiation. *State Enf* is the total inspections and enforcement actions deflated by the total number of facilities in a state (adjusted for the borrowers' inspection and enforcement). Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

<i>Dependent Variable =</i>	Log(1+Toxic Release) (1)
EnvironmentCov × Post × State Enf	-0.051 *** (-2.829)
EnvironmentCov × Post	0.013 (0.573)
EnvironmentCov × State Enf	0.008 (0.434)
Post × State Enf	0.003 (0.573)
EnvironmentCov	0.033 (1.047)
Post	-0.015 (-1.007)
State Enf	-0.049 *** (-3.187)
Controls	YES
Plant-Chemical FE	YES
Chemical-Year FE	YES
Observations	188,650
Adjusted R-squared	0.919

IA Table 7: Controlling for State-level Pollution

Panel A shows OLS estimates of Model (1), with the additional control of borrower's exposure to states with high state-level pollution (*State Pollution*). The unit of observation is at the loan facility level. *State Pollution* is defined as the proportion of borrower's plants located in states with high state-level pollution. A state is defined as having high state-level pollution if the total toxic releases in a state deflated by the total number of facilities in a state (excluding the borrower) in the year before loan initiation is above median. *State Enf* is the proportion of borrower's plants located in states with high environmental regulation intensity. A state is classified having high environmental regulation intensity if the number of environmental inspection and environmental enforcement per plant in the state is above the median of all the firms in all the industries reporting to the TRI and ECHO databases. Panel B shows OLS estimates of Model (2), with the additional control of state-level pollution (*State Pollution*). The unit of observation is at the Plant-Chemical level. *State Pollution* is defined as the total toxic releases in a state deflated by the total number of facilities in a state (excluding the borrower). The dependent variables are the log of total releases scaled by sales. *EnvironmentCov* equals one if a loan facility has environmental covenants and zero otherwise. *Post* is an indicator variable equal to one for years after the loan initiation. *State Enf* is the total inspections and enforcement actions deflated by the total number of facilities in a state (excluding the borrower). The definition of the control variables can be found in Appendix C. Standard errors are clustered at the borrower level. t-statistics are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Panel A: The Determinants of Environmental Covenants

<i>Dependent Variable =</i>	EnvironmentCov (1)
High Polluting Industry × State Enf	0.185*** (2.805)
Real Property Collateral × State Enf	0.195** (2.331)
Non-Real Property Collateral × State Enf	-0.0980 (-1.384)
High Polluting Industry	-0.0205 (-0.423)
Real Property Collateral	0.317*** (5.626)
Non-Real Property Collateral	0.160*** (3.582)
State Enf	-0.0623 (-1.104)
State Pollution	0.00977** (2.108)
Constant	0.162 (1.153)
Controls	YES
Industry FE	YES
Year FE	YES
Loan Purpose FE	YES
Lead Lender FE	YES
Observations	1,995
Adjusted R-squared	0.278

Panel B: The Consequences of Environmental Covenants

<i>Dependent Variable =</i>	Log(1+Toxic Release)
-----------------------------	----------------------

	(1)
EnvironmentCov × Post × State Enf	-0.043 *** (-2.710)
EnvironmentCov × Post	0.003 (0.243)
EnvironmentCov × State Enf	0.013 (1.138)
Post × State Enf	0.004 (0.944)
EnvironmentCov	0.046 ** (2.404)
Post	-0.010 (-1.327)
State Enf	-0.031 *** (-2.731)
State Pollution	0.000 (0.013)
Controls	YES
Plant-Chemical FE	YES
Chemical-Year FE	YES
Observations	380,368
Adjusted R-squared	0.911