The Spillover Effects of Environmental Lawsuits on Industry Peers*

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January 2024

Abstract

We examine the spillover effects of high-profile environmental lawsuits on industry peers. We find that compared to control firms, industry peers experience a decrease in chemical releases after the lawsuits. Industry peers, especially those with a higher decrease in chemical releases, also experience a decline in financial performance, likely due to the increase in abatement costs. In addition, we find that industry peers increase their disclosures related to pollution. Lastly, we confirm that industry peers experience an increase in negative reports on their environmental issues, corroborating that peer firms' environmental litigation risk increases after industry leaders' high-profile environmental lawsuits.

Key words: Environmental lawsuits, peer effects, ESG disclosures, firm performance

JEL codes: G30, M40, O33

* We thank Danqi Hu, Serene Huang, and the workshop participants at Peking University for their helpful comments. We also thank Pinar Darendeli for her excellent research assistance. Chen and Cheng acknowledge funding provided by the Lee Kong Chian Professorship at Singapore Management University. Please contact Xia Chen at xchen@smu.edu.sg, Qiang Cheng at qcheng@smu.edu.sg, Xuefan Peng at xfpeng.2020@phdacc.smu.edu.sg, and Ziliang Zhan at zhanzl.18@sem.tsinghua.edu.cn for comments.

1. Introduction

Given the increasingly urgent threat of climate change and the externalities of firms' pollution on society, how to induce firms to cut their pollution becomes an increasingly important topic. Prior research has studied the impact of institutional investors, customers, and government agencies on firms' environmental performance.[1] There is also a line of research on how environmental lawsuits affect firms' capital market and environmental performance (e.g., Karpoff et al. 2005; Akey and Appel 2021). However, the number of firms targeted in such lawsuits is limited (e.g., Robinson et al. 2023). Because litigation can have spillover effects on peer firms (e.g., Johnson 2020), to evaluate the broad effect of environmental lawsuits on firms' environmental behavior, one must consider the spillover effect on peer firms. In this paper, we examine how the environmental lawsuits faced by industry leaders affect their industry peer firms' environmental performance and disclosures.

This investigation is particularly important because the increasing awareness and public scrutiny of environmental issues have led to heightened litigation risk for public companies. For example, according to Norton Rose Fulbright research, there is an increasing number of legal proceedings related to climate change because litigation can be used to enforce climate commitments and hold corporations accountable.[2] However, there is limited research on the spillover effects of environmental lawsuits.

We focus on environmental lawsuits related to firms' real activities. For most of such lawsuits, plaintiffs argue that firms release chemicals that are harmful to the health of the

[1] For examples, see Dyck et al. (2019), Kim et al. (2019), Azar et al. (2021), and Stroebel and Wurgler (2021) for the impact of institutional investors, Dai et al. (2021) and Darendeli et al. (2021) for the impact of customers, and He et al. (2020) and Bartram et al. (2022) for the impact of environmental regulation and monitoring on firms' environmental performance.

[2] https://www.nortonrosefulbright.com/en/knowledge/publications/8cab0b55/climate-change-litigation-update.

residents in the community and the surrounding natural environment. The communities around firms' pollution sites have limited means other than legal actions to hold polluting firms accountable and induce firms to internalize their pollution actions in the future.

We argue that when a firm (referred to as the focal firm) is sued on environmental issues, such as pollution, its peer firms will improve their environmental disclosures and performances for two non-exclusive reasons. First, upon observing the focal firm's environmental lawsuits, peer firms will revise their estimate of the litigation risk upward and thus have incentives to reduce the likelihood of litigation. Second, the focal firm's environmental lawsuits provide new information to peer firms' stakeholders who care about environmental issues, and these stakeholders update their beliefs accordingly. A focal firm's environmental lawsuits suggest that its industry peers likely have similar environmental issues because they have similar production processes and share similar economic environments (Ashraf 2022). Based on this expectation, peer firms' stakeholders will re-evaluate peer firms' environmental performance. Therefore, peer firms have incentives to improve environmental performance and increase environmental disclosures to reduce the likelihood of lawsuits and alleviate their stakeholders' concerns (Johnson 2020).

Based on these arguments, we hypothesize that in response to the industry leaders' environmental lawsuits, peer firms will reduce chemical releases in the post-lawsuit period compared to the pre-lawsuit period. To test this hypothesis, we examine the effect of 55 environmental lawsuits on 146 industry peers' chemical releases in the post-lawsuit period. Out of the 1,221 environmental lawsuits related to pollution in the period of 2003-2020, we focus on industry leaders' high-profile environmental lawsuits (i.e., top 5 firms in the industry in terms of sales with an abnormal return of -5% or lower around the lawsuits), since these environmental

lawsuits are highly visible and are likely to affect the environmental litigation risk faced by industry peers. We use a difference-in-differences (DID) design to test the hypothesis. The treatment firms are the industry peers that share the lawsuit firms' 4-digit SIC code. The control firms include those firms in the same Fama and French 48 industry as the lawsuit firms. We find that compared to control firms, the treatment firms experience a significant decrease in chemical releases in the post-lawsuit period. The effect is also economically significant. Compared to control firms, the treatment firms experience a 12.7% decrease in chemical releases in the post-lawsuit period.

Next, we examine whether industry peers improve their pollution-related disclosures in the post-lawsuit period to meet the potential increase in the demand for such information by stakeholders and alleviate stakeholders' concerns. Using the pollution-related disclosure items in Bloomberg, we find that the treatment firms experience an increase in the disclosure level in the post-lawsuit period compared to control firms. The increase is economically significant; it is about 14% of the standard deviation of the disclosure measure.

We conduct several sensitivity tests to ensure the robustness of the results. First, given that we use a DID research design, we evaluate the parallel trend assumption. We find that the treatment and control firms have a similar time trend in chemical releases and pollution-related disclosures in the pre-lawsuit period, suggesting that the parallel trend assumption holds. Second, the EPA identifies some chemicals as having a particularly negative effect on human health. We estimate the change in the release of these specific chemicals by the treatment and control firms. We find that the treatment firms experience a significant decrease in the release of these chemicals in the post-lawsuit period compared to control firms. Third, we use alternative industry classifications to identify treatment and control firms and the results continue to hold.

After documenting that the industry leaders' environmental lawsuits affect peer firms' chemical releases and pollution related disclosures, we then investigate the impact of peer firms' actions on their financial performance. Because firms' abatement activities are unobservable to researchers, we examine the change in financial performance of peer firms. We find that treatment firms experience a decrease in return on assets (ROA) in the post-lawsuit period compared to control firms. The decreases in ROA are economically significant; industry peers on average experience a decrease of 1.5 percentage points in ROA. In addition, we find that treatment firms also experience a decrease in return on sales and assets turnover, suggesting that treatment firms increase abatement costs and cut production to reduce chemical releases. To ensure that these decreases in financial performance are related to peer firms' abatement costs, we separately examine the change in financial performance for the treatment firms with a large reduction in chemical releases and the other treatment firms. We find that the decline in financial performance is driven by those treatment firms that experience a large reduction in chemical releases. In contrast, the treatment firms without a large reduction in chemical releases have a similar change in financial performance as the control firms in the post-lawsuit period.

Lastly, we conduct three sets of analyses to further strengthen the inferences. First, we investigate whether perceived environmental litigation risk is higher for industry peers in the post-lawsuit period. We use the number of negative pollution-related news to capture perceived litigation risk. We find that the treatment firms experience a significant increase in the number of negative pollution-related news in the post-lawsuit period. At the same time, we find that treatment firms do not experience a significant change in environmental violations imposed by the EPA, suggesting that the increase in negative pollution-related news is related to public scrutiny after industry leaders' environmental lawsuits. Second, because almost all

environmental lawsuits in our sample are related to chemical releases and none of them are related to carbon emission, we examine the change in the carbon emission level of the peer firms as a falsification test. If the documented results related to chemical releases reflect the general improvement in environmental performance of the peer firms, we should find similar results for carbon emissions. In contrast, if the documented results are driven by lawsuits related to chemical releases, we should not find similar results for carbon emissions. Using the level and intensity of scope 1 and scope 2 carbon emissions disclosed by firms, we find that the treatment firms do not experience a decrease in carbon emissions in the post-lawsuit period. Instead, the treatment firms experience a significant increase in carbon emissions in the post-lawsuit period compared to control firms. Thus, our main findings are due to industry leaders' environmental lawsuits related to pollution. The carbon emission results also suggest that industry peers might trade-off between chemical releases and carbon emissions to reduce the overall abatement costs in the post-litigation period. Third, we examine the impact of environmental lawsuits on focal firms. We find that compared to control firms, focal firms experience a decrease in chemical releases, a decrease in financial performance, and an increase in pollution-related disclosures. These results further support that what we document for peer firms are the spillover effects of focal firms' environmental lawsuits on peer firms.

This paper contributes to the literature in two important ways. First, it contributes to the ESG literature by documenting the spillover effect of environmental lawsuits. The findings suggest that while the preferences of stakeholders, such as investors, customers, and government agencies, can directly influence firms' environmental activities, firms also change their environmental activities in response to the circumstances faced by their peers – the environmental lawsuits of the industry leaders examined in this paper. The documented spillover

effects enhance our understanding of the overall effect of environmental lawsuits.

Second, the findings of this paper are particularly important due to the limited number of studies on environmental lawsuits. The findings shed light on the effect of the actions taken by stakeholders who cannot directly influence firms' decisions, such as community residents. While they bear the externalities of firms' pollution, they do not have direct influence over firms' behavior if they are not the investors or customers. Our study suggests that the actions taken by plaintiffs in environmental lawsuits not only improve the environmental performance of sued firms, but also that of industry peers.

The remainder of the paper is organized as follows. Section 2 provides a discussion of the related research and develops the hypotheses. Section 3 presents the sample, data, and research design. Section 4 presents the main analyses and Section 5 presents the additional analyses. Section 6 concludes the paper.

2. Related research and hypothesis development

2.1 Related research

2.1.1 Prior research on environmental litigation

A small number of studies have examined the effect of environmental litigation and litigation risk on firms' market value and environmental performance. Karpoff et al. (2005) examine 478 environmental violations by publicly traded companies over the period of 1980–2000, including both civil lawsuits and regulatory actions. They find that firms that violate environmental laws suffer significant losses in the market value, and the losses are of similar magnitudes as the legal penalties imposed. They conclude that environmental violations are disciplined largely through legal and regulatory penalties, not through reputational penalties.

Instead of studying the effect of actual legal cases, a few studies examine the impact of the

change in litigation risk. Using a Supreme Court decision that strengthened parent companies' limited liability protection for subsidiaries' environmental cleanup costs, Akey and Appel (2021) find that stronger liability protection (i.e., reduced liability) for parent companies leads to an increase in toxic emissions by subsidiaries. They further document that the increase in pollution is driven by lower investments in abatement technologies rather than by increased production. Freund et al. (2023) use the adoption of universal demand laws as a shock to the litigation risk faced by firms to examine how litigation risk affects firms' corporate social responsibility (CSR) activities. They find that the adoption of universal demand laws, which reduces the likelihood of derivative lawsuits brought by shareholders and thus the litigation risk for firms, is negatively related to firms' CSR scores.

Unlike these studies, our paper examines the spillover effect of environmental lawsuits, that is, the effect of environmental lawsuits on industry peers, not on the sued firms. Such an investigation can enhance our understanding of the total effect of environmental lawsuits. While Robinson et al. (2023) also examine the spillover effect of environmental lawsuits, they focus on the lawsuits brought by shareholders on environmental disclosures and examine peer firms' voluntary environmental disclosures.[3] They find that after a firm is sued for environmental disclosures, peer firms provide less historical and more forward-looking environmental disclosures in conference calls and do not change environmental practices. In contrast, we focus on environmental lawsuits brought by stakeholders related to firms' pollution and harm to human health, and examine the change in peer firms' real activities and disclosures related to pollution.

2.1.2 Prior research on peer effects in the ESG literature

[3] Donelson et al. (2022) also examine peer firms' voluntary disclosure responses to lawsuits, but they focus on voluntary financial disclosures. They document a negative market response of peer firms to lawsuits and provide evidence consistent with peer firms increasing voluntary financial disclosures to improve relations with investors in response to lawsuits.

While peer effects have been documented widely in the literature (e.g., Ashraf 2022; Donelson et al. 2022), there are only a small number of studies examining peer effects in the environmental, social, and governance (ESG) literature, likely due to the nascent nature of the ESG literature. Using a regression discontinuity design approach, Cao et al. (2019) compare the effects of a firm's shareholder-sponsored CSR proposals that pass or fail by a small margin of votes in annual meetings on its peer firms' subsequent CSR practices. They find that if a voting firm marginally passes a CSR proposal, its competing peer firms experience an increase in CSR score in the following year, compared to the competing peer firms of a voting firm whose proposal fails by a small margin. Johnson (2020) examines how publicizing firms' violations of labor laws affects peer firms' actions. Using the press release policy of the Occupational Safety and Health Administration (OSHA), he finds that publicizing firms' violations of workplace safety and health laws improves peer firms' compliance with such laws and reduces peer firms' occupational injuries. As discussed earlier, Robinson et al. (2023) examine how firms' lawsuits related to environmental disclosure affect industry peers' decisions of environmental disclosure. They find that after a firm is sued for its environmental disclosures, its peer firms provide more forward-looking and less historical environmental disclosures in their conference calls.

Our paper extends this line of research by examining the effect of environmental lawsuits related to firms' pollution on peer firms' real actions – chemical releases – and pollution-related disclosures. In addition, unlike prior research on the spillover effects of lawsuits brought by shareholders, which tend to focus on disclosure-related issues, this paper focuses on environmental lawsuits brought by stakeholders other than shareholders. It is unclear whether the results from prior research examining the spillover effects of disclosure-related lawsuits brought by shareholders can generalize to our setting due to the higher cost of taking real actions.

2.2 Hypothesis development

In this section, we develop the hypothesis on the spillover effects of focal firms' environmental lawsuits on peer firms. We argue that when a firm is sued on environmental issues, such as pollution, its peer firms want to improve their environmental disclosures and performance for the following two non-exclusive reasons. First, upon observing the focal firm's environmental lawsuits, peer firms will revise their estimate of the litigation risk upward and thus have incentives to reduce the likelihood of litigation. That is, peer firms regard the probability of being sued as becoming higher because of the focal firm's environmental lawsuits. For example, Gande and Lewis (2009) suggest that lawsuits are clustered by industry and occur in waves. They document evidence of industry spillover effect of litigation and find that peer firms' litigation exposures increase with litigation filing against a firm in the same industry. Consequently, peer firms likely respond by improving environmental disclosures and performance (e.g., cutting chemical releases) to reduce the scrutiny of stakeholders and regulators and the likelihood of lawsuits (Akey and Appel 2021).

Second, a firm's environmental lawsuits provide new information to peer firms' stakeholders who care about environmental issues, and these stakeholders update their beliefs accordingly. A firm's environmental lawsuits suggest that its industry peers likely have similar environmental issues because they have similar production processes and share similar economic environments (Ashraf 2022). Based on this expectation, peer firms' stakeholders will re-evaluate peer firms' environmental performance and likely change their beliefs. For example, if one firm is sued by the stakeholders in its community because it has been releasing harmful chemicals to the surrounding environment above the allowed levels, the communities of its peer firms may

suspect that the peer firms also release harmful chemicals above the allowed levels.[4] As a result, the likelihood of litigation faced by industry peers increases. Therefore, peer firms have incentives to increase environmental disclosures to alleviate their stakeholders' concerns and improve environmental performance to reduce the likelihood of lawsuits (Johnson 2020).

In summary, a focal firm's environmental lawsuits lead both the peer firms' management to update their beliefs about their firms' litigation risk and the peer firms' stakeholders to update the beliefs of the peer firms' environmental issues. In response, peer firms improve both environmental performance and disclosures to reduce litigation risk and address stakeholders' concerns. Thus, our main hypotheses are stated as follows:

H1: Ceteris paribus, a firm experiences an increase in environmental performance after its industry peer is sued for environmental issues.

H2: Ceteris paribus, a firm experiences an increase in environmental disclosures after its industry peer is sued for environmental issues.

However, we might not find results consistent with the hypotheses for the following reason. When a firm is sued for environmental issues, the firm will increase its environmental investment, such as investing in abatement efforts and new technologies to reduce pollution. In addition, the firm is likely to face fines. All these extra expenditures will reduce the firm's performance and competitive advantages. Taking advantage of this situation, its industry peers can expand operations to increase their market share, potentially at the cost of environmental performance. Thus, whether we can find results consistent with the hypotheses is an empirical question.

3. Sample and research design

[4] This logic is consistent with the evidence documented in Freedman et al. (2012): one firm's product recall leads customers to update their beliefs about the product quality of industry peers, leading to an industry-wide sales decline.

3.1 Data collection of high-profile environmental lawsuits

To construct a comprehensive dataset containing environmental lawsuits, we obtain environmental lawsuit data primarily from the Federal Judicial Center (FJC) database. Under the working arrangement with the Administrative Office of the United States Court (AOUSC), the FJC receives quarterly updates of case-related information reported by the federal courts to the AOUSC since 1970. The FJC provides comprehensive information for federal court cases, including the names of plaintiffs and defendants, the docket number, the nature of lawsuits, and the case filing and termination dates. The docket number is the unique lawsuit identifier used in the U.S. legal system. We use it to identify unique lawsuits. The nature of suit (NOS) is a 3-digit code representing the law under which the case is filed.[5] We focus on environment related civil lawsuits and keep the lawsuits with NOS of 893, which include operating activities or actions in violation of environmental laws, such as the Air Pollution Control Act, the Federal Water Pollution Control Act, and the Federal Environment Pesticide Control Act.

We supplement the data from FJC with data from Audit Analytics and the Climate Change Litigation database. The Audit Analytics Legal Case database contains two types of lawsuits: (1) lawsuits that involve audit firms, or (2) lawsuits that are disclosed to the SEC as material pending litigations by public firms. The Climate Change Litigation database, which is maintained by the Sabin Center for Climate Change Law of Columbia Law School, contains environmental lawsuits that are brought before judicial bodies and have climate change law, policy, or science as a material issue. Note that the environmental lawsuit cases included in the Enforcement and Compliance History Online (ECHO) database maintained by the EPA only

[5] See the Nature of Suit Lookup Table for more information about NOS descriptions: https://textbookdiscrimination.com/Tables/NOS/.

covers federal judicial cases brought by the EPA.[6]

To identify environmental lawsuits against public firms, we conduct a fuzzy match between the names of the defendants and the historical names of public firms and their subsidiaries in the Compustat. We then manually check the accuracy of the matches and drop cases with inconsistencies in names and duplicate cases. This process results in 1,185 environmental lawsuits with public firms as the defendants in the period of 2003-2020. We keep the environmental lawsuits filed between 2003 and 2020 because the TRI data – the dataset on chemical releases – are available for the period of 2000-2022, as discussed below, and we use data of at least three years before and two years after the environmental lawsuits in the tests.

To examine the spillover effect of environmental lawsuits, we follow Betty et al. (2013) and Donelson et al. (2022) and only retain the high-profile lawsuits. Specifically, we keep the environmental lawsuits that satisfy two criteria. First, the defendant's revenue in the filing year of lawsuit ranks as one of the top 5 in the industry defined based on 4-digit SIC codes. This requirement is to ensure that the firm is economically significant and is an industry leader so that its lawsuit is visible to industry peers. Second, the size-adjusted cumulative abnormal returns (*CAR*) in the [-10,1] window surrounding the lawsuit filing date (day 0) is -5% or lower (Gande and Lewis 2009). This criterion is to ensure that the environmental lawsuit is important for both the focal firm itself and its industry peers. To avoid the confounding effects of consecutive environmental lawsuits, we drop the second high-profile lawsuit if there are two such lawsuits within two years for the same industry. The selection process leads to 82 environmental lawsuits against 71 focal firms. Panel A of Table 1 presents the environmental lawsuit sample selection process.

[6] Of the 1,185 environmental lawsuit cases in our initial sample, 370 cases were brought by the EPA and covered in the ECHO database.

Panel B of Table 1 provides the yearly distribution of the initial and final sample of environmental lawsuits. There is no clear time trend in the number of environmental lawsuits except that the number of lawsuits is slightly smaller in the last few years of the sample period.

Panel C of Table 1 provides the industry distribution of the initial and final sample of environmental lawsuits. The industries with heavy pollution, such as Petroleum and Natural Gas, Utilities, and Chemicals have the highest percentage of environmental lawsuits. The service industries, such as Healthcare, Printing and Publishing, and Restaurants, Hotels, Motels, have the lowest percentage of environmental lawsuits.

To better understand the nature of the lawsuits, we collect lawsuit complaint information from Bloomberg, the Westlaw database, and Public Access to Court Electronic Records (PACER). We can find such information for 81 lawsuits. Appendix A provides a summary of the key information about these cases. First, we read the Complaint for each case to identify the reasons for environmental lawsuits. All 81 cases were filed against corporate defendants for pollution. Specifically, the plaintiffs sued the defendants for the discharge of metal, toxic wastes or gas, or crude oil into water, land, soil, or air.[7,8] In the Complaint, plaintiffs explicitly claimed that the pollutants contaminated the environment. In 38 cases, the plaintiffs claimed that the chemical releases had caused harm to human health. These allegations are consistent with the focus of the EPA's Toxic Release Inventory (TRI) Program, which requires firms to report toxic chemicals that can cause cancer or have other chronic human health effects, significant adverse

[7] For example, in the case *Louisiana Environmental Action Network et al v. Exxon Mobil Corp.* (Docket No.3:16-cv-00144, M.D. La. March 03, 2016), the plaintiff alleged that "Exxon's violations pose risks to public health and the environment in areas where Ms. Anthony and other LEAN members, work, and recreate. Ms. Anthony and other LEAN members are injured by Exxon's unpermitted emission of 1,3-butadiene, benzene, propylene, ethylene, and other air pollutants Exxon emits in violation of the Clean Air Act."

[8] In an untabulated test, we find that the firms sued for environmental issues have a significantly higher number of negative environmental news (0.72) than control firms (0.09) in the six months prior to the lawsuit date based on the information collected by Reprisk.

acute human health effects, or significant adverse environmental effects. We do not find any case on carbon dioxide emission or climate change. Therefore, we focus on peer firms' chemical releases and disclosures about pollution in the analyses.

Next, we examine the type of defendants and plaintiffs. We find that individuals were sued along with the companies they worked for in only five cases, and these individuals were not directors or top executives of the companies. In terms of the type of plaintiffs, we find that 40 cases (48%) were filed by government agencies. The plaintiffs who are not government agencies include individuals (14 cases), companies (18 cases), and non-profit organizations (15 cases).

We also collect information on the duration of the cases. For the 81 cases with information on the duration of the cases, about 50% of the cases were settled within half a year. The mean duration is 431 days, with a standard deviation of 767 days.

3.2 Firm pollution data – Chemical releases

We obtain the firm-level pollution data from the Toxic Release Inventory (TRI) program maintained by the EPA, which contains facility-year-level chemical emissions in the United States from 1987. Facilities are required to report to the TRI if they have ten or more employees, are in certain industry sectors (e.g., manufacturing, metal mining, electric power generation, chemical manufacturing, hazardous waste treatment), and meet chemical activity threshold. The TRI tracks chemicals that can cause cancer, have other chronic human health effects or significant adverse acute human health effects, or have significant adverse environmental effects. The current TRI toxic chemical list includes 787 individual chemicals in 33 categories.

Chemical releases are self-reported by facilities. While the EPA has implemented a series of policies to ensure reporting accuracy, firms may misreport in the earlier years when the TRI was first implemented because of a lack of experience (Kim et al. 2019). Prior research suggests

that the TRI chemical release data is accurate in the more recent decades.

The TRI added seven more industries to its coverage in 1998. Because prior research suggests that it takes a couple of years for firms to develop practices so that they can accurately report their chemical releases, we start our TRI data period from 2000, two years after the coverage expansion. The TRI data period ends in 2022, the last year with data at the time of our data collection.

The TRI program provides granular information on toxic releases, including the names and locations of facilities, the names, classifications, and quantities of released chemicals, and the names of facilities' parent companies. Following Hsu et al. (2022) and Xu and Kim (2022), we use the historical names of publicly listed firms and their subsidiaries in the Compustat to fuzzy match with the names of facilities' parents in the TRI database. We require that the first word of the names in the two sources is the same and the respective time stamps overlap. We then calculate the name similarity score as one minus the Levenstein distance between the two names scaled by the length of the longer name. Lastly, we manually check the accuracy of the matching results that have a similarity score higher than 0.55 and only keep the correctly matched observations.

3.3 Construction of the chemical release sample

We start the construction of the chemical release sample from the final sample of 82 environmental lawsuits as discussed above. To investigate the spillover effect of environmental lawsuits, for each lawsuit, we define the three years before the lawsuit filing year as the pre-lawsuit period, and the three years after the lawsuit filing year as the post-lawsuit period.

Because chemical releases are closely related to firms' operations and productions, we expect firms in the same industry to face similar environmental litigation risk and therefore to

react to the focal firms' environment lawsuits. As such, we identify treatment firms as those with the same 4-digit SIC codes as the focal firms. To ensure that control firms have similar operations as the treatment firms so as to control for the effect of broad industry trends, we identify control firms as those firms in the same Fama-French 48 industry as the focal firms but not in the same 4-digit SIC industry. To avoid the confounding effect of their own environmental lawsuits, we exclude the treatment or control firms that have environmental lawsuits in the pre- or post-lawsuit period. After dropping observations with missing data on variables used in the regressions and dropping unbalanced observations (i.e., we require that firms have at least one observation in both the pre- and post-lawsuit periods), the final sample comprises 5,554 lawsuit-firm-year observations from 55 environmental lawsuits and 543 unique firms over the period of 2000-2022.[9] Of the 5,554 observations, 940 are from the treatment firms, and 4,614 are from the control firms. Table 2 summarizes the sample selection process.

3.4 Research design

To test H1, we use the following staggered difference-in-differences (DID) regression model to investigate the impact of focal firms' environmental lawsuits on peer firms' chemical releases:

$$\begin{aligned} Chemical\_Release_{s,i,t} &= \beta_0 + \beta_1 Post_{s,t} + \beta_2 Treat_{s,i} \times Post_{s,t} + \gamma Controls_{i,t-1} \\ &+ Lawsuit\_Firm\ FE + Year\ FE + \varepsilon_{s,i,t} \end{aligned} \quad (1)$$

where subscripts *s*, *i*, *t* represents environmental lawsuit *s*, firm *i*, and year *t*. We conduct the analysis at the lawsuit-firm-year level. Following prior studies (e.g., Kim et al. 2019; Akey and Appel 2021; Xu and Kim 2022), $Chemical\_Release_{s,i,t}$ is measured as the natural log of the total

[9] For the environmental lawsuits filed in 2020, the post-lawsuit period is only two years. In an untabulated analysis, we exclude the lawsuits filed in 2020 to ensure that all lawsuits have a 3-year post-lawsuit period. The inferences remain the same.

toxic substance releases for firm *i* in year *t*, with firm *i* being a treatment or control firm for lawsuit *s*. $Post_{s,t}$ is an indicator variable that equals one if the firm-year is in the three years after the filing year of environmental lawsuit *s*, and zero otherwise. $Treat_{s,i}$ is an indicator variable that equals one if firm *i* is a treatment firm for environmental lawsuit *s*, i.e., a firm in the same SIC 4-digit industry as the focal firm, and zero otherwise. The coefficient on *Post* captures the change in chemical releases experienced by control firms in the post-lawsuit period, and the coefficient on *Treat* × *Post* captures the incremental change in chemical releases experienced by the treatment firms in the post-lawsuit period compared to control firms. H1 predicts a negative coefficient on *Treat* × *Post*.

Following prior literature (e.g., Xu and Kim 2022), we control for a number of firm characteristics that might affect chemical releases, including firm size (*Size*), leverage (*Leverage*), return-on-assets (*ROA*), cash holdings (*Cash*), property, plant, and equipment (*PPE*), R&D expenditures (*R&D*), capital expenditures (*CAPX*), sales (*Sales*), the Herfindahl index (*HHI*), and firm age (*Age*). Appendix B provides the detailed variable measurements. We winsorize all the continuous variables at the 1st and 99th percentiles. We also include litigation-firm fixed effects to control for time-invariant litigation and firm characteristics and year fixed effects to control for time trend in chemical releases. The main effect of *Treat* is absorbed by lawsuit-firm fixed effects. Because each litigation has a different post-lawsuit period, the main effect of *Post* is not subsumed by year fixed effects. We calculate *t*-statistics based on standard errors adjusted for clustering at the firm level.

To test H2, we examine the change in *Pollution_Disclosure* of the treatment firms using the following regression:

$$Pollution\_Disclosure_{s,i,t} = \beta_0 + \beta_1 Post_{s,t} + \beta_2 Treat_{s,i} \times Post_{s,t} + \gamma Control_{i,t-1} + Lawsuit\_Firm\ FE + Year\ FE + \varepsilon_{s,i,t} \quad (2)$$

For this test, we obtain information on ESG reporting items disclosed by a firm in a year from Bloomberg. Bloomberg collects information from firms' sustainability reports, annual reports, and corporate websites. We construct a pollution-related disclosure measure (*Pollution_Disclosure*) as the sum of weighted pollution-related disclosure fields a firm provides information on in the year.[10] The research design is similar to Equation (1). We follow prior research (e.g., Pawliczek et al. 2021; Flammer et al. 2019) and control for firm characteristics that might affect ESG disclosures: firm size (*Size*), financial leverage (*Leverage*), book-to-market ratio (*BM*), financial performance (*ROA*), analyst coverage (*Analyst*), institutional ownership (*IO*), and return volatility (*Volatility*).

Panel A of Table 3 reports the descriptive statistics for the regression variables in the chemical releases analyses. The average chemical release is 635 thousand pounds for a firm-year. About 17% of the observations are from industry peer firms, i.e., treatment firms. By design, about 50% of the observations are in the post-lawsuit period. The average *Size* is 7.135, *Leverage* is 0.269, *ROA* is 0.036, *Cash* is 0.102, *PPE* is 0.282, *R&D* is 0.019, *CAPX* is 0.049, *Sales* is 7.135, *HHI* is 0.302, and *Age* is 3.090. Panel B of Table 3 reports the descriptive statistics for pollution-related disclosures. *Pollution_Disclosure* has a mean of 0.439 and a standard deviation of 1.167. Panel C of Table 3 reports the correlations between the explanatory variables for the chemical releases. The magnitudes of the correlation coefficients are generally

[10] Based on industry agnostic frameworks such as Global Reporting Initiative (GRI) and Investor Stewardship Group (ISG), Bloomberg constructs 21 reporting topics and 122 reporting items across environmental, social, and governance pillars. Bloomberg applies different weights for different reporting fields within each topic in calculating ESG disclosure scores. To construct the pollution-related disclosure measure (*Pollution_Disclosure*), we focus on the reporting fields in the Materials and Waste topic and Air Quality topic as collected by Bloomberg (the weights assigned by Bloomberg range from 0.16% to 0.96% for these fields).

small except for the correlation between *Size* and *Sales*.[11]

4. Main analyses

4.1 Analysis of chemical releases – Test of H1

Table 4 reports the regression results from the test of hypothesis H1, first without control variables (Column (1)) and then with control variables (Column (2)). The coefficient on *Treat* × *Post* is significantly negative (t = -1.84 and -2.06, respectively). This result is consistent with H1 that peer firms reduce chemical releases in response to industry leaders' environmental lawsuits. The effect is also economically significant. The magnitude of the coefficient (-0.152) in Column (2) implies that peer firms experience a 14.1% decrease (= $e^{-0.152}$ - 1) in chemical releases in the post-lawsuit period.

The results for the control variables are generally consistent with those reported in the previous research (e.g., Lyu et al. 2022; Thomas et al. 2022; Li et al. 2023). Most of the control variables are not significant because we control for lawsuit-firm joint fixed effects. We find that larger firms and firms with more sales have more chemical releases.

4.2 Pollution-related disclosures – Test of H2

The above tests show that industry peers decrease chemical releases in the post-lawsuit period to reduce litigation risk. In addition to the abatement activities, the peer firms can also reduce litigation risk by providing additional information on their pollution level to address stakeholders' concerns. As such, we examine whether industry peers increase the discussion of pollution-related topics to address the increased demand for such information and to alleviate stakeholders' concerns.

[11] We follow prior research (e.g., Thomas et al. 2022) and include both *Size* and *Sales* to control for the size of the firm and the scale of the production in the chemical releases analyses. Our inferences remain similar if we exclude either one of the two variables from the regressions.

Table 5 reports the regression results, Column (1) without control variables and Column (2) with control variables. Consistent with our expectation, the coefficient on *Treat* × *Post* is significantly positive (t = 2.31 and 2.29 in Columns (1) and (2), respectively), indicating that compared with control firms, industry peers increase pollution-related disclosures in the post-lawsuit period. This change is about 24% (= 0.280/1.167) of the standard deviation of the disclosure measure, suggesting that the effect is economically significant.

Overall, the finding from this test indicates that the peer firms not only reduce chemical releases but also improve pollution-related disclosures to address the concern with the increase in perceived litigation risk.

4.3 Test of the parallel trend assumption

The validity of the inferences from the difference-in-differences specification hinges on the assumption that, absent the treatment, the treatment and control firms would exhibit similar trends in the outcomes of interest. To assess the validity of this parallel trend assumption, we examine whether the treatment and control firms exhibit similar trends in chemical releases and pollution-related disclosures before the environmental lawsuits. For this purpose, we estimate a specification that is analogous to Equation (1) and Equation (2) but replace the *Post* indicator with the following five indicators: *Pre_Y2*, *Pre_Y1*, *Post_Y1*, *Post_Y2*, and *Post_Y3*. The earliest year in the pre-lawsuit period is used as the benchmark year in the regression.

Table 6 reports the regression results, Column (1) for the analysis of chemical releases and Column (2) for the analysis of pollution-related disclosures. The coefficients on the interactions between *Treat* and the two indicators for the pre-lawsuit years are insignificant at conventional levels for both analyses. These results are consistent with the parallel trend assumption that the treatment firms do not change their chemical releases and pollution disclosures relative to control

firms before industry leaders' environmental lawsuits. In addition, we find that the treatment firms start to significantly reduce chemical releases and increase pollution-related disclosures from the first year after industry leaders' environmental lawsuits.

4.4 Sensitivity tests

We conduct several sensitivity tests to ensure the robustness of the results. First, in the main analysis, we follow some prior studies (e.g., Xu and Kim 2022) and use the level of chemical releases as the dependent variable. Other prior studies (e.g., Thomas et al. 2022) also examine the intensity of chemical releases. Because firms might cut operations to reduce chemical releases, we do not use sales as the deflator to calculate chemical release intensity. Instead, we use total assets as the deflator to calculate chemical release intensity. Column (1) of Table 7, Panel A reports the regression results. The inferences remain the same: the coefficient on *Treat* × *Post* is significantly negative (t = -1.87).

Second, instead of using all chemical releases, we focus on health hazardous chemical releases. As discussed above, many of the lawsuits involve harm to human health. We rely on the Integrated Risk Information System (IRIS) program developed by the EPA to identify the chemicals that are carcinogenic to human health. We define *Health_Effects_Release* as the natural logarithm of one plus total carcinogenic substances released by a firm-year. On average, the sample firms release 15.3 thousand pounds of health hazardous chemicals in a year with a standard deviation of 68.8 thousand pounds (not tabulated). Column (2) of Table 7, Panel A reports the regression results using *Health_Effects_Release* as the dependent variable. Consistent with H1, we continue to find a significantly negative coefficient on *Treat* × *Post* (t = -2.73). The effect is also economically significant. Compared to control firms, the treatment firms experience a relative decrease in carcinogens of 16.5% (= $e^{-0.180}$ - 1) in the post-lawsuit period. In Column

(3), we use the releases of carcinogenic chemicals deflated by total assets as the dependent variable and obtain the same inferences (t = -2.09).

Third, we use an alternative way to identify the treatment firms while using the same control firms. Specifically, we use the Text-Based Network Industry Classifications (TNIC) constructed by Hoberg and Phillips (2016) to redefine the treatment firms. Based on product descriptions in the 10-Ks, the TNIC calculates annual firm-by-firm pairwise similarity scores and categorizes firms as peers if they operate in a similar product space. Given that firms' environmental activities are associated with their manufacturing operations, we classify firms as treatment firms if they are the 10 closest peers of the sued firm in the lawsuit filing year based on pairwise similarity scores in the TNIC, to ensure that the treatment firms are exposed to similar environmental litigation risk as the sued firm. As reported in Table 7, Panel B, the inferences remain the same: the coefficient on *Treat* × *Post* is significantly negative (t = -1.77) in the analysis of chemical releases and significantly positive (t = 1.82) in the analysis of pollution-related disclosures.

Lastly, we use an alternative way to identify the control firms while using the same treatment firms. We redefine the control firms as those that share the lawsuit firm's 2-digit SIC code. Table 7, Panel C reports the regression results. Again, the inferences remain the same: the coefficient on *Treat* × *Post* is significantly negative (t = -2.15) in the analysis of chemical releases and significantly positive (t = 2.42) in the analysis of pollution-related disclosures.

Overall, these sensitivity tests suggest that our results are robust to alternative research designs.

5. Additional analyses

In this section, we report several additional analyses to further strengthen the inferences and provide additional insights. We first examine whether industry peers experience a change in financial performance in the post-lawsuit period due to the increased abatement activities. We then investigate the change in perceived litigation risk for peer firms in the post-lawsuit period. We also conduct a falsification test based on carbon emissions and examine the effects of environmental lawsuits on the sued industry leaders.

5.1 Economic consequences – Analyses of financial performance

In this section, we examine the economic consequences of peer firms' actions to cut chemical releases: the abatement costs and financial performance. Since firms' abatement activities are unobservable to researchers, we focus on the changes in financial performance measured by return on assets (*ROA*). To the extent that abatement costs reduce net profits (e.g., Xu and Kim 2022), the treatment firms will experience a decrease in *ROA* in the post-lawsuit period compared to control firms. In addition, firms can reduce chemical releases through two ways: increased investments in abatement activities and reduced production. Increased investments in abatement activities will lead to higher costs for the same amount of sales, resulting in lower return on sales (*ROS*). Reduced production levels will lead to lower sales for the same assets, i.e., lower asset turnover (*ATO*). An investigation of the change in *ROS* and *ATO* in the post-lawsuit period can shed further light on the channels through which treatment firms cut chemical releases.

To test this prediction, we use a similar regression model as Equation (1) except that the dependent variable is *ROA*, *ROS*, or *ATO* and we drop the control variable *ROA*.

Panel A of Table 7 reports the regression results, Column (1) for the analysis of *ROA*, Column (2) for the analysis of *ROS*, and Column (3) for the analysis of *ATO*. First, in Column

(1), the coefficient on *Treat* × *Post* is significantly negative (*t* = -2.10), suggesting that compared to control firms, industry peers experience a decrease in *ROA* in the post-lawsuit period. In terms of economic significance, the magnitude of the coefficient on *Treat* × *Post* indicates that treatment firms experience a decrease of 1.5 percentage points in *ROA.* Second, in Columns (2) and (3), the coefficient on *Treat* × *Post* is significantly negative (*t* = -1.94 and -1.70, respectively) in the analyses of *ROS* and *ATO*, suggesting that compared to control firms, industry peers experience a decrease in *ROS* and *ATO* in the post-lawsuit period. These results suggest that treatment firms increase investments on abatement activities and cut productions to achieve the goal of reducing chemical releases.

Not all treatment firms cut chemical releases. To ensure that the decrease in financial performance documented above is indeed related to treatment firms' abatement activities, we split the treatment firms into two groups and examine whether the treatment firms cutting more chemical releases experience a larger decrease in financial performance. Specifically, we construct a measure of chemical release reduction for each treatment firm as negative one times the percentage change in average chemical releases from the pre-lawsuit period to the post-lawsuit period, with a high value indicating a larger reduction in chemical releases. We then split the treatment firms into high reduction and low reduction groups based on the sample median of this measure. We include the corresponding control firms in the analysis of each group of treatment firms.[12]

Panel B of Table 7 reports the regression results. The coefficient on *Treat* × *Post* is significantly negative for the high reduction group (*t* = -2.43, -1.91, and -2.24 in the analyses of

[12] Note that a treatment firm in the high reduction group might share the same Fama-French industry as a treatment firm in the low reduction group. For such cases, the firms in the same Fama-French industry but not in the same 4-digit SIC industry as the two treatment firms are control firms for both treatment firms. As such, the sum of the number of observations of the two subsample analyses is larger than the number of observations of the full sample.

ROA, *ROS*, and *ATO*, respectively). In contrast, the coefficient on *Treat* × *Post* is insignificant for the low reduction group. As reported at the bottom of the table, the difference in the coefficient on *Treat* × *Post* is significant for the analysis of *ROA* (*p*-value = 0.035), and marginally significant for the analysis of *ROS* (*p*-value = 0.105), and significant for the analysis of *ATO* (*p*-value = 0.020).

Overall, these results indicate that industry peer firms cut chemical releases in the post-lawsuit period at the expense of financial performance. The peer firms that cut more chemical releases experience a significant drop in ROA, ROS, and asset turnover. This finding suggests that industry leaders' lawsuits induce the peer firms to internalize the chemical releases' environmental impact into operation decisions.

5.2 Change in peer firms' perceived litigation risk

A premise underlying our hypotheses is that compared to control firms, the peer firms' *perceived* environmental litigation risk increases in the post-lawsuit period. To investigate whether this is the case, we collect negative pollution-related news in the Reprisk dataset to capture the perceived litigation risk faced by firms and examine whether industry peers experience an increase in the number of negative environmental news in the post-lawsuit period. Reprisk systematically identifies negative ESG news at the firm-day level by screening more than 100,000 public sources across 23 languages and then classifies the news into 28 ESG issues. Based on the negative pollution-related news covered by Reprisk, we construct two measures to proxy for environmental litigation risk: *Pollution_Incidents* and *Num_Pollution_Incidents*. *Pollution_Incidents* is an indicator that equals 1 if the firm has a pollution-related news in a year, and *Num_Pollution_Incidents* is the number of pollution-related news in a year. *Pollution_Incidents* has a mean of 0.081 and a standard deviation of 0.272, and

Num_Pollution_Incidents has a mean of 0.141 and a standard deviation of 0.576 (untabulated).

We use a similar research design as Equation (1) to examine the change in litigation risk; the dependent variable is *Pollution_Incidents* or *Num_Pollution_Incidents*. Table 9 reports the regression results. In both columns, the coefficient on *Treat* × *Post* is significantly positive (t = 3.36 and 2.90 in the analyses of *Pollution_Incidents* and *Num_Pollution_Incidents*, respectively). The effects are also economically significant. The magnitude of coefficient (0.044) in Column (1) indicates that industry peers experience an increase of 16.2% (= 0.044/0.272) of the standard deviation of *Pollution_Incidents* in the likelihood of pollution-related news compared to control firms.

At the same time, we investigate whether treatment firms experience a change in the likelihood of environmental violations in the post-lawsuit period. If treatment firms also experience an increase in the likelihood of environmental violations, then the above results might be driven by the increase in the likelihood of treatment firms' own lawsuits, not necessarily by the lawsuit of industry leaders. We obtain data on corporate misconduct from Violation Tracker maintained by the Corporate Research Project of Good Jobs First. We identify environmental violations based on Violation Tracker's classification scheme, and most of the environmental violations are issued by the EPA or state-level environmental agencies overseen by the EPA.

We construct an indicator variable for the occurrence of environmental violation (*D_Violation*) and count the number of environmental violation (*Num_Violation*) for each firm-year. We use a similar research design as Equation (1) to examine the change in environmental violations. Panel B of Table 9 reports the regression results. In both columns, the coefficient on *Treat* × *Post* is insignificantly at conventional levels, suggesting that treatment firms do not have a higher likelihood of environmental violations in the post-lawsuit period.

These findings indicate that industry peer firms experience an increase in environmental-related litigation risk in the post-lawsuit period, confirming the premise underlying our hypotheses. At the same time, peer firms do not experience an increase in environmental violations.

5.3 Falsification Test

To further strengthen the main inferences, we conduct a falsification test using carbon emission levels disclosed by the firms. As discussed above, we investigate whether the treatment firms reduce chemical releases in the post-lawsuit period because all the environmental lawsuits are related to industry leaders' chemical releases and pollution issues. Because none of the environmental lawsuits are related to carbon emissions, if the documented results are due to environmental lawsuits related to chemical releases as argued in the hypothesis development, we would not observe similar reductions in peer firms' carbon emissions. However, if the reduction in chemical releases of peer firms is driven by other industry or firm factors, such as the pressure to improve environmental performance in general, we would observe a similar decrease in carbon emissions for the treatment firms.

To investigate this issue, we obtain the level of scope 1 and scope 2 carbon emissions disclosed by the firms from the Trucost database. We investigate the change in carbon emissions for the treatment and control firms using the same research design as Equation (1); the dependent variable is the level or intensity of scope 1 and scope 2 carbon emissions.[13] Table 10 reports the regression results. Column (1) and Column (2) report the results for the level and intensity of scope 1 carbon emissions, respectively. Column (3) and Column (4) report the results for the

[13] We do not investigate scope 3 carbon emissions because firms rarely disclose such information and scope 3 carbon emissions in the Trucost database are primarily estimated by the data provider based on firm characteristics (Aswani et al. 2023).

level and intensity of the sum of scope 1 and scope 2 carbon emissions, respectively. In all the four columns, the coefficient on *Treat* × *Post* is significantly positive (t = 3.34, 3.88, 2.40, and 3.01, respectively), indicating that industry peers experience an increase, instead of a decrease, in carbon emissions in the post-lawsuit period relative to control firms.

These results suggest that our main findings are unlikely to be driven by treatment firms' general improvement in environmental performance and are more likely to be attributed to the industry leaders' environmental lawsuits related to chemical releases. The results also suggest that the implementation of environmental-friendly activities is costly and industry peers might trade-off between chemical releases and carbon emissions to reduce the overall abatement costs.

5.4 Effects of environmental lawsuits on the focal firms

The argument underlying our hypotheses is that firms reduce pollution in response to environmental litigation risk. It thus follows that industry leaders sued for environmental issues (i.e., the focal firms) should reduce chemical releases, experience a drop on ROA because of the increased abatement costs, and improve pollution-related disclosures. To further validate the main inferences, we thus examine the effects of environmental lawsuits on the focal firms. Specifically, we investigate the change in chemical releases (*Total_Release*), the increase in abatement costs as manifested in lower performance (*ROA*), and the change in pollution-related disclosures (*Pollution_Disclosure*). We use the same research design as the corresponding tests presented above. The sample used for these analyses includes the observations in the six-year window around lawsuits of the focal firms and the same set of control firms – firms in the same Fama and French 48 industries but not in the same 4-digit SIC industries as the focal firms. We construct an indicator, *Focal*, for the observations from the focal firms.

Table 11 reports the regression results. Column (1) presents the results for the analysis of

Total_Release. The coefficient on *Focal* × *Post* is significantly negative (*t* = -2.65), indicating that the focal firms cut chemical releases in the post-lawsuit period. The magnitude of the coefficient suggests that the focal firms experience a relative decrease of 34.2% (=$e^{-0.419}$-1) in chemical releases, a larger decrease than that experienced by the peer firms. Column (2) presents the results for the analysis of *ROA*. The coefficient on *Focal* × *Post* is also significantly negative (-0.014, *t* = -1.76), indicating that the focal firms experience a decrease in ROA of 1.4 percentage points in the post-lawsuit period. Column (3) presents the results for the analysis of *Pollution_Disclosure*. The coefficient on *Focal* × *Post* is significantly positive (*t* = 1.95), suggesting that the focal firms increase pollution-related disclosures in the post-lawsuit period. The magnitude of the coefficient (0.277) suggests that the focal firms experience a relative increase of 22.9% (= 0.277/1.207) of the standard deviation of the disclosure measure (the disclosure measure for the sample used in this analysis has a standard deviation of 1.207 (untabluated)).

In sum, these results suggest that the focal firms – the industry leaders sued for environmental issues – cut chemical releases, experience a decrease in financial performance likely due to the increased abatement costs, and increase pollution-related disclosures in the post-lawsuit period. These findings further strengthen our inferences.

6. Conclusion

In this paper, we investigate the spillover effects of high-profile environmental lawsuits on industry peers. We find that compared to control firms, industry peers experience a decrease in chemical releases and an increase in disclosures related to pollution after the lawsuits. Industry peers also experience a decline in financial performance, likely due to the increase in abatement costs, and the decline in financial performance primarily occurs in firms with a higher decrease

in chemical releases. Lastly, we confirm that industry peers experience an increase in negative reports on their environmental issues, suggesting that peer firms' environmental litigation risk increases after industry leaders' high-profile environmental lawsuits.

Overall, this paper contributes to the literature by documenting important spillover effects of environmental lawsuits. These findings are important because they shed light on how litigation affects not only the sue firms but also the industry peers. They suggest that litigation is an important means to induce firms to internalize the externalities of their pollutions, which are harmful to the environment and human health.

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Appendix A
Summary Information of the Final Sample of Environmental Lawsuits

In this appendix, we provide descriptive information for the final sample of environmental lawsuits used in the analyses. We manually collect lawsuit complaint information from the Bloomberg terminal, the Westlaw database, and Public Access to Court Electronic Records (PACER). We are able to find such information for 81 lawsuits.

Lawsuit Classification	Number
Type of alleged damage	
Release of pollutants to water, land, soil, or air	81
Contamination of environment	81
Harmful to human health	38
Total	81
Type of defendants	
Company only	76
Company and individuals	5
Total	81
Type of plaintiffs	
U.S. government agency	40
Individuals	14
Company	18
Non-profit organization	15
Total	81
Lawsuit duration in days (N = 81)	
Mean	431
Standard deviation	767
Q1	63
Median	188
Q3	353

Appendix B
Variable Definitions

Variable		Definition
Dependent Variables		
Total_Release	=	The natural log of one plus the total toxic substance releases (000s' of pounds) for a firm in the year.
Pollution_Disclosure	=	The sum of weighted pollution-related disclosure fields a firm provides information on in a year.
Independent Variables of Interest		
Treat	=	The indicator variable for peer firms, set to 1 if the firm is in the same SIC 4-digit industry as the focal firm with environmental lawsuits, and 0 otherwise.
Post	=	The indicator variable for the post-lawsuit period, set to 1 if the firm-year is in the three years following the lawsuit, and 0 otherwise.
Control Variables for the Chemical Release Analyses		
Size	=	Natural log of total assets (in millions).
Leverage	=	The sum of long-term debt and debt in current liabilities scaled by total assets.
ROA	=	Net income scaled by total assets.
Cash	=	The sum of cash and cash equivalents scaled by total assets.
PPE	=	Property, plant, and equipment (net of accumulated depreciation) scaled by total assets.
R&D	=	R&D expenditures scaled by total assets. Missing values are set to zero.
CAPX	=	Capital expenditures scaled by total assets.
Sales	=	Natural log of one plus sales (in millions).
HHI	=	The Herfindahl–Hirschman index in the 4-digit SIC industry, calculated based on firms' revenue.
Age	=	The natural log of one plus the number of years the firm is present in the Compustat.
Control Variables for the Pollution Disclosure Analyses		
Size	=	Natural log of total assets (in millions).
Leverage	=	The sum of long-term debt and debt in current liabilities scaled by total assets.
BM	=	The book-to-market ratio, calculated as total assets divided by the sum of market value of equity and total liabilities.
ROA	=	Net income scaled by total assets.
Analyst	=	The natural log of one plus the number of unique analysts issuing earnings forecasts for the firm in the year.
IO	=	The proportion of a firm's outstanding shares owned by institutional investors.
Volatility	=	The standard deviation of monthly stock returns of the firm over the year.

TABLE 1
Sample Selection and Distribution of Environmental Lawsuits

This table presents the sample selection process and the sample distribution for environmental lawsuits. Panel A reports the sample selection process. We obtain lawsuit data from the Federal Judicial Center, Audit Analytics, and Climate Change Litigation Database, and focus on environmental lawsuits filed under environmental laws with NOS of 893. Panels B and C present the yearly and industry distribution of environmental lawsuits, respectively.

Panel A: Environmental lawsuits selection

	Number of lawsuits	Number of sued firms
Environmental lawsuits filed against publicly listed companies from 2003 to 2020	1,185	588
Less: environmental lawsuits that are not high profile	(1,086)	(510)
Less: second environmental lawsuit if it is within two years after the first lawsuit in the same industry	(17)	(7)
Number of lawsuits used in the main tests	82	71

Panel B: Distribution by year

Year	Initial Sample	Percent	Final Sample	Percent
2003	80	6.75%	6	7.32%
2004	73	6.16%	7	8.54%
2005	86	7.26%	5	6.10%
2006	71	5.99%	6	7.32%
2007	77	6.50%	1	1.22%
2008	72	6.08%	8	9.76%
2009	65	5.49%	7	8.54%
2010	82	6.92%	6	7.32%
2011	80	6.75%	6	7.32%
2012	68	5.74%	3	3.66%
2013	88	7.43%	3	3.66%
2014	71	5.99%	3	3.66%
2015	51	4.30%	6	7.32%
2016	45	3.80%	3	3.66%
2017	59	4.98%	1	1.22%
2018	46	3.88%	4	4.88%
2019	35	2.95%	0	0.00%
2020	36	3.04%	7	8.54%
Total	1,185	100.00%	82	100.00%

TABLE 1 (cont'd)

Panel C: Distribution by defendants' Fama and French 48 industries

Fama-French 48 Industry	Initial Sample	Percent	Final Sample	Percent
Petroleum and Natural Gas	208	17.55%	7	8.54%
Utilities	162	13.67%	3	3.66%
Chemicals	123	10.38%	6	7.32%
Others	72	6.08%	6	7.32%
Transportation	65	5.49%	3	3.66%
Steel Works etc.	57	4.81%	4	4.88%
Machinery	38	3.21%	5	6.10%
Wholesale	37	3.12%	4	4.88%
Aircraft	31	2.62%	4	4.88%
Construction Materials	30	2.53%	3	3.66%
Business Supplies	29	2.45%	3	3.66%
Automobiles and Trucks	24	2.03%	2	2.44%
Electronic Equipment	24	2.03%	2	2.44%
Retail	23	1.94%	2	2.44%
Food Products	21	1.77%	1	1.22%
Non-Metallic and Industrial Metal Mining	21	1.77%	0	0.00%
Construction	18	1.52%	2	2.44%
Trading	18	1.52%	0	0.00%
Coal	17	1.43%	2	2.44%
Electrical Equipment	15	1.27%	2	2.44%
Measuring and Control Equipment	15	1.27%	0	0.00%
Pharmaceutical Products	15	1.27%	0	0.00%
Business Services	13	1.10%	2	2.44%
Communication	12	1.01%	2	2.44%
Shipping Containers	12	1.01%	1	1.22%
Insurance	11	0.93%	1	1.22%
Defense	10	0.84%	2	2.44%
Precious Metals	10	0.84%	2	2.44%
Consumer Goods	9	0.76%	1	1.22%
Computers	6	0.51%	3	3.66%
Entertainment	6	0.51%	0	0.00%
Agriculture	5	0.42%	3	3.66%
Apparel	5	0.42%	0	0.00%
Banking	4	0.34%	0	0.00%
Rubber and Plastic Products	4	0.34%	0	0.00%
Real Estate	3	0.25%	2	2.44%
Shipbuilding, Railroad Equipment	3	0.25%	1	1.22%
Candy & Soda	2	0.17%	0	0.00%
Personal Services	2	0.17%	0	0.00%
Fabricated Products	1	0.08%	1	1.22%
Healthcare	1	0.08%	0	0.00%
Printing and Publishing	1	0.08%	0	0.00%
Restaurants, Hotels, Motels	1	0.08%	0	0.00%
Textiles	1	0.08%	0	0.00%
Total	1,185	100.00%	82	100.00%

TABLE 2
Sample Selection for the Chemical Release Analyses

This table presents the sample selection process for the chemical release analyses. The final sample includes 55 environmental lawsuits, 543 firms, and 5,554 observations at the lawsuit-firm-year level.

	Number of lawsuits	Number of firms	Number of lawsuit-firm-years
Number of observations within the [-3, 3] year window, excluding year 0	82	6,419	56,463
Less:			
firms with environmental lawsuits	(0)	(199)	(4,225)
observations with missing control variables	(0)	(265)	(3,785)
observations with missing data on chemical releases	(4)	(5,193)	(41,110)
firms with observations only in the pre- or post-lawsuit period	(1)	(153)	(762)
lawsuits without treatment or control firms	(22)	(66)	(1,027)
Sample for the chemical release test	55	543	5,554
Treatment firms	55	146	940
Control firms	55	460	4,614

TABLE 3
Descriptive Statistics

Panels A and B report the descriptive statistics on the variables used in the chemical release analyses and in the disclosure analyses, respectively. Panels C and D report the correlations between the variables. The full sample for the analyses of chemical releases includes 55 environmental lawsuits, 543 firms, and 5,554 observations at the lawsuit-firm-year level. The final sample for the analyses of pollution-related disclosures includes 38 environmental lawsuits, 1,204 firms, and 8,319 observations at the lawsuit-firm-year level. Please see Appendix B for variable definitions.

Panel A: Descriptive statistics for the analysis of chemical releases

Variables	Mean	Std Dev	Q1	Median	Q3
Total_Release (000's of lbs.)	635.485	2,639.954	2.340	29.034	169.854
Total_Release	3.420	2.511	1.206	3.402	5.141
Treat	0.169	0.375	0	0	0
Post	0.494	0.500	0	0	1
Size	7.135	1.687	6.054	7.119	8.215
Leverage	0.269	0.201	0.125	0.244	0.375
ROA	0.036	0.093	0.011	0.048	0.083
Cash	0.102	0.106	0.026	0.068	0.140
PPE	0.282	0.167	0.156	0.243	0.379
R&D	0.019	0.029	0.000	0.010	0.024
CAPX	0.049	0.045	0.022	0.035	0.058
Sales	7.135	1.640	6.134	7.163	8.189
HHI	0.302	0.209	0.153	0.253	0.393
Age	3.090	0.813	2.565	3.219	3.784

Panel B: Descriptive statistics for the analysis of pollution-related disclosures

	N	Mean	SD	Q1	Median	Q3
Pollution_Disclosure	8,319	0.439	1.167	0	0	0.160

TABLE 3 (cont'd)

Panel C: Pearson correlation matrix for the variables in the analysis of chemical releases

	Total_Release	*Size*	*Leverage*	*ROA*	*Cash*	*PPE*	*R&D*	*CAPX*	*Sales*	*HHI*
Total_Release	1									
Size	0.287***	1								
Leverage	0.187***	0.183***	1							
ROA	0.024	0.170***	-0.212***	1						
Cash	-0.157***	-0.052***	-0.329***	0.048***	1					
PPE	0.258***	-0.062***	0.127***	-0.146***	-0.218***	1				
R&D	-0.159***	0.017	-0.166***	-0.045***	0.373***	-0.185***	1			
CAPX	0.091***	-0.048***	-0.050***	0.078***	-0.016	0.472***	0.036**	1		
Sales	0.291***	0.952***	0.169***	0.221***	-0.118***	-0.075***	-0.015	-0.059***	1	
HHI	-0.069***	-0.143***	-0.073***	-0.016	-0.049***	-0.169***	-0.119***	-0.118***	-0.111***	1
Age	0.101***	0.182***	-0.160***	0.112***	0.022	-0.159***	0.010	-0.143***	0.191***	0.112***

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on two-sided tests.

TABLE 4
Environmental Lawsuits and Peer Firms' Chemical Releases

This table reports the regression results of the chemical releases based on the following regression:

$$Chemical\_Release_{s,i,t} = \beta_0 + \beta_1 Post_{s,t} + \beta_2 Treat_{s,i} \times Post_{s,t} + \gamma Controls_{i,t-1} + Lawsuit\_Firm\ FE + Year\ FE + \varepsilon_{s,i,t}$$

The sample includes 55 environmental lawsuits, 543 firms, and 5,554 observations at the lawsuit-firm-year level. Please see Appendix B for variable definitions. Intercepts are included but not tabulated. The *t*-statistics are based on standard errors adjusted for firm-level clustering. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on two-sided tests.

Dependent Variable =	*Total_Release*	
	(1)	(2)
Post	0.163***	0.168***
	(3.60)	(3.70)
Treat* × *Post	**-0.137***	**-0.152****
	(-1.84)	**(-2.06)**
Size		0.166*
		(1.74)
Leverage		-0.140
		(-0.93)
ROA		0.336
		(1.49)
Cash		0.373
		(1.36)
PPE		0.427
		(1.40)
R&D		-1.238
		(-0.55)
CAPX		0.204
		(0.45)
Sales		0.213***
		(2.64)
HHI		-0.311
		(-1.26)
Age		-0.163
		(-1.40)
Lawsuit-Firm FE	Y	Y
Year FE	Y	Y
N	5,554	5,554
Adj. R^2	0.929	0.930

TABLE 5
Environmental Lawsuits and Peer Firms' Pollution-related Disclosures

This table presents the regression results of the change in pollution-related disclosures based on the following regression model:

$$Pollution\_Disclosure_{s,i,t} = \beta_0 + \beta_1 Post_{s,t} + \beta_2 Treat_{s,i} \times Post_{s,t} + \gamma Control_{i,t-1} + Lawsuit\_Firm\ FE + Year\ FE + \varepsilon_{s,i,t}$$

The sample includes 38 environmental lawsuits, 1,204 firms, and 8,319 observations at the lawsuit-firm-year level. Please see Appendix B for the variable definitions. Intercepts are included but not tabulated. The *t*-statistics are based on standard errors adjusted for firm-level clustering. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on two-sided tests.

Dependent Variable =	*Pollution_Disclosure*	
	(1)	(2)
Post	0.141***	0.144***
	(3.61)	(3.60)
Treat* × *Post	**0.282****	**0.280****
	(2.31)	**(2.29)**
Size		0.010
		(0.31)
Leverage		0.113
		(0.96)
BM		0.074
		(0.98)
ROA		0.054
		(0.72)
Analyst		0.032
		(1.02)
IO		0.023
		(0.29)
Volatility		-0.223
		(-1.29)
Lawsuit-Firm FE	Y	Y
Year FE	Y	Y
N	8,319	8,319
Adj. R^2	0.710	0.710

TABLE 6
Test of the Parallel Trend Assumption

This table reports the tests of the parallel trend assumption. The sample includes 55 environmental lawsuits, 543 firms, and 5,554 observations at the lawsuit-firm-year level for the analysis of chemical releases and 38 environmental lawsuits, 1,204 firms, and 8,319 observations for the analysis of pollution-related disclosures. *Pre_Y2* is an indicator variable that equals 1 for the observations in the second year before the environmental lawsuit. *Pre_Y1*, *Post_Y1*, *Post_Y2*, and *Post_Y3* are defined similarly. Please see Appendix B for the definitions of other variables. Intercepts are included but not tabulated. The *t*-statistics are based on standard errors adjusted for firm-level clustering. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on two-sided tests.

Dependent Variable =	*Total_Release*	*Pollution_Disclosure*
	(1)	(2)
Pre_Y2	-0.040	0.509
	(-0.45)	(0.48)
Pre_Y1	-0.145	0.974
	(-0.80)	(0.45)
Post_Y1	-0.125	2.095
	(-0.34)	(0.49)
Post_Y2	-0.167	2.526
	(-0.36)	(0.47)
Post_Y3	-0.265	3.028
	(-0.48)	(0.47)
Treat × *Pre_Y2*	-0.109	-0.049
	(-1.61)	(-0.85)
Treat × *Pre_Y1*	-0.014	0.119
	(-0.18)	(1.61)
Treat × *Post_Y1*	-0.174*	0.268*
	(-1.68)	(1.89)
Treat × *Post_Y2*	-0.198*	0.407**
	(-1.81)	(2.54)
Treat × *Post_Y3*	-0.212*	0.262
	(-1.96)	(1.60)
Control Variables	Y	Y
Lawsuit-Firm FE	Y	Y
Year FE	Y	Y
N	5,554	8,310
Adj. R^2	0.930	0.710

TABLE 7
Sensitivity Tests

This table reports the sensitivity tests of the chemical release analyses using the following regression:

$$Chemical\_Release_{s,i,t}, Pollution\_Disclosure_{s,i,t} = \beta_0 + \beta_1 Post_{s,t} + \beta_2 Treat_{s,i} \times Post_{s,t} + \gamma Controls_{i,t-1} + Lawsuit\_Firm\ FE + Year\ FE + \varepsilon_{s,i,t}$$

In Panel A, *Chemical_Release* is *Total_Release_Intensity* in Column (1), *Health_Effects_Release* in Column (2), and *Health_Effects_Release_Intensity* in Column (3). *Total_Release_Intensity* is calculated as ln(1+*Total Release*/*Total Assets*). *Health_Effects_Release* is calculated as the natural logarithm of one plus total carcinogenic chemicals released in thousands of pounds by a firm in a year. We identify carcinogenic chemicals based on health hazardous chemicals classified by Integrated Risk Information System (IRIS). *Health_Effects_Release_Intensity* is calculated as ln(1+ *Health Effects Release*/*Total Assets*). Panel B reports the sensitivity test results based on alternative classifications of treatment firms. We identify firms as treatment firms if they are the 10 closest peers of the sued firm in the lawsuit filing year based on the pairwise similarity score in TNIC. Panel C reports the sensitivity test results based on alternative classifications of control firms. We redefine control firms as those that share the lawsuit firm's 2-digit SIC code but not in the same 4-digit SIC code as the lawsuit firm. Please see Appendix B for the definitions of the other variables. Intercepts are included but not tabulated. The *t*-statistics are based on standard errors adjusted for firm-level clustering. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on two-sided tests.

Panel A: Alternative measures of chemical releases

Dependent Variable =	*Total_Release_ Intensity* (1)	*Health_Effects_ Release* (2)	*Health_Effects_ Release_Intensity* (3)
Post	0.010	0.055**	0.001
	(1.22)	(2.00)	(1.39)
Treat* × *Post	**-0.031***	**-0.180*****	**-0.004****
	(-1.87)	**(-2.73)**	**(-2.09)**
Control Variables	Y	Y	Y
Lawsuit-Firm FE	Y	Y	Y
Year FE	Y	Y	Y
N	5,554	5,554	5,554
Adj. R^2	0.928	0.905	0.819

Panel B: Alternative definitions of treatment firms

Dependent Variable =	*Total_Release* (1)	*Pollution_Disclosure* (2)
Post	0.106***	0.093***
	(2.75)	(2.81)
Treat* × *Post	**-0.145***	**0.153***
	(-1.77)	**(1.82)**
Control Variables	Y	Y
Lawsuit-Firm FE	Y	Y
Year FE	Y	Y
N	6,409	10,231
Adj. R^2	0.936	0.720

TABLE 7 (cont'd)

Panel C: Alternative definitions of control firms

Dependent Variable =	*Total_Release* (1)	*Pollution_Disclosure* (2)
Post	0.092**	0.020
	(2.37)	(0.64)
Treat* × *Post	**-0.147****	**0.318****
	(-2.15)	**(2.42)**
Control Variables	Y	Y
Lawsuit-Firm FE	Y	Y
Year FE	Y	Y
N	8,319	8,766
Adj. R^2	0.936	0.754

TABLE 8
Environmental Lawsuits and Financial Performances of Peer Firms

This table presents the regression results of the change in financial performances based on the following regression model:

$$Performance_{s,i,t} = \beta_0 + \beta_1 Post_{s,t} + \beta_2 Treat_{s,i} \times Post_{s,t} + \gamma Control_{i,t-1} + Lawsuit\_Firm\ FE + Year\ FE + \varepsilon_{s,i,t}$$

Performance is *ROA*, *ROS*, or *ATO*. *ROA* is net income scaled by total assets, *ROS* is net income scaled by sales, and *ATO* is the natural logarithm of the ratio of sales to total assets. Panel A reports the regression results for the full sample. Panel B reports the regression results separately for the high and low chemical release reduction groups. We split the treatment firms into a high chemical release reduction group and a low chemical release reduction group based on the sample median of the chemical release reduction. We include the corresponding control firms in the analysis of each group of treatment firms. We employ the Fisher's Permutation test to examine the difference in the coefficient on *Treat* × *Post* between the two groups (e.g., Odén and Wedel 1975). The sample includes 55 environmental lawsuits, 543 firms, and 5,554 observations at the lawsuit-firm-year level. Please see Appendix B for the definitions of the other variables. Intercepts are included but not tabulated. The *t*-statistics are based on standard errors adjusted for firm-level clustering. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on two-sided tests.

Panel A: Results for the full sample

Dependent Variable =	*ROA*	*ROS*	*ATO*
	(1)	(2)	(3)
Post	-0.006	-0.01	-0.012
	(-1.02)	(-1.37)	(-1.02)
Treat* × *Post	**-0.015****	**-0.020***	**-0.030***
	(-2.10)	**(-1.94)**	**(-1.70)**
Size	-0.085***	-0.088***	-0.277***
	(-8.53)	(-6.93)	(-11.95)
Leverage	-0.013	0.009	0.107*
	(-0.64)	(0.41)	(1.93)
Cash	0.066**	-0.038	0.406***
	(2.40)	(-0.92)	(4.81)
PPE	-0.012	0.073	-0.535***
	(-0.32)	(0.23)	(-6.82)
RD	0.070	0.199***	-0.127
	(0.26)	(2.59)	(-0.96)
CAPX	0.121**	0.077***	2.277***
	(2.37)	(5.32)	(3.30)
Sales	0.067***	-0.008	-0.157
	(6.43)	(-0.54)	(-0.85)
HHI	-0.003	0.015	-0.044
	(-0.18)	(1.21)	(-0.93)
Age	0.005	-0.01	0.133***
	(0.42)	(-1.37)	(3.82)
Lawsuit-Firm FE	Y	Y	Y
Year FE	Y	Y	Y
N	5,554	5,554	5,554
Adj. R^2	0.488	0.519	0.904

TABLE 8 (Cont'd)

Panel B: Results for subsamples of treatment firms

Dependent Variable =	*ROA*		*ROS*		*ATO*	
	High chemical release reduction group	Low chemical release reduction group	High chemical release reduction group	Low chemical release reduction group	High chemical release reduction group	Low chemical release reduction group
	(1)	(2)	(3)	(4)	(5)	(6)
Post	-0.011	0.002	-0.017**	0.007	-0.014	-0.003
	(-1.57)	(0.26)	(-1.99)	(1.01)	(-1.07)	(-0.24)
Treat* × *Post	**-0.027****	**-0.004**	**-0.029***	**-0.009**	**-0.058****	**-0.005**
	(-2.43)	**(-0.41)**	**(-1.91)**	**(-0.70)**	**(-2.24)**	**(-0.24)**
Control Variables	Y	Y	Y	Y	Y	Y
Lawsuit-Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
N	3,954	4,315	3,954	4,315	3,954	4,315
Adj. R^2	0.515	0.474	0.556	0.515	0.899	0.908
P-value for the difference in the coefficient on *Treat* × *Post*	0.035		0.105		0.020	

TABLE 9
Environmental Lawsuits and Peer Firms' Litigation Risk

Panel A: Peer Firms' Negative Environmental News

This table presents the regression results of the change in negative environmental news covered by the Reprisk dataset:

$$E\_Incidents_{s,i,t} = \beta_0 + \beta_1 Post_{s,t} + \beta_2 Treat_{s,i} \times Post_{s,t} + \gamma Control_{i,t-1} + Lawsuit\_Firm\ FE + Year\ FE + \varepsilon_{s,i,t}$$

E_Incidents is *Pollution_Incidents* or *Num_Pollution_Incidents*. *Pollution_Incidents* equals one if the firm has a pollution related-incident in a year. *Num_Pollution_Incidents* is the number of negative pollution-related incidents in a year. The sample includes 50 environmental lawsuits, 1,653 firms, and 14,644 observations at the lawsuit-firm-year level. Please see Appendix B for the definitions of the other variables. Intercepts are included but not tabulated. The *t*-statistics are based on standard errors adjusted for firm-level clustering. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on two-sided tests.

Dependent Variable =	*Pollution_Incidents* (1)	*Num_Pollution_Incidents* (2)
Post	-0.010	-0.026
	(-1.17)	(-1.61)
Treat* × *Post	**0.044*** **	**0.084*** **
	(3.36)	**(2.90)**
Size	0.001	0.004
	(0.15)	(0.29)
Leverage	0.017	0.003
	(0.72)	(0.10)
ROA	-0.048**	-0.047*
	(-2.53)	(-1.93)
Cash	0.020	0.023
	(0.84)	(0.69)
PPE	-0.053	-0.011
	(-1.55)	(-0.22)
RD	-0.128	-0.113
	(-1.15)	(-0.59)
CAPX	-0.006	-0.021
	(-0.22)	(-0.59)
Sales	0.009	0.008
	(1.31)	(0.91)
HHI	0.003	0.068
	(0.08)	(1.11)
Age	0.003	0.012
	(0.24)	(0.65)
Lawsuit-Firm FE	Y	Y
Year FE	Y	Y
N	14,644	14,644
Adj. R^2	0.438	0.606

TABLE 9 (cont'd)

Panel B: Peer Firms' Environmental Violations

This table presents the regression results of the change in environmental violations:

$$E\_Violation_{s,i,t} = \beta_0 + \beta_1 Post_{s,t} + \beta_2 Treat_{s,i} \times Post_{s,t} + \gamma Control_{i,t-1} + Lawsuit\_Firm\ FE + Year\ FE + \varepsilon_{s,i,t}$$

E_Violation is *D_Violation* or *Num_Violation*. *D_Violation* equals one if the firm has an environment-related offense in a year. *Num_Violation* is the number of environment-related offenses in a year. The sample includes 79 environmental lawsuits, 4,531 firms, and 42,396 observations at the lawsuit-firm-year level. Please see Appendix B for the definitions of the other variables. Intercepts are included but not tabulated. The *t*-statistics are based on standard errors adjusted for firm-level clustering. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on two-sided tests.

Dependent Variable =	*D_Violation* (1)	*Num_Violation* (2)
Post	0.009**	0.010
	(2.057)	(1.621)
Treat* × *Post	**0.004**	**0.010**
	(0.633)	**(1.204)**
Size	0.003	0.004*
	(1.345)	(1.672)
Leverage	0.001	0.001
	(0.659)	(0.695)
ROA	-0.001	-0.001
	(-1.069)	(-1.331)
Cash	0.005	0.007
	(0.926)	(0.993)
PPE	-0.001	0.001
	(-0.095)	(0.091)
RD	0.003	0.009
	(0.594)	(1.310)
CAPX	0.013	0.014
	(1.600)	(1.374)
Sales	0.005**	0.008***
	(2.522)	(3.081)
HHI	0.004	0.006
	(0.366)	(0.400)
Age	0.001	-0.001
	(0.162)	(-0.118)
Lawsuit-Firm FE	Y	Y
Year FE	Y	Y
N	42,396	42,396
Adj. R^2	0.440	0.501

TABLE 10
Falsification Tests – Environmental Lawsuits and Peer Firms' Carbon Emissions

This table presents the regression results of the change in carbon emissions using the following regression model:

$$Carbon\_Emission_{s,i,t} = \beta_0 + \beta_1 Post_{s,t} + \beta_2 Treat_{s,i} \times Post_{s,t} + \gamma Control_{i,t-1} + Lawsuit\_Firm\ FE + Year\ FE + \varepsilon_{s,i,t}$$

Carbon-Emission is *LnScope1, LnScope1_Int, LnCarbon,* or *LnCarbon_Int*. *LnScope1* (*LnCarbon*) is the natural logarithm of one plus the scope 1 (the sum of scope 1 and scope 2) carbon emissions in thousands of pounds of CO_2 equivalent disclosed by a firm in a year. *LnScope1_Int* (*LnCarbon_Int*) is the natural logarithm of one plus the scope 1 (the sum of scope 1 and scope 2) carbon emission intensity, which is calculated as scope 1 (the sum of scope 1 and scope 2) carbon emissions in tons divided by total assets in millions. The sample includes 25 environmental lawsuits, 256 firms, and 1,880 observations at the lawsuit-firm-year level for the analysis of scope 1 carbon emissions in Column (1) and Column (2). The sample includes 20 environmental lawsuits, 206 firms, and 1,535 observations at the lawsuit-firm-year level for the analysis of the sum of scope 1 and scope 2 carbon emissions in Column (3) and Column (4). Please see Appendix B for the definitions of the other variables. Intercepts are included but not tabulated. The *t*-statistics are based on standard errors adjusted for firm-level clustering. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on two-sided tests.

Dependent Variable =	*LnScope1*	*LnScope1_Int*	*LnCarbon*	*LnCarbon_Int*
	(1)	(2)	(3)	(4)
Post	-0.036	-0.038	0.039	0.042
	(-0.83)	(-0.95)	(1.05)	(1.17)
Treat × Post	**0.237*** **	**0.260*** **	**0.153** **	**0.191*** **
	(3.34)	**(3.88)**	**(2.40)**	**(3.01)**
Size	0.403***	-0.238**	0.415***	-0.197**
	(3.59)	(-2.33)	(3.95)	(-2.14)
Leverage	0.026	0.139	-0.010	0.146
	(0.08)	(0.47)	(-0.05)	(0.69)
ROA	0.026	-0.126	0.061	-0.068
	(0.07)	(-0.48)	(0.22)	(-0.27)
Cash	0.452	0.179	0.218	0.080
	(1.44)	(0.61)	(0.85)	(0.31)
PPE	-0.085	-0.102	-0.095	-0.066
	(-0.24)	(-0.30)	(-0.29)	(-0.20)
RD	4.744*	3.692	5.636***	4.770**
	(1.92)	(1.57)	(2.69)	(2.50)
CAPX	-1.141**	-1.408**	-0.725	-1.102**
	(-2.00)	(-2.51)	(-1.54)	(-2.39)
Sales	0.183**	0.119	0.228***	0.152**
	(2.20)	(1.54)	(3.07)	(2.02)
HHI	0.184	0.147	-0.306	-0.272
	(0.67)	(0.62)	(-1.01)	(-0.86)
Age	0.414**	0.460***	0.414**	0.497***
	(2.37)	(2.62)	(2.60)	(2.97)
Lawsuit-Firm FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
N	1,880	1,880	1,535	1,535
Adj. R^2	0.981	0.972	0.982	0.964

TABLE 11
The Effects of Environmental Lawsuits on the Focal Firms

This table reports the regression results of the changes in chemical releases, ROA, and pollution-related disclosures experienced by the focal firms in the post-lawsuit period, using the same research design as in the previous tables. *Focal* is an indicator for focal firms and equals 1 if the firm has a high-profile environmental lawsuit, and 0 if the firm is a control firm. The control firms include those in the same Fama and French 48 industries as the focal firms but not in the same 4-digit SIC industry. Please see Appendix B for the definitions of the other variables. Intercepts are included but not tabulated. The *t*-statistics are based on standard errors adjusted for firm-level clustering. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on two-sided tests.

Dependent Variable =	*Total_Release*	*ROA*	*Pollution_Disclosure*
	(1)	(2)	(3)
Post	0.147***	-0.009	0.162***
	(2.87)	(-1.4)	(3.39)
Focal* × *Post	**-0.419*** **	**-0.014***	**0.277***
	(-2.65)	**(-1.76)**	**(1.95)**
Size	0.075	-0.092***	0.022
	(0.57)	(-7.79)	(0.71)
Leverage	-0.160	-0.012	0.123
	(-0.83)	(-0.52)	(1.00)
ROA	0.229		0.128
	(0.85)		(1.57)
Cash	0.305	0.070**	
	(0.86)	(2.07)	
PPE	0.181	0.011	
	(0.41)	(0.24)	
RD	-2.042	0.034	
	(-0.64)	(0.16)	
CAPX	-0.046	0.105	
	(-0.07)	(1.61)	
Sales	0.293**	0.069***	
	(2.48)	(6.03)	
HHI	-0.417	-0.007	
	(-1.45)	(-0.36)	
Age	-0.232	-0.004	
	(-1.48)	(-0.30)	
BM			0.128
			(1.57)
Analyst			0.018
			(0.24)
IO			0.001
			(0.02)
Volatility			-0.011
			(-0.14)
Lawsuit-Firm FE	Y	Y	Y
Year FE	Y	Y	Y
N	3,627	3,627	7,761
Adj. R^2	0.937	0.452	0.734