Climate litigation and corporate emissions

ABSTRACT

Climate litigation against corporations is on the rise, yet research on firms' responses yields mixed findings. We argue that different types of litigation remedial requests trigger distinctive institutional logics as interpretive cultural toolkit and thus explain this inconsistency. When firms see their jurisdictional peers facing injunctive relief litigation, they activate a climate logic to interpret the legal action, perceive sustained pressures, and thus reduce their emissions. In contrast, when they see their peers facing monetary relief litigation, firms activate a financial logic: they perceive the legal action as financially motivated and see an opportunity to "buy out" the pressure, ultimately increasing their emissions. When peers face mixed relief litigation, firms experience institutional ambiguity and struggle to activate an interpretive system that combines competing logics, resulting in inaction. Using a 2010–2023 dataset linking U.S. climate litigation to facility emissions, a contiguous border discontinuity design, and complementary interviews with legal experts, we provide causal evidence for these arguments. We address concerns on whether there are genuine emissions responses (e.g., pollution outsourcing or reduction), whether it is driven by logic activation or cancelling out of multiple logics, and whether legal threat intensity or corporate-level factors drives both litigation types and emissions responses.

INTRODUCTION

Climate litigation, a novel form of legal action against a wide range of organizations for inadequate climate accountability, has proliferated over the past two decades.[1] Since the 2015 Paris Agreement, climate litigation against corporations (hereafter "climate litigation") has quadrupled, reaching 318 of the 2,967 global filings by 2024 (Setzer and Higham 2025), with the United States (U.S.) alone accounting for 42% of these filings. Initially concentrated on oil and gas giants, climate litigation has spread to the agriculture, manufacturing, and service sectors, elevating climate-related legal risks from a peripheral concern to a material strategic consideration for businesses in general (Ardia et al. 2023, Sato et al. 2024).

However, we still know little about whether and how firms respond to climate litigation, as current evidence presents a mixed picture. For example, Eliet-Doillet (2024) reports no statistically significant average effect of litigation filings on defendant firms' emissions, concluding that information disclosed in climate litigation is not sufficient to alter firms' behavior. Anecdotal evidence, however, reveals considerable discrepancies with this conclusion. For instance, in *Conservation Law Foundation v. ExxonMobil* (2016), ExxonMobil ceased refining operations at its Everett facility, demonstrating effective climate activism. However, in other cases, such as *King County v. BP p.l.c.* (2018), the defendant firms have continued to increase their investments in fossil fuels, suggesting a backlash rather than progress.

These inconsistencies suggest several important theoretical and methodological opportunities for advancing the literature. First, prior studies have overlooked the content of different remedial requests in climate litigation, a key piece of public information common in all lawsuits with a potential to shape organizational interpretations and reactions. Although it is well-established

[1] https://www.ft.com/content/8b9f42c4-f916-403d-b3e5-0edc9460a56e, https://www.nytimes.com/2024/09/12/climate/climate-lawsuits-major-cases.html, accessed December 2025.

that different use of languages and vocabularies plays a key role in shaping organizational interpretations and thus their responses (Ferraro et al. 2005, Mayer et al. 2019), it is unclear theoretically whether and how different types of content in remedial requests of climate litigation influence these processes. Furthermore, research on the impact of climate litigation has focused narrowly on the immediate defendant firms, although activism in other settings has been shown to have broader spillover effects (Hurst 2023, Zhang 2022, Zhang et al. 2023). Studies correlating litigation events and direct targets also face endogeneity issues such as a pre-existing selection process between litigators and defendants, making it difficult to determine a clear impact of climate litigation on firm responses.

We address these issues by asking the following question: How do firms adjust their emissions levels in response to heightened legal risk due to climate litigation? In the U.S., corporate climate litigation remains an emerging field marked by unresolved legal disputes and limited definitive rulings (Burger and Gundlach 2017, Peel and Osofsky 2018, 2020, Wentz et al. 2022, Wentz 2024, Setzer and Higham 2025). We focus on instances when firms first observe a peer corporation in the same jurisdiction facing climate litigation[2], because in those contexts firms face unprecedented events and must rely on available informational cues to make sense of the situation (Cyert 1963, March and Simon 1993, Weick et al. 2005). Remedial requests, defined as legal solutions sought by plaintiffs in lawsuits, are particularly important informational cues in climate litigations, which include two major forms: injunctive relief and

[2] We define peers by filing jurisdiction rather than industry for the following reasons. First, most climate litigation is filed in state or federal district courts. In the absence of binding precedents from higher appellate courts, the legal environment (e.g., legal actors, environmental regulations, legal norms) is much more correlated for firms in the same jurisdiction than for those in the same industry. Second, emerging legal doctrines increasingly emphasize universal corporate duties toward climate mitigation (e.g., climate disclosure, climate risk management duties, emissions control, greenwashing prevention), thus diminishing the relevance of industry boundaries. Finally, our expert interviews and robustness checks confirm that jurisdictional spillovers, rather than industry contagion, drive firms' emissions responses.

monetary relief (Aydin Ozden and Khashabi 2023, Mezzanotti 2021, Shapiro 2016, Vaca and Zúñiga 2025, Wentz et al. 2022).[3] Injunctive relief, typically expressed using terms such as "*enjoin*," "*injunction*," and "*cease*," mandates changes in business practices, ranging from emission controls and facility upgrades to complete shutdowns. In contrast, monetary relief seeks financial compensation for past and/or future climate-related damage, using terms such as "*penalty*," "*compensation*," "*cost*," and "*financial*."[4]

We leverage the perspective of "institutional logics as a cultural toolkit" (McPherson and Sauder 2013, Swidler 1986, Thornton et al. 2012) to provide insights into how organizations activate different institutional logics to interpret climate litigation based on linguistic cues of remedial requests. Institutional logics are defined as taken-for-granted understandings of the norms, assumptions, values, and practices that provide meaning and stability (Ocasio 1997, Thornton et al. 2012). Although many prior studies posit logics as restrictive cognitive frameworks and normative guidelines, we build on recent development in the literature (Durand et al. 2013, McPherson and Sauder 2013) and suggest that firms have a non-trivial degree of agency to choose between two salient institutional logics prevailing in the climate–business nexus to help them interpret climate litigation as a cultural toolkit. Through a lens of climate logic, climate litigation will be perceived by firms as emphasizing climate stewardship and long-term sustainability as uncompromising goals. In contrast, through a lens of financial logic, climate litigation will be understood as a sophisticated balancing act between climate crisis and economic interests, involving a utilitarian calculation of cost and benefit (Davis 2009, Almandoz

[3] Although climate litigation may involve other forms of relief, we focus on injunctive and monetary relief, which legal experts and our analysis indicate impose the most substantial obligations on firms. Details on other types of relief and our empirical design regarding them are discussed in the Methods section.

[4] The vocabulary cited here is drawn from word clouds based on all injunctive or monetary relief sought in U.S. climate litigation. Examples of relief are provided in Appendix B, while the classification scheme for relief is detailed in the Methods section. To create word clouds, the text corpus was preprocessed using standard techniques (e.g., stop-word removal, lemmatization), and the word clouds are presented in Appendix Figure A1.

2014, Yan et al. 2021). Depending on the resonance between salient linguistic cues and institutional logics, firms determine whether certain institutional logic is more suitable than the other to interpret the climate litigation and thus activate this logic as an interpretive filter through which they assess litigation risks and guide their emissions responses.

Firms are likely to activate climate logic when remedial requests against peer firms are primarily focused on injunctive terms, thus perceiving the objective of climate litigation as a quest for climate responsibility, even at the expense of short-term gains (Ansari et al. 2013). Expecting these risks to last until meaningful sustainability transitions take place, firms are likely to preemptively adjust their operations and reduce their emissions to avoid future litigation. In contrast, firms are likely to activate financial logic as an interpretive toolkit when remedial requests against peer firms are primarily focused on financial relief, perceiving litigating organizations as adopting an instrumental perspective to approach climate issues and willing to trade climate issues for economic benefits. Thus, firms expect that the main objective of climate litigation will not necessarily be the transition to sustainability but financial compensation. They will assume that it is possible to "buy out" such litigation if the price is right and will find ways to prepare for the necessary litigation costs by lowering their operational costs, even if doing so increases carbon emissions, because they believe that the first-order concern (i.e., financial compensation) has been addressed.

Building on this reasoning, we further anticipate that firms' responses will be attenuated when a logic fails to activate. Litigation seeking both injunctive and monetary relief (i.e., mixed relief litigation) presents firms with cues that appear to align with both logics. As these logics prescribe fundamentally conflicting interpretive frameworks and courses of action, firms experience institutional ambiguity and struggle to activate an interpretive system that combines

competing logics. Accordingly, firms exposed to mixed relief litigation are more likely to exhibit inaction than those exposed to pure relief litigation.

To test our theoretical framework, we compile a novel dataset linking U.S. climate litigation to facility-level greenhouse gas (GHG) emissions from the Environmental Protection Agency (EPA). A key identification challenge in this context is the non-random targeting of climate litigation. To isolate the causal effect, we use a contiguous border discontinuity design (Dube et al. 2010, 2016, Shapiro 2016, Spenkuch and Toniatti 2018, Yildirim et al. 2024) that compares emissions from facilities in contiguous counties straddling jurisdictional borders that share similar climate, economic, and social conditions but differ in litigation exposure. Our empirical results strongly support our theoretical framework. Facilities exposed to injunctive relief litigation reduce their emissions by 22,654 metric tons on average (26% of the standard deviation). Conversely, exposure to monetary relief litigation corresponds to an increase in emissions of 22,197 metric tons on average (10% of the standard deviation). The effects of pure relief litigation on facilities' emissions are more pronounced than in the mixed relief litigation scenario, supporting our institutional ambiguity hypothesis. We systematically rule out alternative explanations, including pollution outsourcing, productivity adjustments, offsetting of conflicting logics in mixed relief litigation, or legal threat intensity driving both remedial request choices and emissions responses. We also address concerns on whether financial (e.g., size, profitability, growth) and non-financial factors (e.g., political ideology, reputation, susceptibility to activism) at the corporate level or industry level may confound the results, using firm-year and industry-year fixed effects, with consistent results. Supplementary analyses show that changes in emissions stem primarily from energy use-related emissions, with coal and natural gas being the main contributors. A battery of robustness checks further reinforces the credibility of our

findings. We also complement our findings with interviews with legal experts to enhance face validity.

This study contributes to the literature in the following aspects. First, we reconcile mixed evidence on the climate impacts of climate litigation by theorizing and causally validating new mechanisms that link litigation types to local emissions. Building on the perspective of institutional logics as a cultural toolkit, our framework goes beyond a monolithic view of climate litigation and shows that firm responses reflect the institutional logics activated by the vocabulary of remedial requests. Therefore, litigation's potential to enforce or dilute climate accountability hinges critically on how remedial requests are structured and interpreted, rather than on the mere occurrence of litigation. Second, our finding that climate litigation generates jurisdiction-wide spillovers highlights an overlooked channel of impact: peers within the same jurisdiction adjust their emissions in economically meaningful ways. Failing to account for these responses risks underestimating the systematic impact of litigation. Third, we enrich the literature on institutional logics by proposing a more dynamic and contingent view of logics (Lounsbury et al. 2021). Although prior studies have largely treated logics as either given and deterministic (Lee and Lounsbury 2015, Vedula et al. 2022) or as a freely deployable resource (McPherson and Sauder 2013), we conceptualize them as contingently activated cultural resources. By illustrating how external linguistic cues drive the activation and muting of situational logics, our study highlights a more dynamic process through which logics materialize into organizational behavior. In doing so, we shift the theoretical focus from "which logics are present" to "when and why do specific logics become operative?"

THEORETICAL BACKGROUND AND HYPOTHESES

The rise of climate litigation: A new source of uncertainty

Corporate climate litigation refers to legal actions brought up by NGOs, individuals, and governments to hold firms accountable for inadequate climate action. Emerging in the mid-1990s, such litigation has soared at an unprecedented scale in recent decades, as shown in Figure 1. The annual number of corporate climate litigation cases filed has more than quadrupled since the 2015 Paris Agreement, reaching a global total of 318. The U.S., historically the jurisdiction with the highest number of litigation cases year on year, represents approximately 42% of these filings (NGFS 2023). Initially concentrated on major carbon emitters in the oil, gas, and utility sectors, corporate climate litigation has now spread to agriculture, manufacturing, and services (Setzer and Higham 2022). The escalation in both volume and scope has elevated climate litigation risks from a peripheral concern to a material strategic consideration for businesses in general (Ardia et al. 2023, Sato et al. 2024). As former Unilever CEO Paul Polman warned, "by ignoring the legal risks, boards are 'playing with fire'."[5]

Insert Figure 1 about here

Despite the growing importance of climate litigation as a discernable risk, scholarly understanding of how firms respond remains limited. Studies have focused primarily on the financial consequences, showing that climate litigation is associated with direct costs, such as legal fees, fines, and penalties, and indirect costs, such as higher insurance premiums and deteriorating credit ratings, which in turn raise firms' capital costs and reduce their financial leverage (Setzer and Vanhala 2019, Solana 2020). Beyond financial influences, climate litigation can also harm public reputation and staff morale (Armour et al. 2017).

However, little is known about how firms respond by adjusting their GHG emissions, a major contributor to climate change. Among the limited studies, Eliet-Doillet (2024) reports no

[5] https://www.ft.com/content/ad8a6478-1d84-4be6-9a46-91819a7fa086, accessed September 2025.

statistically significant average effect of litigation filings on defendant firms' emissions, concluding that information disclosed in climate litigation is insufficient to change firms' practices. This finding is puzzling given the heterogeneity of firm responses observed in practice. For example, following *Conservation Law Foundation v. ExxonMobil* (2016), ExxonMobil ceased refining operations at its Everett facility, demonstrating effective climate activism. However, in other litigation cases, such as *King County v. BP p.l.c.* (2018), the defendant firms have continued to increase their investments in fossil fuels, suggesting a backlash rather than progress. This mixed evidence highlights the need for a more in-depth understanding of the factors and mechanisms that drive firms' divergent emissions responses to climate litigation.

The gap between the literature and reality is likely to stem from several critical limitations of previous research. First, studies tend to treat climate litigation as a monolithic phenomenon and focus on its occurrence rather than what it demands. This approach overlooks the rich diversity in legal filings and obscures the different ways in which climate litigation can be interpreted and acted upon by firms. This oversight is particularly problematic in the unique context of climate litigation, which remains a highly uncertain and contested domain, marked by ongoing legal disputes and limited definitive precedents (Burger and Gundlach 2017, Peel and Osofsky 2018, Wentz et al. 2022, Setzer and Higham 2025). In such settings, firms cannot rely on pre-existing, well-known information to guide decision-making due to cognitive limitations (Zucker 1977, Powell and DiMaggio 1991). Rather, their responses hinge on subjective interpretations and perceptions of the risks at stake. A key source of information shaping this interpretive variation lies in legal complaint filings, the first official and publicly available documents that define the contours of a dispute. Complaints typically set out the parties, jurisdiction and venue, alleged wrongs, legal claims, and requested relief. While the first elements delineate the dispute's scope

and its factual and legal bases, requested relief specifies the actions sought for resolution, making it the most direct source for firms to infer litigators' intentions and develop strategic responses.

Requested relief in climate litigation takes two main forms: injunctive relief and monetary relief (Aydin Ozden and Khashabi 2023, Burger et al. 2021, Mezzanotti 2021, Shapiro 2016). Injunctive relief mandates behavioral changes such as stopping projects, retrofitting facilities, revoking licenses, divesting high-emitting assets, or adopting climate shareholder proposals, which often entail non-linear costs, irreversibility, and strategic reorientation. For example, in *Benton v. Global Companies LLC* (2016), the plaintiff sought "*a permanent injunction enjoining Defendant from receiving, storing, handling, or marine loading crude oil … with a VOC emission factor greater than 1.3590 pounds … (p.21)*" In contrast, monetary relief seeks financial compensation for climate-related damages through penalties, restitution, or remediation funds, as in *King County v. BP p.l.c*. The vocabulary used in these two forms of relief, as shown in Appendix Figure A1, also diverges systematically: injunctive relief typically uses terms such as "*enjoin*," "*injunction*," and "*cease*," while monetary relief more often relies on terms such as "*penalty*," "*compensation*," "*cost*," and "*financial*." In addition, these categories are not mutually exclusive: although some climate litigation cases seek only one form of relief, others combine the two and request mixed relief.

Crucially, the requested relief in climate litigation is seldom the result of a finely tuned strategic choice by the plaintiffs. Legal scholars have long recognized that "*the question of effective remedies in the context of the climate crisis remains [a largely] undertheorized issue*" (Sormunen 2023), identifying this gap as one of the central weaknesses that has hindered substantive progress in climate litigation (Peel and Osofsky 2018, Doelle and Seck 2020, Roach 2021). As recent scholarship has begun to propose more systematic frameworks for remedy

formulation, such as a “two-track approach” (Roach 2021) or multidimensional models (Bustos 2025, Vaca and Zúñiga 2025), these efforts reveal that prior remedial requests should be understood less as a strategic choice and more as exploratory legal experiments. Accordingly, the content heterogeneity of remedial requests constitutes a plausibly exogenous source of variation, which offers a natural-experimental yet underexplored opportunity to explain why firms exhibit divergent strategies in response to climate litigation.

A second critical limitation of prior research is its narrow focus on firms directly targeted by litigation, paying less attention to the potential spillover effects on organizations subject to similar risks. However, evidence from social activism studies suggests that firms do not operate in an information vacuum but learn from the experiences of their peers. For instance, Briscoe and Gupta (2016) show that firms change their location choices after observing activism against co-located peers. Similarly, Zhang et al. (2023) find that large-scale community protests, even when not directly targeting corporations, provide informational cues that prompt firms to update their understanding of salient social issues. In climate litigation, spillover effects are particularly likely among firms operating in the same legal jurisdiction, as they are subject to similar regulatory environments, legal norms, and judicial tendencies. Jurisdictional peers thus constitute the most theoretically salient reference group for understanding how firms perceive and respond to litigation.

Moreover, studies on the direct effects of litigation on defendant firms face serious endogeneity concerns. Litigators rarely target firms randomly but often select defendants based on pre-existing conditions (e.g., poor emissions records), which complicates causal inference (Arena 2018). However, examining the spillover effects helps circumvent this issue. When a peer firm is targeted for the first time in a given jurisdiction, this generates an exogenous increase in

the perceived likelihood of similar litigation for other firms in that jurisdiction. This quasi-natural experimental setting enables stronger causal identification of how perceived litigation risk, rather than a firm's prior actions, influences subsequent behavior.

Overall, to uncover more nuanced mechanisms and provide a causal explanation of firms' heterogeneous responses to climate litigation, we analyze firm responses within a spillover framework that both mitigates endogeneity concerns and, crucially, accounts for the linguistic content of litigation cases. Specifically, we ask the following question: How do firms adjust their emissions levels in response to foreseeable litigation risks when they first observe a peer corporation in the same jurisdiction facing climate litigation?

Interpreting climate litigation: Institutional logics as a cultural toolkit

As previously mentioned, firms are unable to rely on rational cost–benefit calculations to navigate the unresolved terrain of climate litigation, where legal ambiguity, scarce definitive precedents, and high uncertainty make optimization impossible. The perspective of institutional logics as a cultural toolkit (Friedland and Alford 1991, McPherson and Sauder 2013, Swidler 1986, Thornton et al. 2012) offers a valuable alternative lens for understanding how organizations interpret ambiguity and respond to uncertainty. It posits that organizations accumulate repertoires of culturally embedded logics, essentially sets of cultural schemas and belief systems that delineate legitimate courses of actions (Friedland and Alford 1991, Ocasio 1997, Thornton 2004), through repeated social interactions in various contexts. These logics constitute a "cultural toolkit" from which firms selectively choose to make sense of situational demands (Thornton et al. 2012). Once activated, a logic enables firms to interpret new events by mapping them onto familiar normative principles and to implement responses deemed institutionally appropriate (Thornton 2004, Thornton et al. 2012, Thornton and Ocasio 1999).

In the climate–business nexus, two salient logics prevail. Climate logic, rooted in the principles of intergenerational equity and planetary stewardship, champions long-term ecological sustainability over short-term economic gains (Ansari et al. 2013, Purdy et al. 2019). It views climate responsibility as a categorical moral duty that obliges organizations to safeguard the climate system, and prescribes a range of environmental preservation practices such as decarbonization, transition to renewable energy, adherence to science-based targets, and the adoption of circular economy principles. Actors guided by this logic tend to maintain their commitment to genuine emission management practices beyond mere acknowledgment, often sustaining such moral pressure for years. The persistence of these value-based demands is well documented in previous studies. Ferraro and Beunza (2018), for instance, show that value-driven investors continuously engaged with the Ford Motor Company from 1998 to 2009 to push for carbon emissions reductions, exemplifying how moral commitments can generate enduring demands for genuine corporate change. Emerging in the scientific community of the 1960s and 1970s as evidence linked anthropogenic emissions to climate change (Hansen et al. 1981, Hart and Victor 1993), climate logic gradually gained global institutional traction through milestones such as the Intergovernmental Panel on Climate Change (1988). Since the 2000s, and having accelerated after the 2015 Paris Agreement, climate logic has permeated the business sphere, reshaping corporate governance, investment decisions, and risk management. Today, it is one of the most influential organizing principles for both public and private actors, shaping state policies and corporate environmental strategies (Yan et al. 2021).

In contrast, financial logic is grounded in utilitarian and materialistic values, privileging self-interested norms that prioritize profit maximization and cost minimization (Polillo and Guillén 2005, Fourcade 2006, Davis 2009, Weber et al. 2009, Almandoz 2014, Yan et al. 2021). Applied

to climate change, this logic frames climate responsibility not as an intrinsic ethical duty but as external risks and opportunities to be managed instrumentally. Decarbonization and related actions are subjected to rigorous cost–benefit evaluations and are only adopted if they yield positive financial returns. Climate initiatives perceived as imposing net costs or harming competitiveness are often dismissed as illegitimate (Cordeiro and Sarkis 1997, Hart and Ahuja, 1996, Sarkis and Cordeiro 2001, Wagner et al. 2001). Historically, the rise of financial logic is closely linked to the consolidation of modern capitalism. Although it gained momentum during the 20th century, its dominance was cemented with the global rise of shareholder primacy in the 1980s, underpinned by Friedman's (1970) doctrine and Jensen's (2002) agency theory. Since then, it has become deeply institutionalized in corporate law, capital markets, accounting standards, and business education (Epstein 2005, Krippner 2005, Davis and Kim 2015). Today, financial logic provides one of the most pervasive cognitive frameworks and normative expectations guiding the strategic decisions of contemporary business organizations.

Firms are inevitably exposed to both institutional logics through repeated interactions with regulators, investors, activists, and communities. These encounters embed both logics in firms' cultural repertoires, allowing them to coexist as dormant interpretive frames. However, this does not imply equal accessibility of the two logics for activation. Rather, logic activation depends on situational cues that make one schema more salient than the other. To manage climate litigation risks, an area of contested meanings, firms must choose whether to interpret legal disputes from a climate or financial perspective. This is where the language of relief exerts its power: remedial requests steer firms toward one logic rather than the other, shaping the strategic responses they deem legitimate.

Injunctive relief litigation, climate logic, and GHG emissions

Firms are likely to activate climate logic as an interpretive lens when remedial requests against jurisdictional peers focus on injunctive relief. Injunctive relief requires immediate and often irreversible operational changes through commanding terms such as "*enjoin*," "*cease*," or "*revoke*." This language resonates strongly with the normative core of climate logic, which treats climate responsibility as a categorical moral imperative that supersedes short-term financial calculations (Ansari et al. 2013). This resonance elevates climate logic's cognitive salience (Swidler 1986, Thornton et al. 2012), making climate logic a useful framework through which observing firms make sense of the litigation event. Through this lens, firms perceive plaintiffs as pressing for uncompromising climate responsibility, and in turn, expect that such normative pressures will endure until genuine corporate efforts are made to address climate issues (Lee and Lounsbury 2015, Ferraro and Beunza 2018). Consequently, firms are motivated to consider incorporating climate responsibility into a constitutive principle of organizational strategy, as under-delivering on climate accountability is unlikely to address foreseeable future risks.

For example, prior to 2019, First Interstate BancSystem, a financial services company based in Montana, frequently discussed climate-related issues as confined to financial materiality and suggested that such risks were not considered material to its operations in their annual reports:

> *"Adverse conditions (e.g., natural disasters, environmental contamination) could…adversely impact our business, financial condition, results of operations and cash flows... [However,] there are no legal, administrative, arbitral, private environmental investigations or remediation activities… [which] would reasonably be expected to have… a material adverse effect on the company."*

Yet, the firm's 2021 annual report began to reconstitute climate issues as matters of organizational identity and showcased specific initiatives to reduce its carbon footprint:

> *"Exemplary corporate citizenship is part of First Interstate's DNA…we are committed to folding conservation considerations into our core business strategy and values… introducing practices that… reduce our carbon footprint and create a better environment for everyone. Energy efficiency is a key focus, as evidenced by the addition of solar panels to our new Livingston, Montana branch… opened in August 2021."*

Although such disclosure changes are strategic choices in corporate public communication, external events such as the occurrence of *Tosdal v. NorthWestern Corp.* (2019), an injunctive relief litigation, likely played a role in compelling firms to take a substantive stance in climate issues.

Recognizing that effective risk mitigation requires substantive alignment with climate logic's normative framework, firms infer that symbolic gestures or temporary adjustments will prove inadequate. In contrast, firms may consider concrete emission reductions as more effective means of appeasing potential litigators, as they represent a sustained and non-trivial commitment to the principles of climate logic. Expecting similar legal challenges will likely extend to their own operations unless they demonstrate proactive climate stewardship, firms reduce emissions to avoid future litigation risks. For example, CHS Inc., a major petroleum refinery company, reduced emissions at its Montana plant by approximately 6% in the four years following *Tosdal v. North Western Corp* (2019), a case filed in the same legal jurisdiction as CHS Inc.[6] Hence, we propose the following hypothesis:

> ***Hypothesis 1:*** *Injunctive relief climate litigation in a legal jurisdiction is negatively related to GHG emissions.*

Monetary relief litigation, financial logic, and GHG emissions

Firms are likely to activate financial logic as an interpretive toolkit when remedial requests against peer firms are focused on monetary relief. The vocabulary of monetary relief, using terms such as "*penalty*," "*compensation*," and "*cost*," resonates with financial logic, which treats climate issues as external risks to be financially priced and instrumentally managed. In this context, firms may perceive that plaintiffs are willing to trade climate remediation for a financial settlement, viewing litigation not as a call for the transition to sustainability but as a negotiable

[6] https://ghgdata.epa.gov/ghgp/service/facilityDetail/2022?id=1006671&ds=E&et=&popup=true#:~:text=Total%20Facility%20Emissions%20in%20metric,GWPs%2C%20excluding%20Biogenic%20CO2), accessed July 2025.

financial transaction. For example, Phil Goldberg, an industry representative at the National Association of Manufacturers, whose members include major emitters such as ExxonMobil and BP, mentioned in a 2023 interview that many litigation cases merely "seek to monetize climate change and provide no solutions."[7] This perception is further reinforced by the rise of third-party litigation finance, where outside investors fund litigation in exchange for a share of settlements (Antill and Grenadier 2023, Geiss 2024), amplifying the impression that financial gain, rather than climate accountability, may be the primary driver of climate litigation. Our pre-study interview with a legal expert with decades of experience advising Fortune 500 companies and corporate boards on legal, ethics, and corporate governance matters corroborated this view:

> *"Somebody [a plaintiff] who is just asking for money, from the company's perspective, it seems like they just want to get paid and they will go away… Whatever the amount, the company will usually say: let's just negotiate and settle the matter. Because the reality is that the final number almost always gets negotiated downward… So for them, paying isn't a punishment, it's just part of the cost of doing business."*

By anticipating that litigation can be "bought out" if the price is right, firms may prepare for such risks not by cutting emissions, an action that carries immediate and substantial financial costs (Flammer and Bansal 2017), but by strengthening their financial buffers to absorb potential monetary payments. A highly effective pathway for firms to build financial buffers, particularly when local demand conditions are not directly affected by climate litigation, is to reduce costs and thus retain more profits. For example, firms can leverage cheaper but "dirtier" energy sources and defer costly investments in abatement technologies, thereby significantly lowering their operational costs and increasing their margins. The financial gains from these cost savings can then be allocated to cash reserves or insurance coverage that enable firms to better withstand future litigation payouts.

[7] https://www.eenews.net/articles/watershed-moment-california-enters-climate-litigation-fray/, accessed September 2025.

In this way, firms observing their peers facing monetary relief litigation anticipate similar exposure in the future and may respond by increasing their emissions, as they believe that higher-emitting operations can strengthen their financial capacity to preempt such litigation's primary threat: financial liability. Consistent with this rationale, the Labadie Power Station in Missouri increased its emissions by approximately 7.4% in the seven years following *Lynn v. Peabody Energy Corp* (2015), a monetary relief lawsuit against a peer coal company.[8] We therefore propose the following hypothesis:

> ***Hypothesis 2:*** *Monetary relief climate litigation in a legal jurisdiction is positively related to GHG emissions.*

Mixed relief litigation, interpretive ambiguity, and GHG emissions

Climate litigation that simultaneously requests injunctive and monetary relief poses interpretive challenges for firms. This is consistent with the literature, which posits that entities that fit identifiable categories are privileged and those that do not are ignored. Zuckerman's (1999) fundamental two-step evaluation framework articulates this logic in detail: before people can assess the substantive qualities of an item of interest, they need to first classify it into a recognized category; actors or offerings that fail to meet this legitimacy threshold are likely to be overlooked or devalued. Building on this reasoning, studies provide empirical support that category-spanning entities are less appealing to the public than their category-focused counterparts because they create cognitive ambiguity (Hsu 2006, Hsu et al. 2009, Negro and Leung 2013).

The understanding of mixed relief climate litigation highlights this dilemma: the coexistence of injunctive and monetary relief introduces parallel streams of informational cues, complicating firms' efforts to coherently connect this litigation to climate or financial logic as a guiding

[8] https://ghgdata.epa.gov/ghgp/service/facilityDetail/2021?id=1000192&ds=E&et=FC_CL&popup=true, accessed July 2025.

interpretive frame. The climate and financial logics prescribe fundamentally opposing courses of action regarding emissions. As a result, neither logic can be consistently activated, leaving firms without a coherent understanding of litigators' intentions.

Deprived of a coherent interpretive frame, firms face increased uncertainty about how to respond. In this case, firms' behavioral responses tend to weaken as uncertainty undermines the perceived value of immediate action and increases the appeal of postponing commitment until the environment stabilizes (McDonald and Siegel 1986, Leiblein 2003). Hence, we propose that compared with litigation requesting pure forms of relief, observing peers facing mixed relief litigation is less likely to elicit changes in emissions.

> ***Hypothesis 3a:*** *The effect of injunctive relief climate litigation in a legal jurisdiction on reducing GHG emissions is stronger than that of mixed relief climate litigation.*
> ***Hypothesis 3b:*** *The effect of monetary relief climate litigation in a legal jurisdiction on increasing GHG emissions is stronger than that of mixed relief climate litigation.*

METHODS

Data sources and sample

To test our hypotheses, we analyzed data from two main sources. Facility-level GHG emissions data were collected from the U.S. EPA's GHG Reporting Program. Since 2010, the EPA has required facilities emitting over 25,000 metric tons of CO_2e to report their annual GHG emissions. Covering data through 2023, the dataset captures roughly 50% of all U.S. emissions, along with facility-level information on industry, location, and ownership. Climate litigation records were obtained from the Climate Change Litigation Database maintained by the Sabin Center for Climate Change Law at Columbia University, the primary source for both academic and industry research in this area (Sato et al. 2024, Voeten 2025). The database includes global litigation cases in which "climate change law, policy or science" constitutes a material legal issue, and excludes litigation cases that make only a passing reference to climate change. Our

analysis focused on 134 U.S. litigation cases specifically targeting corporations, as they represent direct legal pressures on business entities.

To understand how climate litigation content affects facility-level emissions, we classified each litigation into one of three categories: *injunctive relief litigation* (no monetary relief), *monetary relief litigation* (no injunctive relief), or *mixed relief litigation* (both injunctive and monetary relief present), based on the remedies sought in the initial complaint files. We focused on complaint files because they represent the formal articulation of plaintiffs' legal demands and serve as the first public signal of escalated litigation risks for facilities in the filing jurisdiction. In each complaint, we coded the *Prayer for Relief* section (see Appendix A for an example), where the requested remedies are enumerated.

We adopted a two-step approach to categorizing each litigation: first by identifying and classifying the individual relief items in each complaint, and then by aggregating item-level classifications to the litigation level. To classify the relief items, we applied textual analysis combining expert validation with a large language model. We first extracted the relief requests from each litigation, excluding boilerplate or irrelevant terms. Two researchers then jointly reviewed a random subset of 27 litigation cases (approximately 20% of the sample) to develop a classification scheme identifying five types of legal remedies: *Injunctive* (compelling/prohibiting specific actions to enforce climate accountability), *Monetary* (financial compensation, monetary penalties, remediation funds, or restitution), *Declaratory* (formal judicial statements on legal rights or obligations),[9] *Costs/Fees* (reimbursement of legal expenses), and *Other* (procedural or

[9] Declaratory relief seeks legal determination that clarifies the rights, obligations, or legal status of the parties, without sanctioning an action or practice against the parties involved. In climate litigation, a common example is seeking a judicial statement that a firm's conduct violates existing statutes, such as "a declaration that Washington Gas's conduct is in violation of the CPPA" in *Client Earth v. Washington Gas Light Co*.

ancillary requests).[10] This classification scheme was then applied to the full dataset using ChatGPT-4o-latest via the OpenAI API, guided by a structured prompt aligned with the defined categories (see Appendix B for the prompt). To assess classification reliability, we compared model-generated classifications with human-coded labels in the initial 27 litigation cases. The model achieved over 98% agreement, supporting the validity of the automated approach.

At the litigation level, we aggregated the item-level classifications to assign each litigation to one of three litigation types. Although the relief items were initially categorized into five legal types to ensure comprehensive coverage, we focused on injunctive and monetary relief because the literature (Aydin Ozden and Khashabi 2023, Shapiro 2016, Vaca and Zúñiga 2025) and our interviews with legal experts confirm that these are the most important remedy forms in litigation practice. The *Declaratory*, *Costs/Fees*, and *Other* relief categories are either nearly ubiquitous or do not entail distinct behavioral implications, and are therefore excluded from our analysis. Appendix Figure A2 presents the annual percentage distribution of climate litigation by type.

Empirical design

To isolate the causal effect of litigation exposure, we adopted a contiguous border discontinuity design based on prior studies (Dube et al. 2010, 2016, Shapiro 2018, Spenkuch and Toniatti 2018, Yildirim et al. 2024). Our design exploited discontinuities in litigation exposure at jurisdictional borders by comparing emissions from facilities in border counties of litigation-exposed jurisdictions (treatment group) with those in contiguous counties of non-litigation jurisdictions (control group), before and after litigation events. The reason is that facilities in these counties are more likely to share similar observable and unobservable characteristics (e.g., climate, economic, social, and political environments) and to experience comparable local

[10] In climate litigation, such relief is often expressed in boilerplate language such as "such other relief as the Court deems just and proper."

economic shocks, serving as good counterfactuals for causal inference. We focused on spillover effects to further strengthen our causal identification. Specifically, the treated facilities were not necessarily named as defendants but operated in jurisdictions where peer firms had faced climate litigation. This approach captured high litigation risks arising from a shared legal environment and mitigated selection bias associated with being named as a defendant.

We implemented this design by first obtaining continuous county pairs straddling jurisdictional borders using U.S. Census boundary files and official court jurisdictional assignments available on each court's website. These pairs were then merged with facility-level GHG emissions data from the EPA to locate facilities in these border counties. Facilities were classified as treated if they were located in border counties of jurisdictions exposed to corporate climate litigation for the first time. To isolate the effect of initial litigation exposure, we restricted the treatment group to facilities in jurisdictions without any subsequent litigation, ensuring that each facility was exposed to at most one treatment. The control group consisted of facilities in adjacent out-of-jurisdiction counties without exposure to any climate litigation throughout the sample period, thus constituting so-called clean controls. By carefully selecting the treatment and control groups, we avoided recent concerns about bias in staggered DID designs when comparing later- to earlier-treated groups (Baker et al. 2022, De Chaisemartin and d'Haultfoeuille 2020, 2023). Figure 2 illustrates this sample construction process using *Lynn v. Peabody Energy Corp* (2015), the first corporate climate litigation seeking purely monetary relief filed in the U.S. District Court for the Eastern District of Missouri. A facility was classified as treated if it was located in Missouri border counties within the Eastern District jurisdiction (highlighted in dark gray, e.g., Adair County, Chariton County) and had at least one facility in an adjacent out-of-jurisdiction county (highlighted in light gray, e.g., Livingston County in the

Western District of Missouri, Winneshiek County in Iowa) available to serve as a control. We further verified that all adjacent jurisdictions including Iowa (north), Arkansas (south), or the Western District of Missouri (west), and the Central and Southern Districts of Illinois (east) faced no climate litigation throughout the sample period. The county pairs in which the control jurisdictions were exposed to litigation were excluded.

Insert Figure 2 about here

Following these procedures, our regression sample was based on six first-time litigations, one injunctive relief litigation, three monetary relief litigations, and two mixed relief litigations, as shown in Appendix Table A1. To enhance analytical precision, we restricted the sample to emissions-intensive sectors, such as electric utilities, natural gas pipelines, paper, and chemicals, excluding facilities in education and professional services (less than 3% of the full sample). Appendix Figure A3 shows the industry distribution of our full sample by treatment and control groups. The two groups exhibit broadly similar distributions across industries, ensuring reasonable comparability.

As a county may border multiple counties from another jurisdiction, a facility may appear multiple times corresponding to each matched county pair, resulting in a panel dataset at the facility-county pair-year level. We further partitioned the full sample into three datasets according to the type of litigation. The final datasets comprised 1,031 facility-county pair-year observations for injunctive relief litigation cases, 7,580 for monetary relief litigation cases, and 40,961 for mixed relief litigation cases. An overview of the definitions and sources of all key

variables is provided in Appendix Table A2. We then estimated the following baseline model separately for each of the three datasets[11]:

$$GHG\ Emission_{ipt} = \alpha + \beta Litigation_{ipt} + X_{it} + X_{pt} + \gamma_i + \gamma_{pt} + \varepsilon_{ict} \quad (1)$$

where $GHG\ Emission_{ipt}$ is the logarithm of facility *i*'s total GHG emissions in county pair *p* in year *t*, and $Litigation_{ipt}$ is an indicator equal to 1 for facility *i* in county pair *p* when peer corporations in the same jurisdiction are litigated in year *t* or after, and 0 otherwise. We created separate indicators for injunctive, monetary, and mixed relief litigation samples. α is the intercept and β is the primary coefficient of interest. We also included a vector of controls to absorb any residual time-varying heterogeneity that might influence emissions. Specifically, X_{it} denotes controls at the facility-year level. We controlled for *Same county sibling* and *Parent colocation* to proxy for community embeddedness because embedded facilities are more likely to be responsive to local environmental concerns (Doshi et al. 2013). The variable *Same county sibling* was measured as the number of same county sibling facilities belonging to the same parents. *Parent colocation* was coded 1 if a facility was collocated with one of its parent firms, and 0 otherwise. As public firms are subject to stricter investor and public scrutiny and ESG disclosure pressures, we also controlled for *Public parent*, a dummy coded 1 if at least one of the facility's parent firms was publicly listed, and 0 otherwise. To proxy for industry peer influences, we included *Co-located industry peer* as well, measured as the number of same-industry facilities in each facility's county. X_{pt} represents county-year level controls. We accounted for local environmental preferences by using public attitudes toward limiting CO_2 emissions (*Public*

[11] We also pooled these three samples to estimate an average emissions response to exposure to climate litigation. As shown in Appendix Table A5, the main effect of *Litigation* in this pooled sample is negative but not statistically significant. This null result suggests that merely analyzing the average effect of climate litigation, without accounting for the heterogeneity of remedial demands, can mask its true and varied impacts on firm emissions.

attitude) obtained from the Yale Program on Climate Change Communication, which estimates the share of residents supporting strict limits on CO_2 emissions. We used *Bachelor percentage* to measure the percentage of working-age residents (25–64 years) with a bachelor's degree, as education levels can influence awareness and support for climate-related issues. We also included *Unemployment rate* among working-age adults to capture the impacts of local economic conditions. Finally, the log-transformed county population (*Population*) was added to control for regional-scale effects on emissions.

Furthermore, γ_i denotes facility fixed effects to control for unobserved time-invariant differences between facilities. γ_{pt} represents county pair-year fixed effects, which are key to our empirical design because they eliminate variation between pairs and use only variation within local areas surrounding a jurisdictional border. ε_{it} is the error term. Clustering of standard errors required special consideration in our design. First, as the level of litigation risk is determined at the jurisdiction level, our variable of interest was constant across all counties within a jurisdiction. This created a downward bias in the standard errors. Second, because a county may border multiple counties on the other side of the border, this generated a mechanical correlation across county-pairs. To account for these conditions, we followed Dube et al. (2010, 2016) and double-clustered standard errors at the jurisdiction and border segment level.

RESULTS

Descriptive statistics

Table 1 presents the summary statistics, including means, standard deviations, and selected percentiles, of the key variables in our full analytical sample. The dependent variable, representing the logarithmic transformation of direct GHG emissions, has a sample mean of 11.35, which corresponds to approximately 84,965 metric tons of CO_2 equivalent. Detailed summary statistics for each of the three analytical subsamples are provided in Appendix Table

A3. Table 2 presents the correlations between our key variables for the full sample. The correlation coefficients between the variables are generally low. The variance inflation factors range from 1.18 to 2.55, well below the common threshold of 10 (Neter et al. 1996), indicating that multicollinearity is not a concern. The correlation matrices for each of the three analytical subsamples are provided in Appendix Table A4.

Insert Tables 1 and 2 about here

Identification assumption validation

A key assumption of our empirical strategy is that facilities in contiguous border counties would exhibit parallel emissions trends in the absence of litigation exposure. To assess the validity of this assumption, we estimated the following event-study specification:

$$GHG\ Emission_{it} = \alpha + \sum_{\tau \in T} I_i(\tau) + X_{it} + X_{pt} + \gamma_i + \gamma_{pt} + \varepsilon_{i,t} \quad (2)$$

where $I_i(\tau)$ is an indicator equal to 1 exactly τ years after (or before if τ is negative) a litigation event. We plotted the estimated coefficients of these annual indicators in Figure 3. As shown in Figures 3a and 3b, we find no evidence of different pre-trends for either injunctive or monetary relief litigation, supporting the parallel trend assumption.

Insert Figure 3 about here

Empirical results

Table 3 presents the main results of the effects of exposure to climate litigation on U.S. facilities' emissions. In Model 1, *Litigation* shows a negative and significant impact on facility emissions (β = -0.398, $p < 0.05$), supporting Hypothesis 1 that following litigation against jurisdictional peers seeking exclusively injunctive relief, facilities activate the financial logic and

reduce their emissions relative to unexposed facilities. The coefficient is not only statistically significant but also economically meaningful, implying an average reduction of 22,654 metric tons of GHG emissions (26% of the standard deviation). The results for Model 2 in Table 3 supports Hypothesis 2. The coefficient of *Litigation* is positive and significant ($\beta = 0.224$, $p < 0.05$), indicating that U.S. facilities increase their emissions following climate litigation against co-located firms seeking purely monetary relief, relative to neighboring facilities that are never exposed to climate litigation. The coefficient corresponds to an estimated increase of 22,197 metric tons of GHG emissions (10% of the standard deviation).

Insert Table 3 about here

The results for mixed relief litigation are presented in Model 3 of Table 3. The coefficient on *Litigation* is negative but not statistically significant ($\beta = -0.136$, $p > 0.1$), suggesting that facilities do not significantly change their emissions in response to such litigation. To test Hypothesis 3a that firms' emissions responses are more pronounced when exposed to injunctive relief litigation than to mixed relief litigation more directly, we pooled the injunctive and mixed relief litigation samples and constructed two indicators: (1) *Litigation* is equal to 1 when peer corporations in the same state face either injunctive or mixed relief litigation in year *t* and after, and 0 otherwise; and (2) $Pure\ relief_{inj}$ is coded 1 for all observations in the injunctive relief litigation sample, and 0 for those in the mixed relief litigation sample. We then reran the baseline model with the interaction term $Litigation * Pure\ relief_{inj}$. As shown in Model 1 of Table 4, the interaction term has a negative and significant coefficient ($\beta = -0.463$, $p < 0.01$), supporting Hypothesis 3a. We applied the same approach to test Hypothesis 3b by pooling the monetary and mixed relief litigation samples and constructing two analogous dummies: (1) *Litigation* takes a

value of 1 when peer corporations in the same jurisdiction face either monetary or mixed relief litigation in year *t* and after, and 0 otherwise; and (2) $Pure\ relief_{mon}$ is coded 1 for all observations in the monetary relief litigation sample, and 0 for those in the mixed relief litigation sample. As shown in Model 2 of Table 4, the interaction term $Litigation * Pure\ relief_{mon}$ has a positive and significant coefficient ($\beta = 0.428$, $p < 0.05$), supporting Hypothesis 3b that litigation seeking exclusively monetary relief generates a stronger effect on increasing emissions than mixed relief litigation. Taken together, the results of Model 3 in Table 3 and Models 1 and 2 in Table 4 support our theorization that pure relief litigation activates coherent institutional logics, while mixed relief litigation introduces conflicting interpretive frameworks that prescribe divergent courses of action, leading to corporate inaction. In the following section, we further explore the mechanisms underlying this inaction.

Insert Table 4 about here

Alternative explanation

Production mobility and relocation. A potential concern is that facilities may appear to reduce or increase their emissions not through internal decarbonization or intensification adjustments but by reallocating pollution-intensive activities between different locations. To address this concern, we examined whether the treatment effects differ depending on the ease of production mobility of facilities. The rationale is that outsourcing and reallocation typically require a certain degree of operational flexibility and geographic mobility; therefore, if the observed reductions and increases in emissions remain in facilities with low production mobility, the results are more likely to reflect actual changes in emissions management practices rather than a geographic shift in emissions. We classified the facilities into high- and low-mobility groups based on industry characteristics (Tomar 2023). Specifically, firms operating in industries such as cement and

concrete product manufacturing, metal ore mining, and natural gas distribution were classified as less mobile, given their reliance on location-specific natural resources and infrastructure. We estimated the treatment effects of the low- and high-mobility groups for injunctive and monetary relief litigation and for mixed relief litigation separately. As shown in Appendix Table A6, changes in emissions are concentrated in facilities in low-mobility industries for both injunctive and monetary relief litigation cases, suggesting that outsourcing or relocation is unlikely to explain the observed effects.

Production scale and economic activity. Another potential explanation for the observed emissions responses is that firms may have adjusted their production scale in response to litigation risks. Specifically, facilities may have reduced their production in response to injunctive relief litigation, mechanically lowering their emissions without implementing substantive decarbonization measures. Conversely, facilities may have increased their production in response to monetary relief litigation, driving emissions upward simply due to higher output levels rather than lower internal abatement efforts. To investigate these possibilities, we analyzed changes in economic activity using the logarithm of volatile organic compounds (VOCs) as a proxy for production levels (Tomar 2023). VOCs are a class of carbon-based chemicals that evaporate readily at room temperature and are closely associated with industrial production processes. Importantly, unlike carbon-related emissions, VOCs are not primarily driven by fossil fuel combustion and tend to remain relatively stable even when facilities improve or reduce their carbon efficiency, making VOC emissions a reliable indicator of production levels. As shown in Appendix Table A7, we find no statistically significant change in VOC emissions following injunctive or monetary relief litigation, suggesting that neither the reduction nor the increase in emissions is explained solely by changes in output levels, strengthening the interpretation that

litigation risks influence firms' emissions strategies through behavioral rather than purely mechanical channels. We also re-estimated the pooled regressions comparing pure and mixed relief litigation cases with VOC emissions as dependent variables. As shown in Appendix Table A8, the interaction terms remain not statistically significant, confirming that the different effects of pure versus mixed relief litigation on emissions are not confounded by production-level changes.

Mixed relief litigation: inhibited logic activation or offsetting effects. To investigate whether the absence of emissions responses to mixed relief litigation reflects inhibited logic activation or rather the simultaneous activation of conflicting logics whose effects offset each other, we tested whether the estimated effect varies with the intensity of injunctive or monetary relief in the mixed relief litigation sample. The rationale is that if inaction results from offsetting effects, then as one type of relief becomes more dominant in remedial requests, its corresponding logic should resonate more strongly, leading to clearer activation and ultimately prevailing in shaping firms' responses. Conversely, if no response is observed even when one form of relief represents a larger share, this would point to inhibited logic activation as the more plausible mechanism. We measured *Injunctive relief intensity* as the proportion of words devoted to injunctive relief items in the relief section of a complaint. Similarly, *Monetary relief intensity* was measured as the proportion of words devoted to monetary relief items in the relief section of a complaint. As shown in Models 1 and 2 of Appendix Table A9, the coefficients of the interaction terms *Litigation * Injunctive Relief Intensity* and *Litigation * Monetary Relief Intensity* are not statistically significant, suggesting that inaction by facilities exposed to mixed relief litigation is more likely due to inhibited logic activation.

GHG emissions by source. To determine the sources of change in emissions, we decomposed total GHG emissions into three components: energy use, production, and waste management (Lee and Kaul 2025). We expect facilities under litigation pressure to adjust their emissions primarily from sources that are both more visible to regulators and more influential in shaping their overall emissions footprint. Given that emissions related to energy use constitute the largest share of total GHG emissions (70% on average in our sample), they are likely to be the first and most cost-effective margin that firms adjust when facing litigation risks. Models 1–3 of Appendix Table A10 show that injunctive relief litigation leads to a significant reduction in energy-related emissions (β = -0.385, $p < 0.05$), while its effects on production and waste emissions are small in magnitude and not statistically significant. This pattern is consistent with injunctive relief litigation triggering climate logic, encouraging facilities to demonstrate visible reductions in their primary source of emissions. In contrast, Model 4 of Appendix Table A10 shows that monetary relief litigation significantly increases emissions related to energy use (β = 0.569, $p < 0.05$), suggesting that when financial penalties are interpreted as the cost of doing business, facilities may increase such emissions to recover the costs. Finally, Models 7 to 9 of Appendix Table A10 reveal that mixed relief litigation has no significant effects across all emission sources, consistent with the conclusion that exposure to mixed relief litigation leads to inaction. The results in Appendix Table A11 further confirm that changes in emissions related to energy use are more pronounced when firms are exposed to injunctive and monetary relief litigation than to mixed relief litigation.

GHG emissions by fuel type. We also tested whether adjustments in emissions differ by fuel type, as different fuels vary in their carbon intensity, cost, and ease of substitution. To test this, we decomposed GHG emissions related to energy use by fuel type: coal, petroleum, and natural

gas. Models 1 to 3 of Appendix Table A12 show that injunctive relief litigation leads to a significant reduction in coal-related emissions (β = -0.564, $p < 0.05$), consistent with facilities seeking to reduce their emissions by targeting the most carbon-intensive fuel. Similarly, facilities significantly reduce their natural gas emissions (β = -0.199, $p < 0.1$), which on average accounts for 78% of all emissions related to energy use in our sample, suggesting a targeted effort to lower their overall GHG emissions. However, we find no significant change in petroleum-related emissions, potentially because its use is often linked to transportation or specialized machinery in industrial settings, making substitution or adjustment difficult in the short term. Models 4 to 6 reveal that when exposed to monetary relief litigation, facilities significantly increase their emissions from both coal (β = 1.077, $p < 0.001$) and natural gas (β = 0.156, $p < 0.1$). These patterns align with the activation of financial logic, whereby facilities relax costly emission controls to preserve financial buffers amid perceived financial risks. Coal, as the most carbon-intensive yet cheapest energy source, offers an immediate way to reduce costs. The rise in natural gas emissions is likely to reflect its dominant share in facilities' overall energy use, with the relaxation of emission controls manifesting most prominently in natural gas emissions. Petroleum-related emissions again remain unaffected, reinforcing the notion that petroleum use may be less elastic in operational adjustments. Finally, Models 7 to 9 indicate that mixed relief litigation has no statistically significant effect on emissions from any fuel type, further supporting the interpretation that conflicting cues lead to inaction. The results of Appendix Table A13 further confirm that these changes in coal and natural gas emissions are more pronounced in the case of injunctive and monetary relief litigation than in the case of mixed relief litigation.

Legal threat intensity. We further examine whether our findings could alternatively be explained by variation in the perceived intensity of legal threats across litigation types. One

might argue that injunctive relief litigation, which can disrupt operations, poses a stronger threat and therefore induces emission reductions, whereas monetary relief litigation presents weaker threats and thus instead leads facilities to increase emissions. However, both qualitative and quantitative evidence suggest this explanation is unlikely. First, insights from our expert interview indicate that perceived litigation threats are not systematically tied to the type of requested relief. Legal experts emphasized that both injunctive relief litigation and high-value monetary relief litigations are "inherently stressful and costly to manage," and even small monetary claims can trigger "copycat litigation" and create systemic risk exposure. Firms are therefore incentivized to treat all forms of litigation with comparable seriousness, albeit through different actions. This perspective reduces the likelihood that a "strong vs. weak threat" dynamic across litigation types accounts for our results. Second, litigation outcomes provide little evidence that certain litigation types are categorically more threatening. If litigation type reflected differences in threat intensity, one would expect plaintiffs to prevail more often in certain categories. Yet, as summarized in Appendix Table A1, plaintiffs do not prevail more frequently in any particular category of litigation. Finally, we further test whether variation in actual legal outcomes within each litigation type explains facilities' responses. If litigation threat were the operative mechanism, firms should react more strongly when the litigation imposes greater realized risk (e.g., when the plaintiff prevails) than when it is voluntarily dismissed or stayed. Empirical evidence contradicts this prediction. In injunctive relief litigation, the only litigation in our sample was decided in favor of the defendant, yet exposed facilities still reduced emissions. In monetary relief litigations, emissions increased regardless of litigation outcomes. As shown in Model 1 and 2 of Appendix Table A14, facilities exposed to two

Missouri litigations (defendant prevailed or litigation stayed)[12] and the Washington litigation (voluntarily dismissed) all increased emissions. Likewise, in mixed relief litigations, emissions remained unchanged regardless of whether the defendant prevailed or the litigation was partially successful, as presented in Model 3 and 4 of Table A14. Together, the evidence is inconsistent with a threat-based explanation but aligns with our theoretical mechanism: it is the interpretive logic activated by the language of requested relief that drives the observed divergence in emissions responses.

Robustness checks

To enhance the credibility of our empirical findings and mitigate concerns that our results may be driven by random variation or model-specific artifacts, we conducted several robustness checks. First, we exploited the disaggregated emissions data provided by the EPA's GHG Reporting Program, which reports facility-level emissions separately for CH_4, CO_2, and N_2O. We re-estimated our main models using the logarithm of each of these specific emissions measures as dependent variables. As shown in Appendix Table A15, our main results remain largely robust to these alternative measures. Moreover, to address concerns that our results may be biased by unobserved industry- or parent firm-specific trends that vary over time, we re-estimated our main models by incorporating industry-by-year and parent firm-by-year fixed effects. In particular, these time-variant fixed effects are helpful in alleviating concerns on whether financial (e.g., size, profitability, growth) and non-financial factors (e.g., political ideology, reputation, susceptibility to activism) at the firm level may confound the results. As shown in Appendix Table A16, our results remain robust to these alternative fixed effects specification. Finally, we constructed an alternative sample where treatment and control groups were defined based on

[12] The two litigations are analyzed jointly as both were filed within the same legal jurisdiction.

industry peers rather than shared legal jurisdiction. In this sample, treated facilities were those operating in the same six-digit industry as the defendant firms, while control facilities were in the same two-digit industry but different six-digit industries. As shown in Appendix Table A17, industry peers showed no significant response to either pure or mixed relief litigation. Collectively, these robustness checks indicate that our results hold across alternative variable definitions, model specifications, and peer classifications, reinforcing confidence in the credibility of our conclusions.

DISCUSSION AND CONCLUSION

This study sheds light on corporate emissions responses to climate litigation risks, a rising yet surprisingly underexplored material risk for corporations. Drawing on insights from the perspective of institutional logics as a cultural toolkit (Swidler 1986, Thornton et al. 2012), we theorize that the vocabularies used in litigations' remedial requests activate distinct institutional logics available in firms' cultural repertoires. These activated logics function as interpretive filters through which firms assess litigation risks and determine their emissions responses. To test this framework, we compile a new dataset linking U.S. climate litigation to facility-level GHG emissions from 2010 to 2023 and implement a contiguous border discontinuity design to advance causal identification. Our analyses show that facilities exposed to injunctive relief litigation activate a climate logic, perceiving such litigation as mandating climate responsibility and consequently reducing their local emissions. In contrast, facilities exposed to monetary relief litigation activate a financial logic, viewing such litigation as financially motivated and as an opportunity to "buy out" the pressures, ultimately increasing their emissions to recoup their potential financial liabilities. Moreover, facilities exposed to mixed relief litigation that blends injunctive and monetary relief show no systematic emissions responses, as they struggle to

activate an interpretive system that combines competing logics. As one of the first empirical studies linking the content of climate litigation to firms' emissions decisions, our analysis makes several important contributions to the study of climate risk and organizational theories.

First, we reconcile mixed evidence on the climate impact of corporate climate litigation by uncovering the causal mechanisms through which the language of remedial requests translates into distinct emissions outcomes. Beyond treating climate litigation as monolithic pressures, we extend research on corporate responses to climate risks by showing that climate litigation constitutes a novel and complex risk whose consequences diverge depending on how remedial requests are structured and interpreted. In particular, our finding that monetary relief litigation can inadvertently backfire calls for attention to the unintended consequences of relying solely on financial compensation as a climate governance tool.

Second, we highlight that corporate climate litigation generates jurisdiction-wide spillovers, revealing an overlooked channel of impact: peers within the same jurisdiction adjust their emissions in economically meaningful ways. Our findings indicate that climate litigation can have a ripple effect on entire clusters of firms that share legal jurisdictions, transforming isolated litigation cases into jurisdiction-wide governance events. Failing to account for these spillover effects risks underestimating the aggregate effect of litigation.

Third, we enrich the literature on institutional logics by showing the effect of contingent activation of multiple logics. Studies have largely treated logics as explanatory typologies for understanding real-world phenomena, either emphasizing the constraining effects of multiple logics (Lee and Lounsbury 2015, Vedula et al. 2022) or highlighting multiple logics as a resource that actors can use freely (McPherson and Sauder 2013). We instead conceptualize logics as contingently activated cultural resources. Crucially, we show that their activation is

constrained by external linguistic cues: a logic only becomes operative when coherent cues resonate with it. Similarly, Almandoz (2014) shows that the activation of logics is contingent on the size of the group. Although more research is needed, our reconceptualization shifts the theoretical focus from "which logics are present" to "when and why do specific logics become operative?" By illustrating how external linguistic cues drive situational activation and muting of logics as critical mechanisms through which logics materialize into organizational behavior, our study contributes to a more dynamic and contingent understanding of this literature.

Furthermore, our findings contrast with the literature on institutional complexity (Greenwood et al. 2011). Although the literature predicts a combination of different institutional effects from multiple logics (Lee and Lounsbury 2015, Vedula et al. 2022), we show that actors are likely to experience institutional ambiguity, leading to inaction, rather than instantiating multiple logics simultaneously. The reason is that in prior studies, multiple logics have already been activated, thus presenting relatively durable and visible effects. Our study questions this assumption and shows that in complex and uncertain settings, logic activation is contingent on social conditions.

Finally, our findings have important implications for practitioners. For managers, climate litigation represents a non-trivial and complex source of risk. Effective risk management requires paying attention not only to the probability of being sued but also to the language of remedial requests. Moreover, managers should monitor litigation against their jurisdictional peers, because limiting risk assessments to direct exposure can severely underestimate firms' true legal vulnerability. For plaintiffs and advocacy groups, litigation is more likely to trigger meaningful change when remedial requests are designed to align with and activate climate logic. Monetary relief, at least at the current stage of climate litigation, is prone to backfire and should be used with caution as a standalone strategy. For policymakers, the observed jurisdiction-wide spillover

effects suggest that strategic interventions in key jurisdictions can produce leverage points, amplifying the role of litigation as a governance mechanism for systemic change.

Our study also has limitations that open important avenues for future research. First, our theorization and empirical tests focus on the language of remedial requests. Therefore, future research could explore other linguistic content, such as factual background or scientific evidence that may influence corporate responses beyond emissions. Second, our results are likely to constitute a conservative assessment of the overall impact of climate litigation. As one legal expert we interviewed pointed out, many disputes are negotiated or settled before they reach court. Future research could incorporate settlements or pre-trial communications to reveal how these non-public interactions shape observable firm behavior. Finally, our analyses focus on U.S. climate litigation and its impact on local emissions. Extending our framework to other legal systems and emerging economies is a crucial next step in testing the boundary conditions of the mechanisms we identify.

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Table 1. Summary statistics

Variable	Mean	Stan. Dev.	10th percentile	Median	90th percentile
(1) GHG Emission	11.35	1.96	9.877	11.12	13.92
(2) Litigation	0.36	0.48	0	0	1
(3) Parent colocation	0.64	0.52	0	1	1
(4) Public parent	0.60	0.52	0	1	1
(5) Same county sibling	1.45	1.07	1	1	3
(6) Same county facility	51.11	73.03	6	20	176
(7) Public attitude	59.05	10.49	45.21	59.67	71.69
(8) Bachelor percentage	35.10	18.61	7.83	45.12	52.71
(9) Unemployment rate	5.49	1.62	3.90	5.20	8
(10) Population	12.02	2.30	9.39	11.89	15.33
Observations	49,572				

Table 2. Correlation table

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) GHG Emission	1.000								
(2) Litigation	0.048	1.000							
(3) Parent colocation	0.051	0.012	1.000						
(4) Public parent	-0.081	0.032	0.002	1.000					
(5) Same county sibling	-0.058	-0.027	0.060	0.172	1.000				
(6) Same county facility	-0.031	0.119	-0.036	-0.069	0.189	1.000			
(7) Public attitude	-0.068	0.280	-0.063	-0.070	0.008	0.261	1.000		
(8) Bachelor percentage	0.046	0.085	-0.009	0.065	-0.033	0.025	0.044	1.000	
(9) Unemployment rate	-0.013	-0.168	-0.034	-0.068	-0.022	0.012	-0.094	-0.109	1.000
(10) Population	0.030	0.206	-0.104	-0.129	0.082	0.550	0.117	0.175	0.021

Two tailed tests.

Table 3. Climate litigation and GHG emissions

	Injunctive relief litigation	**Monetary relief litigation**	**Mixed relief litigation**
VARIABLE	M1	M2	M3
Litigation	-0.398•	0.224•	-0.128
	(0.131)	(0.086)	(0.068)
Parent colocation	-0.555	-0.013	0.017
	(0.381)	(0.089)	(0.039)
Public parent	-0.570	-0.228•	-0.083•
	(0.517)	(0.096)	(0.016)
Same county sibling	0.004	0.183••	0.022••
	(0.002)	(0.048)	(0.001)
Co-located industry peer	0.001	0.039	0.000
	(0.014)	(0.038)	(0.000)
Public attitude	-0.026	-0.026+	-0.003
	(0.017)	(0.012)	(0.004)
Bachelor ratio	0.028	0.003	-0.009•
	(0.019)	(0.071)	(0.002)
Unemployment ratio	0.123	0.075	0.002
	(0.072)	(0.040)	(0.004)
Population (lg)	3.362••	-0.287	-0.019
	(0.658)	(0.181)	(0.016)
Facility FE	YES	YES	YES
County pair-Year FE	YES	YES	YES
Constant	11.776•••	11.401•••	11.411•••
	(1.105)	(0.041)	(0.008)
Observations	1,031	7,580	40,961
R-Squared	0.835	0.916	0.811
Adj R-squared	0.774	0.892	0.784
Within R-squared	0.081	0.023	0.001

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < .1$, • $p < .05$; •• $p < .01$; ••• $p < .001$; two-tailed tests.

Table 4. Climate litigation and GHG emissions: Pure vs. mixed relief litigation

	Injunctive relief litigation vs. Mixed relief litigation	**Monetary relief litigation vs. Mixed relief litigation**
VARIABLE	M1	M2
Litigation	-0.095	-0.154
	(0.088)	(0.145)
Litigation * Pure relief$_{inj}$	-0.463••	
	(0.114)	
Litigation * Pure relief$_{mon}$		0.428•
		(0.174)
Parent colocation	-0.006	0.018
	(0.054)	(0.032)
Public parent	-0.094•••	-0.104•••
	(0.008)	(0.020)
Same county sibling	0.030•••	0.026••
	(0.005)	(0.006)
Co-located industry peer	0.002•	-0.000
	(0.001)	(0.000)
Public attitude	-0.009••	-0.009
	(0.003)	(0.010)
Bachelor ratio	0.007••	-0.007
	(0.002)	(0.005)
Unemployment ratio	0.011	-0.077
	(0.028)	(0.120)
Population (lg)	0.900	0.300
	(1.006)	(0.510)
Facility FE	YES	YES
County pair-Year FE	YES	YES
Constant	11.339•••	11.405•••
	(0.117)	(0.016)
Observations	41,992	48,541
R-Squared	0.806	0.825
Adj R-squared	0.801	0.797
Within R-squared	0.004	0.002

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < .1$, • $p < .05$, •• $p < .01$, ••• $p < .001$; two-tailed tests.

Figure 1. Global trends in corporate climate litigation

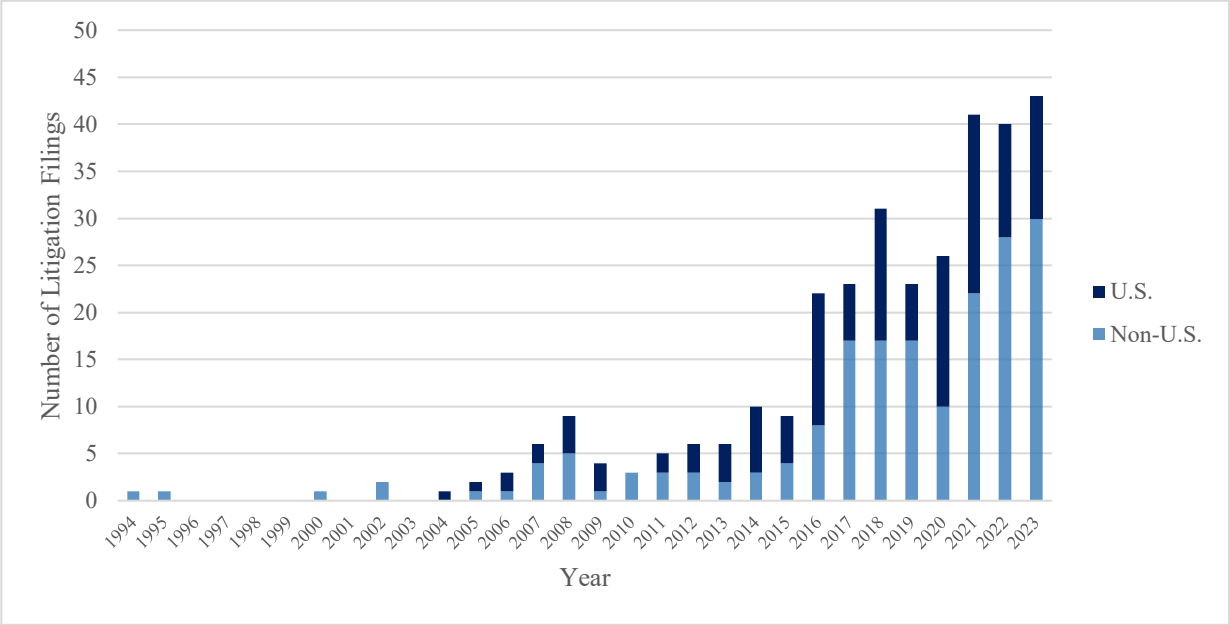
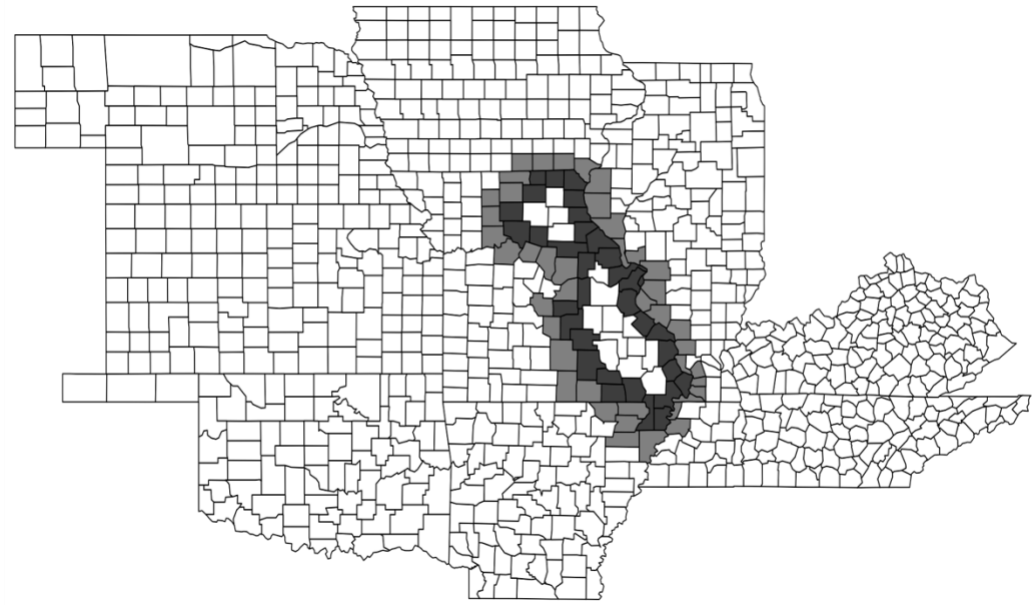


Figure 2. Contiguous county pairs straddling the U.S. District Court for the Eastern District of Missouri



Note: Dark gray areas represent border counties within the U.S. District Court for the Eastern District of Missouri, facilities located in these counties constitute the treated group. Light gray areas represent contiguous counties outside this district, facilities located in these counties constitute the control group.

Figure 3. Parallel trend

Figure 3a. Parallel trend for injunctive relief litigation

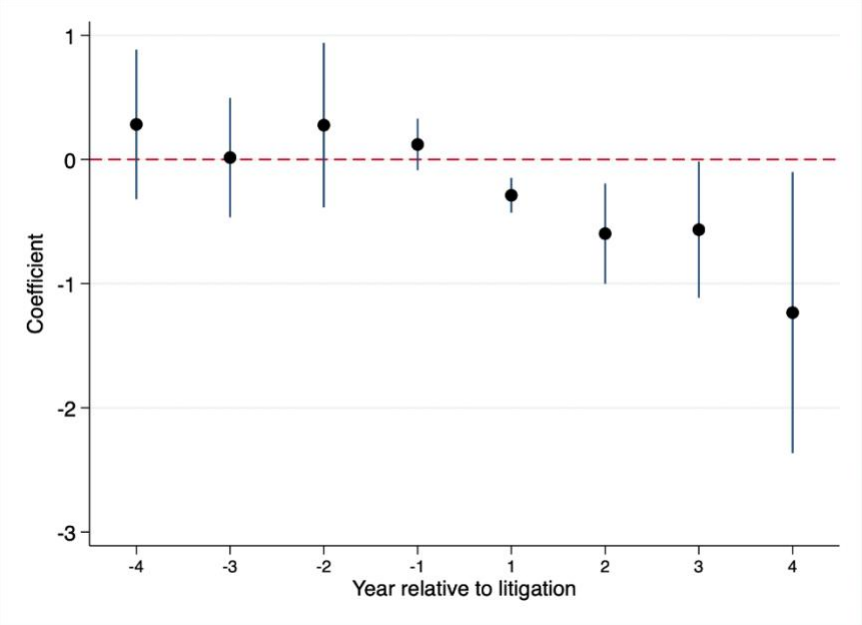
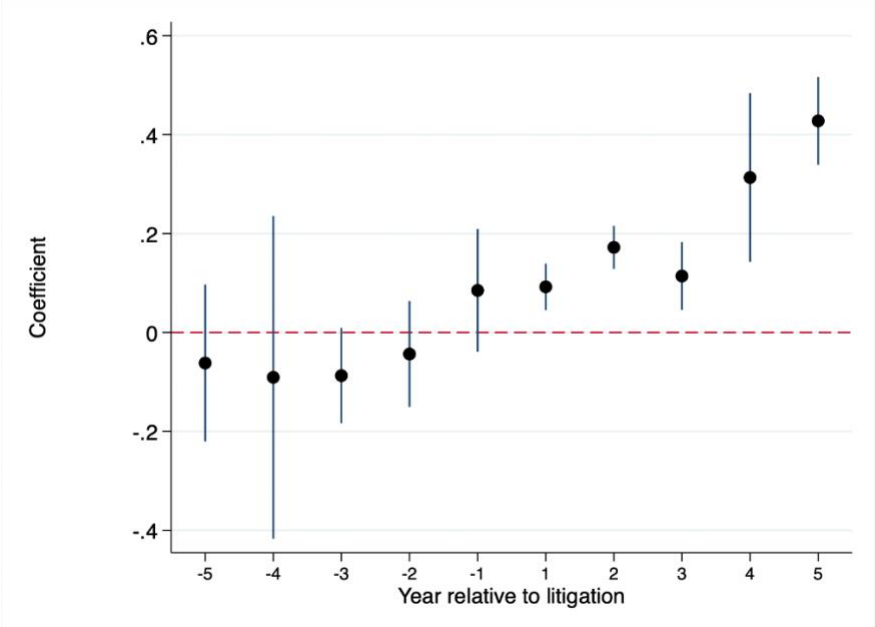


Figure 3b. Parallel trend for monetary relief litigation



APPENDIX

Table A1. Empirical sample: Climate litigation cases, treatment and control group

Case Type	Case Name	Filing Year	Venue	Treat	Control	Case Outcome
Injunctive-relief litigation	Tosdal v. NorthWestern Corp.	2019	United States District Court for the District of Montana	MT	ID; WY; ND; SD	Dismissed: Defendant prevailed
Monetary-relief litigation	Lynn v. Peabody Energy Corp.	2015	United States District Court for the Eastern District of Missouri	MO	IA; AR; IL; TN; KY; MO	Dismissed: Defendant prevailed
	Roe v. Arch Coal, Inc.	2015	United States District Court for the Eastern District of Missouri	MO	IA; AR; IL; TN; KY; MO	Stayed
	King County v. BP p.l.c.	2018	Washington State Superior Court, King County Removed to: United States District Court Western District of Washington[13]	WA	WA	Voluntary dismissal
Mixed-relief litigation	Fentress v. Exxon Mobil Corp.	2016	The United States District Court for The Southern District of Texas Houston Division	TX	TX	Dismissed: Defendant prevailed
	Ramirez v. Exxon Mobil Corp.	2016	United States District Court Northern District of Texas Dallas Division	TX	NM; OK; TX	Motion to certify class granted in part and denied in part

[13] For this case, jurisdictional boundaries and peers are identified using the United States District Court Western District of Washington as the case was moved to this district court in the same year it was filed and stayed there until it was ultimately dismissed three years later.

Table A2 Variable Definition

Variable	Measurement	Data Source
GHG emission	Natural logarithm of the facility's direct GHG emission in a given year.	EPA GHG Reporting Program
Litigation	1 if peer corporations in the same legal jurisdiction are litigated in a given year or thereafter, and 0 otherwise.	The Sabin Center for Climate Change Law at Columbia University; U.S. Census boundary files; Court's official website
Same county sibling	The number of same-county sibling facilities owned by the same parent firms in a given year.	EPA GHG Reporting Program
Parent colocation	1 if a facility is collocated with at least one of its parent firms in a given year, and 0 otherwise.	EPA GHG Reporting Program
Public parent	1 if at least one of the facility's parent firms is publicly listed in a given year, and 0 otherwise.	EPA GHG Reporting Program; Compustat
Co-located industry peer	The number of same-industry facilities operating in the facility's county in a given year.	EPA GHG Reporting Program
Public attitude	The share of residents supporting strict limits on CO_2 emissions in a county and a given year.	Yale Program on Climate Change Communication
Bachelor percentage	The percentage of working-age residents (25-64 years) with a bachelor's degree in a county and a given year.	U.S. census bureau
Unemployment rate	The percentage of unemployed working age adults (25-64 years) in a county and a given year.	U.S. census bureau
Population	Natural logarithm of county population in a given year.	U.S. census bureau

Table A3. Summary statistics

Variable	Mean	Stan. Dev.	10th percentile	Median	90th percentile
Panel A. Injunctive-relief litigation					
GHG Emission	11.14	1.53	10.02	11.12	12.94
Litigation	0.11	0.32	0	0	1
Parent colocation	0.16	0.36	0	0	1
Public parent	0.56	0.50	0	1	1
Same county sibling	1.91	1.99	1	1	4
Co-located industry peer	5.82	5.97	2	3	15
Public attitude	55.57	9.50	43.16	55.54	67.90
Bachelor percentage	38.75	19.08	10.07	49.93	56.45
Unemployment rate	4.51	4.65	0	3.40	9.60
Population	10.16	1.05	9.28	10.28	11.64
Observations	1,031				
Panel B. Monetary-relief litigation					
GHG Emission	11.39	2.18	10.15	11.21	14.40
Litigation	0.38	0.49	0	0	1
Parent colocation	0.46	0.51	0	0	1
Public parent	0.46	0.51	0	0	1
Same county sibling	1.08	0.37	1	1	1
Co-located industry peer	12.29	7.58	6	8	24
Public attitude	63.98	8.19	54.45	64.47	73.85
Bachelor percentage	36.66	18.19	7.66	45.85	54.31
Unemployment rate	5.77	1.82	3.80	5.20	8.70
Population	11.75	1.57	9.81	11.76	13.81
Observations	7,580				
Panel C. Mixed-relief litigation					
Emission	11.35	1.92	9.95	11.10	13.88
Litigation	0.36	0.48	0	0	1
Monetary relief intensity	0.51	0.16	0.36	0.36	0.67
Injunctive relief intensity	0.08	0.04	0.04	0.12	0.12
Parent colocation	0.69	0.51	0	1	1
Public parent	0.63	0.52	0	1	1
Same county sibling	1.53	1.15	1	1	3
Co-located industry peer	60.35	78.16	7	24	208
Public attitude	58.22	10.64	43.94	58.86	71.69
Bachelor percentage	34.7	18.61	7.83	44.82	52.32
Unemployment rate	5.49	1.55	3.90	5.20	8
Population	12.14	2.41	9.26	11.93	15.34
Observations	40,961				

Table A4. Correlation table

Panel A. Injunctive relief litigation

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Emission	1.000								
(2) Litigation	-0.048	1.000							
(3) Parent colocation	0.085	-0.041	1.000						
(4) Public parent	-0.118	-0.016	-0.353	1.000					
(5) Same county sibling	0.014	-0.148	0.076	0.124	1.000				
(6) Co-located industry peer	0.001	0.257	0.081	-0.001	0.137	1.000			
(7) Public attitude	0.029	-0.102	-0.058	0.252	0.274	0.349	1.000		
(8) Bachelor percentage	-0.031	-0.112	0.013	-0.057	0.078	-0.170	-0.055	1.000	
(9) Unemployment rate	0.050	-0.075	-0.005	-0.094	-0.097	-0.176	-0.258	-0.047	1.000
(10) Population (lg)	0.188	-0.053	0.185	-0.322	0.033	0.006	-0.289	0.065	-0.049

Panel B. Monetary relief litigation

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Emission	1.000								
(2) Litigation	0.105	1.000							
(3) Parent colocation	-0.059	0.069	1.000						
(4) Public parent	0.011	-0.026	-0.377	1.000					
(5) Same county sibling	-0.082	-0.083	0.177	-0.143	1.000				
(6) Co-located industry peer	-0.022	-0.084	0.032	0.251	0.111	1.000			
(7) Public attitude	-0.035	0.392	-0.021	0.030	0.017	-0.044	1.000		
(8) Bachelor percentage	-0.104	0.238	0.332	-0.142	0.135	0.112	0.187	1.000	
(9) Unemployment rate	0.017	-0.082	-0.152	-0.058	-0.032	-0.005	0.291	-0.247	1.000
(10) Population (lg)	-0.090	-0.041	0.333	-0.154	0.186	0.193	0.026	-0.034	0.082

Panel C. Mixed relief litigation

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Emission	1.000								
(2) Litigation	0.041	1.000							
(3) Parent colocation	0.056	0.007	1.000						
(4) Public parent	-0.094	0.028	0.047	1.000					
(5) Same county sibling	-0.067	-0.029	0.033	0.169	1.000				
(6) Co-located industry peer	-0.035	0.132	-0.106	-0.115	0.161	1.000			
(7) Public attitude	-0.044	0.315	-0.050	-0.068	0.047	0.143	1.000		
(8) Bachelor percentage	0.069	0.204	0.015	0.059	-0.033	0.043	0.149	1.000	
(9) Unemployment rate	-0.029	-0.180	-0.062	-0.067	-0.017	0.012	-0.233	-0.113	1.000
(10) Population (lg)	0.046	0.114	-0.152	-0.178	0.072	0.566	0.144	0.171	0.007

Note: Two tailed tests.

Table A5. Climate litigation and GHG emission: Pooled sample

VARIABLES	**GHG Emission**
Litigation	-0.063
	(0.073)
Parent colocation	0.029
	(0.075)
Public parent	-0.133*
	(0.063)
Same county sibling	0.002
	(0.002)
Co-located industry peer	0.000*
	(0.000)
Public attitude	-0.004
	(0.003)
Bachelor ratio	-0.026
	(0.126)
Unemployment ratio	0.128*
	(0.059)
Population (lg)	0.034
	(0.197)
Facility FE	YES
County pair-Year FE	YES
Constant	11.558***
	(0.169)
Observations	49,572
R-Squared	0.818
Adj R-squared	0.813
Within R-squared	0.004

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Table A6. Alternative explanation: Outsourcing

	GHG Emission (log)					
	Injunctive-relief litigation		**Monetary-relief litigation**		**Mixed-relief litigation**	
	Immobile	**Mobile**	**Immobile**	**Mobile**	**Immobile**	**Mobile**
VARIABLES	M1	M2	M3	M4	M5	M6
Litigation	-0.572***	-0.170	0.271*	0.620	-0.202	0.087
	(0.064)	(0.293)	(0.103)	(0.969)	(0.116)	(0.045)
Controls	YES	YES	YES	YES	YES	YES
Facility FE	YES	YES	YES	YES	YES	YES
County pair-Year FE	YES	YES	YES	YES	YES	YES
Constant	11.549***	10.029***	11.461***	11.392***	10.897***	12.627***
	(0.590)	(0.861)	(0.296)	(0.445)	(0.026)	(0.027)
Observations	682	288	2,690	4,181	21,917	17,164
R-squared	0.879	0.856	0.891	0.921	0.684	0.868
Adj R-squared	0.815	0.762	0.833	0.890	0.610	0.848
Within R-squared	0.266	0.078	0.011	0.023	0.007	0.002

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Table A7. Alternative explanation: Productivity

	VOC (log)		
	Injunctive-relief litigation	**Monetary-relief litigation**	**Mixed-relief litigation**
VARIABLES	M1	M2	M3
Litigation	-0.027	0.038	-0.040
	(0.373)	(0.043)	(0.037)
Controls	YES	YES	YES
Facility FE	YES	YES	YES
County pair-Year FE	YES	YES	YES
Observations	1,031	7,580	40,961
Constant	0.276***	0.417***	0.379***
	(0.057)	(0.030)	(0.009)
R-squared	0.987	0.980	0.991
Adj R-squared	0.965	0.975	0.989
Within R-squared	0.007	0.008	0.001

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Table A8. Alternative explanation: Productivity effects of pure- vs. mixed-relief litigation

	VOC (log)	
	Injunctive-relief litigation vs. Mixed-relief litigation	**Monetary-relief litigation vs. Mixed-relief litigation**
VARIABLES	M1	M2
Litigation	-0.001	-0.039***
	(0.005)	(0.006)
Litigation * Pure relief$_{inj}$	-0.000	
	(0.006)	
Litigation * Pure relief$_{mon}$		0.013
		(0.065)
Controls	YES	YES
Facility FE	YES	YES
County pair-Year FE	YES	YES
Observations	41,992	48,541
Constant	0.366***	0.385***
	(0.003)	(0.004)
R-squared	0.999	0.989
Adj R-squared	0.999	0.988
Within R-squared	0.003	0.001

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Table A9. Alternative explanation: Interpretive ambiguity vs. offsetting effects in mixed-relief litigation

	GHG Emission (log)	
VARIABLES	M1	M2
Litigation	-0.249	-0.011
	(0.172)	(0.183)
Litigation * Injunctive relief intensity	1.125	
	(1.125)	
Litigation * Monetary relief intensity		-0.276
		(0.267)
Controls	YES	YES
Facility FE	YES	YES
County pair-Year FE	YES	YES
Constant	11.602***	10.850***
	(0.198)	(0.296)
Observations	40,961	40,961
R-Squared	0.811	0.811
Adj R-squared	0.784	0.784
Within R-squared	0.002	0.002

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Table A10. Climate litigation and GHG emission by source

	GHG Emission (log)								
	Injunctive-relief litigation			**Monetary-relief litigation**			**Mixed-relief litigation**		
	Energy	Prod	Waste	Energy	Prod	Waste	Energy	Prod	Waste
VARIABLES	M1	M2	M3	M4	M5	M6	M7	M8	M9
Litigation	-0.385*	0.018	-0.024	0.569*	0.005	0.019	-0.075	-0.016	-0.038
	(0.125)	(0.019)	(0.053)	(0.229)	(0.051)	(0.092)	(0.086)	(0.021)	(0.026)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Facility FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
County pair-Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	11.410***	1.224***	0.539***	8.968***	2.806***	2.149***	9.717***	1.595***	1.181***
	(0.496)	(0.140)	(0.068)	(0.047)	(0.073)	(0.017)	(0.264)	(0.069)	(0.070)
Observations	1,031	1,031	1,031	7,580	7,580	7,580	40,961	40,961	40,961
R-Square	0.937	0.992	0.999	0.953	0.967	0.982	0.951	0.987	0.999
Adj R-squared	0.914	0.989	0.999	0.950	0.965	0.981	0.944	0.985	0.998
Within R-squared	0.069	0.005	0.042	0.039	0.007	0.005	0.002	0.001	0.006

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Table A11. Climate litigation and GHG emission by source: Pure- vs. mixed-relief litigation

	GHG Emission (log)					
	Injunctive-relief litigation vs. Mixed-relief litigation			Monetary-relief litigation vs. Mixed-relief litigation		
	Energy	Prod	Waste	Energy	Prod	Waste
VARIABLES	M1	M2	M3	M4	M5	M6
Litigation	-0.053	-0.056***	-0.054	-0.059	0.004	-0.116
	(0.058)	(0.006)	(0.034)	(0.063)	(0.028)	(0.248)
Litigation * Pure relief$_{inj}$	-0.501***	0.0326	0.081			
	（0.096）	（0.027）	（0.095）			
Litigation * Pure relief$_{mon}$				0.482*	0.232	0.052
				(0.166)	(0.213)	(0.100)
Controls	YES	YES	YES	YES	YES	YES
Facility FE	YES	YES	YES	YES	YES	YES
County pair-Year FE	YES	YES	YES	YES	YES	YES
Constant	9.682***	1.450***	1.323***	9.219***	1.858***	1.293***
	(0.667)	(0.023)	(0.072)	(0.062)	(0.071)	(0.014)
Observations	41,922	41,922	41,922	48,541	48,541	48,541
R-Square	0.953	0.989	0.996	0.953	0.984	0.993
Adj R-squared	0.952	0.989	0.996	0.946	0.981	0.992
Within R-squared	0.004	0.002	0.004	0.002	0.002	0.006

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Table A12. Climate litigation and GHG emission by fuel type

	GHG Emission (log)								
	Injunctive-relief litigation			**Monetary-relief litigation**			**Mixed-relief litigation**		
	Coal	Petro.	Natural Gas	Coal	Petro.	Natural Gas	Coal	Petro.	Natural Gas
VARIABLES	M1	M2	M3	M4	M5	M6	M7	M8	M9
Litigation	-0.564*	0.323	-0.199+	1.077***	0.161	0.156+	0.036	0.117	-0.170
	(0.143)	(0.300)	(0.091)	(0.128)	(0.116)	(0.082)	(0.022)	(0.187)	(0.113)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Facility FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
County pair-Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	7.610***	2.310	10.745***	3.940***	1.779***	8.601***	2.379***	1.889***	10.636***
	(0.546)	(1.198)	(1.218)	(0.026)	(0.088)	(0.056)	(0.019)	(0.165)	(0.123)
Observations	945	945	945	6,844	6,844	6,844	33,678	33,678	33,678
R-Square	0.972	0.980	0.936	0.944	0.881	0.972	0.992	0.840	0.924
Adj R-squared	0.962	0.973	0.912	0.924	0.812	0.971	0.991	0.814	0.912
Within R-squared	0.057	0.060	0.045	0.031	0.033	0.026	0.001	0.001	0.003

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Table A13. Climate litigation and GHG emission by fuel type: Pure- vs. mixed-relief litigation

	GHG Emission (log)					
	Injunctive-relief litigation vs. Mixed-relief litigation			Monetary-relief litigation vs. Mixed-relief litigation		
	Coal	Petro.	Natural Gas	Coal	Petro.	Natural Gas
VARIABLES	M1	M2	M3	M4	M5	M6
Litigation	-0.018	0.246	-0.087**	-0.029	0.091	-0.071
	(0.049)	(0.294)	(0.024)	(0.045)	(0.201)	(0.099)
Litigation * Pure relief$_{inj}$	-0.349+	-0.165	-0.618***			
	(0.168)	(0.231)	(0.102)			
Litigation * Pure relief$_{mon}$				0.535*	0.002	0.056+
				(0.253)	(0.391)	(0.029)
Controls	YES	YES	YES	YES	YES	YES
Facility FE	YES	YES	YES	YES	YES	YES
County pair-Year FE	YES	YES	YES	YES	YES	YES
Constant	1.974***	1.063***	10.631***	0.600***	1.010***	10.431***
	(0.374)	(0.095)	(0.138)	(0.043)	(0.153)	(0.120)
Observations	33,632	33,632	33,632	39,833	39,833	39,833
R-Square	0.974	0.845	0.929	0.975	0.858	0.945
Adj R-squared	0.973	0.841	0.927	0.971	0.833	0.935
Within R-squared	0.016	0.005	0.003	0.006	0.000	0.003

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Table A14. Climate litigation and GHG emission by jurisdiction

	GHG Emission (log)			
	Monetary-relief litigation		Mixed-relief litigation	
	US District Court for the Eastern District of Missouri	US District Court for the Western District of Washington	US District Court for the Northern District of Texas	US District Court for the Southern District of Texas
VARIABLES	M1	M2	M3	M4
Litigation	0.224*	0.398*	-0.085	-0.206
	(0.057)	(0.028)	(0.093)	(0.183)
Controls	YES	YES	YES	YES
Facility FE	YES	YES	YES	YES
County pair-Year FE	YES	YES	YES	YES
Constant	11.478***	9.892+	11.432***	11.498***
	(0.002)	(0.909)	(0.028)	(0.161)
Observations	4,202	3,378	21,426	19,534
R-Square	0.909	0.920	0.797	0.815
Adj R-squared	0.879	0.902	0.760	0.795
Within R-squared	0.019	0.033	0.006	0.002

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Table A15. Robustness test: Alternative dependent variables

	GHG Emission (log)								
	Injunctive-relief litigation			Monetary-relief litigation			Mixed-relief litigation		
VARIABLES	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
Litigation	-0.362*	-0.363+	-0.472*	0.994***	0.112	-0.111	-0.108	-0.174	-0.081
	(0.126)	(0.144)	(0.167)	(0.046)	(0.163)	(0.073)	(0.095)	(0.075)	(0.067)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Facility FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
County pair-Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	14.211***	7.324***	9.619***	9.581***	6.104***	4.878***	10.028***	6.441***	4.414**
	(0.523)	(0.988)	(1.048)	(0.043)	(0.068)	(0.014)	(0.018)	(0.019)	(0.172)
Observations	1,031	1,031	1,031	7,580	7,284	6,227	40,961	39,714	35,341
R-Square	0.928	0.927	0.902	0.954	0.961	0.955	0.951	0.945	0.950
Adj R-squared	0.902	0.890	0.866	0.941	0.950	0.941	0.944	0.937	0.942
Within R-squared	0.078	0.042	0.117	0.018	0.033	0.016	0.001	0.005	0.004

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Table A16. Robustness test: Alternative fixed effects

	Injunctive-relief litigation	Monetary-relief litigation	Mixed-relief litigation
VARIABLES	M1	M2	M3
Litigation	-0.203*	0.285*	-0.030
	(0.070)	(0.092)	(0.041)
Controls	YES	YES	YES
Facility FE	YES	YES	YES
Parent Firm-Year FE	YES	YES	YES
Industry-Year FE	YES	YES	YES
County pair-Year FE	YES	YES	YES
Constant	10.740***	11.955***	11.421***
	(0.072)	(0.132)	(0.019)
Observations	1,001	7,353	39,332
R-Squared	0.955	0.993	0.952
Adj R-squared	0.904	0.988	0.939
Within R-squared	0.142	0.233	0.004

Standard errors double clustered at the jurisdiction and border segment level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Table A17. Robustness test: Industry-based peer identification

	Injunctive-relief litigation	**Monetary-relief litigation**	**Mixed-relief litigation**
VARIABLES	M1	M2	M3
Litigation	0.038	-0.039	0.000
	(0.101)	(0.056)	(0.052)
Controls	YES	YES	YES
Facility FE	YES	YES	YES
Year FE	YES	YES	YES
Constant	12.240***	11.444***	11.505***
	(0.191)	(0.019)	(0.021)
Observations	20,098	30,065	18,840
R-Squared	0.797	0.766	0.784
Adj R-squared	0.778	0.741	0.760
Within R-squared	0.005	0.001	0.002

Standard errors clustered at the industry level are in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-tailed tests.

Appendix A. Example from the prayers for relief section of a climate litigation complaint

Fentress v. Exxon Mobil Corp.

Description: Class action lawsuit on behalf of Exxon Mobil Corporation (Exxon) employees alleging that Exxon defendants' failure to disclose climate change information violated fiduciary duties under Employee Retirement Income Security Act.

Prayers for relief:

A. Determination that the instant action may be maintained as a class action under Rule 23, Federal Rules of Civil Procedure, appointing Plaintiffs as class representatives, and determining that Plaintiffs' counsel satisfies the prerequisites of Rule 23(g);
B. Declaration that Defendants breached ERISA fiduciary duties owed to the Plan and its participants;
C. An Order compelling Defendants to make good to the Plan all losses to the Plan resulting from Defendants' breaches of their fiduciary duties, including losses to the Plan resulting from imprudent investment of the Plan's assets, and to restore to the Plan all profits Defendants made through use of the Plan's assets, and to restore to the Plan all profits which the participants would have made if Defendants had fulfilled their fiduciary obligations;
D. Imposition of a Constructive Trust on any amounts by which Defendants were unjustly enriched at the expense of the Plan as the result of breaches of fiduciary duty;
E. An Order enjoining Defendants from any further violations of their ERISA fiduciary obligations;
F. Actual damages in the amount of any losses the Plan suffered, to be allocated among the participants' individual accounts in proportion to the accounts' losses including the lost opportunity costs;
G. An Order that Defendants allocate the Plan's recovery to the accounts of all participants who had any portion of their account balances invested in Company stock in proportion to the accounts' losses attributable to the decline in the price of its common stock and/or the value of investment in alternative options under the Plan;
H. Awarding the Plan and/or Plan participants rescission and/or money damages including pre-judgment interest;
I. An Order awarding costs pursuant to 29 U.S.C. § 1132(g);
J. An Order awarding attorneys' fees pursuant to 29 U.S.C. § 1132(g) and the common fund doctrine;
K. An Order for equitable restitution and other appropriate equitable monetary relief against Defendants; and
L. Such other and further relief the Court deems just and equitable.

Sierra Club v. Talen Energy Corp.

Description: Citizen suit against owner-operators of power plant in Pennsylvania.

Prayers for relief:

A. Declaring that Defendants' discharges of pollution into Susquehanna River from Brunner Island's CCR waste units are not authorized by NPDES permit PA0008281 and violate the CWA, 33 U.S.C. § 1311(a) and Clean Streams Law, 35 P.S.§§ 691.301, 691.307, and 691.401;
B. Ordering that Defendants take all actions necessary to comply with the CWA and Clean Streams Law, including ceasing all discharges that are not authorized by DEP NPDES permit;
C. Declaring that Defendants' past and present handling, storage, treatment, transportation, or disposal of CCR at the Brunner Island site may present an imminent and substantial endangerment to health or the environment in violation of RCRA, 42 U.S.C. § 6972(a)(1)(B);

D. Ordering that Defendants take all actions necessary to eliminate the endangerment to health and the environment in the vicinity of Brunner Island, including ordering that Defendants determine and implement the most expeditious, cost-effective, and environmentally sound means to eliminate ongoing migration of CCR pollutants into groundwater, surface water, and sediment; and to fully abate the endangerment associated with CCR pollutants that have already migrated into groundwater, surface water, and sediments near the site.
E. Assessing Defendants civil penalties under 33 U.S.C. §§ 1319(d) & 1365 and 40 C.F.R. § 19.4 not to exceed $37,500 per day for each violation of the CWA within the five-year statute of limitations period;
F. Awarding Plaintiff its litigation costs and reasonable attorney fees incurred in prosecuting this action, pursuant to 33 U.S.C. § 1365(d), 42 U.S.C. 6972(e), and 35 P.S. § 691.601(g); and,
G. Ordering such relief as the Court may deem just and proper.

Appendix B. Classification prompt for prayers for relief in climate litigation cases

You are a legal expert classifying relief requests from climate litigation complaints. Carefully review the <remedial_request> text provided and classify it into ONE of the following categories only.

- **Injunctive Relief:** Orders requiring defendants to change business operations directly related to the alleged misconduct (e.g. cease emissions, close facilities, remediate hazards, etc.).
- **Monetary Relief:** Requests for financial compensation for past or future damages caused by defendants' alleged misconduct (e.g. money for climate damage mitigation, remediation costs, punitive damages, etc.).
- **Declaratory Relief:** Requests for a legal declaration of rights or duties (e.g. declaring conduct unlawful) without requesting enforcement actions or damages.
- **Costs / Fees:** Legal or procedural costs of pursuing the litigation itself, (e.g. attorneys' fees, court costs, expert fees, cost of notices, etc.)
- **Other / No Relief**: Sentences explicitly disclaiming relief (e.g. 'Plaintiffs do not seek...'), or vague, non-relief content.
- **Only return the category name. No explanation. Classify strictly based on these definitions.**

Figure A1. Linguistic patterns in requested remedies

Figure A1.1 Word cloud for injunctive relief litigation

Figure A1.2 Word cloud for monetary relief litigation

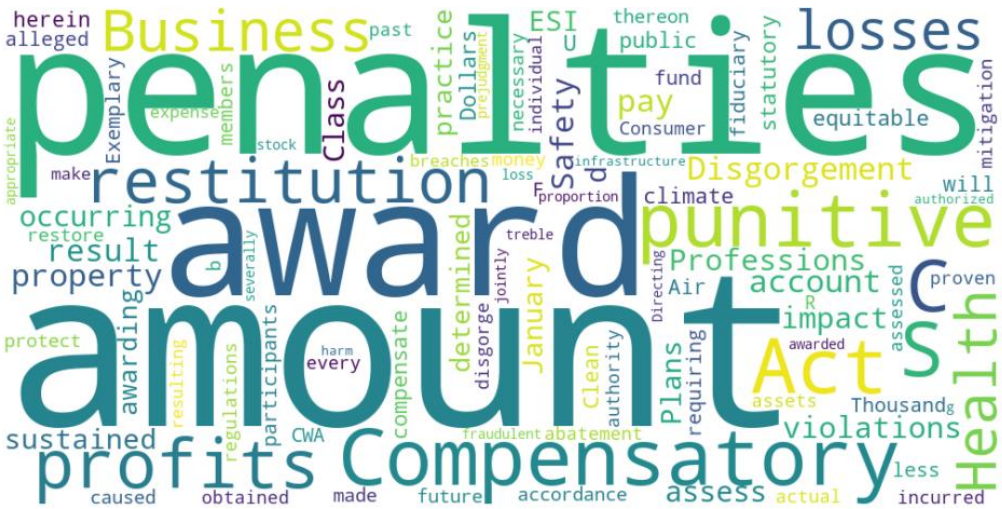


Figure A2. Annual proportion of litigation types

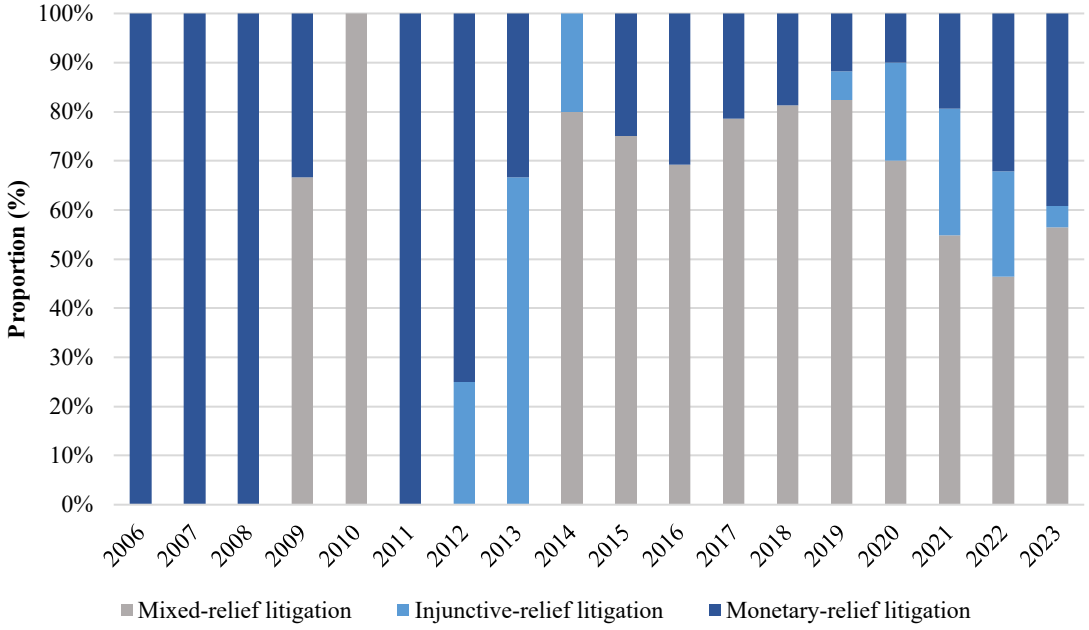


Figure A3. Sample distribution by industry and treatment status