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Research article

Litigation pressure and pollution: How shareholder lawsuits shape corporate emission strategy

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ABSTRACT

We study whether and through what channels shareholder litigation risk shapes firms' greenhouse-gas (GHG) emissions by altering managerial decision constraints and resource allocation to emission-reduction initiatives. We exploit the staggered adoption of U.S. Universal Demand (UD) laws, which raise the bar for derivative suits and thereby lower litigation pressure, in a difference-in-differences (DiD) design covering S&P 500 firms, 1993–2020. We interpret the DiD as identifying a reduced-form effect of litigation pressure on emissions, and then show how three forces, i.e., industry carbon intensity, financing constraints, and the Inevitable Disclosure Doctrine (IDD), moderate this effect along the causal chain. Firms exposed to lower litigation pressure emit more: our preferred estimate implies 48 % higher emissions after UD adoption. The effect is attenuated in high-emission industries, for financially constrained firms, and in IDD states, consistent with stronger constraints or career concerns keeping managers engaged in abatement even when litigation pressure weakens. Results survive extensive identification checks and alternative measures. We conclude that shareholder litigation operates as external governance that tightens managerial constraints and sustains resource allocation to abatement.

1. Introduction

Climate change has emerged as a central global concern alongside economic productivity and wealth creation, prompting governments, activists, and scholars to pursue measures aimed at reducing greenhouse gas (GHG) emissions (Broadstock et al., 2018; Hammoudeh et al., 2020; Barroso et al., 2024). It also introduces significant transition risks due to evolving technologies, regulatory changes, and shifting stakeholder expectations (Faccini et al., 2023; Chang et al., 2024). Air pollution, a key outcome of rising GHG levels, causes over 7 million deaths annually (Khan et al., 2019), damages ecosystems, and deteriorates infrastructure. Yet, the financial costs and benefits of mitigation remain ambiguous, making it difficult to assess the net present value of environmental investments (Alessi et al., 2021). This emphasizes the need for deeper insights into how economic activity relates to GHG emissions.

Recent research links corporate governance to environmental outcomes. Executive incentives (Haque and Ntim, 2020), ESG-tied compensation, shareholder rights (Smith, 1996), and transparent reporting (Davis, 2010) all influence environmental performance. Studies highlight the positive role of managerial ability (Gaganis et al., 2023), board diversity (Kizys et al., 2023), and institutional ownership (Bose et al., 2024; Cohen et al., 2023; Dimson et al., 2015; Becht et al., 2009), though sustainability committees show limited impact (Orazalin et al., 2024). Cultural norms and political ties also play a role (Wang et al., 2021a, 2023). Meanwhile, GHG emissions influence both market valuation and firm performance (Aswani et al., 2024; Raghunandan and Rajgopal, 2024).

Empirical legal research helps unpack how regulations shape corporate environmental behavior (Alessi et al., 2021), emphasizing the influence of stakeholder pressure and litigation risk (Broadstock et al., 2018; Hammoudeh et al., 2020). Shareholder litigation, in particular, alters firm decision-making (Arena and Ferris, 2017; Capelle-Blancard et al., 2021) and disclosure behavior (Bourveau et al., 2017), spurs R&D (Lin et al., 2021), and affects CSR outcomes (Freund et al., 2023; Jaroenjitrkam et al., 2022; Donelson et al., 2024a,b; Liu et al., 2022). Yet, few studies directly address how litigation risk affects environmental performance. Some show that firms avoid litigation by adopting greener practices (Deng et al., 2014; Grabar et al., 2022), while others note adverse effects, such as reduced environmental innovation under heightened legal threat (Treepongkaruna and Padungsaksawasdi,

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2024).

This study contributes to this nascent literature by investigating how shareholder litigation risk influences the GHG emissions of U.S. firms. In the U.S., litigation serves as a key external governance mechanism (Chu and Zhao, 2021; Arena, 2018; Ferris et al., 2007), disciplining executives and reducing agency conflicts (Appel, 2019; Cheng et al., 2010; Ni and Yin, 2018), while also affecting decisions on earnings management, financing, and CSR (Humphery-Jenner et al., 2024; Degl'Innocenti et al., 2023; Foroughi et al., 2022).

Using panel data from 485 firms (13,580 firm-year observations) from 1993 to 2020, we proxy environmental performance using log GHG emissions data (Scopes 1, 2, and occasionally 3) sourced from the Refinitiv ESG and state laws (Wu et al., 2020). Shareholder litigation risk is measured by state-level adoption of Universal Demand (UD) laws, which make it harder for shareholders to file lawsuits (Bourveau et al., 2017; Appel, 2019; Gong et al., 2023; Freund et al., 2023). Employing a difference-in-differences design with firm, state and year, and industry-year fixed effects, we assess the causal impact of reduced litigation threat.

Our results reveal that firms in UD states emit significantly more GHGs, indicating that reduced litigation risk weakens environmental performance. This finding holds across multiple robustness checks and alternative specifications. Dominance analysis shows that litigation risk has a stronger impact on emissions than many firm-level traits, though the effect is mitigated by factors like industry, financial constraints, and the inevitable disclosure doctrine. These findings align with evidence that heightened litigation risk can deter sustainability efforts (Treepongkaruna & Padungsaksawasdi, 2024), and suggest that shareholder litigation may play a crucial role in shaping firm responses to climate change, especially in areas like carbon disclosure and innovation.

Our premise is that litigation pressure constrains managerial discretion and reallocates resources toward compliance and abatement; when this pressure is relaxed (e.g., via UD laws), these constraints loosen and resources reallocate away from abatement, yielding higher emissions. We test this reduced-form link (litigation → emissions) and then show how industry context, financing constraints, and IDD condition the strength of this chain.

This study enhances the literature in three ways: First, we provide reduced-form evidence that lower litigation pressure increases emissions, moving beyond prior work centered on financial outcomes or disclosure proxies to examine real, policy-relevant GHG levels. This addresses a gap in the empirical legal and finance literatures that link litigation risk to firm behavior and market consequences (Aswani et al., 2024; Degl'Innocenti et al., 2023; Duanmu et al., 2022; Obaydin et al., 2021; Wu et al., 2020; Ni and Yin, 2018). Unlike studies emphasizing environmental disclosure or broad sustainability scores (Wegener et al., 2013; Deng et al., 2014), our focus on emissions yields tangible insights for regulators and stakeholders amid escalating climate policy needs.

Second, we foreground institutional context by exploiting the U.S. UD law setting, salient in a major emitting economy, where raising the threshold for derivative suits reduces litigation risk and can weaken environmental accountability. Evidence that UD laws increase toxic releases and ESG controversies underscores the environmental salience of litigation frameworks (Do et al., 2023; Treepongkaruna et al., 2022). Our findings support the view of litigation as external governance that helps align managerial behavior with shareholder interests on sustainability (Cheng et al., 2010; Ni and Yin, 2018). This legal governance angle complements earlier emphases on internal governance (board design and incentives: Haque, 2017; Haque and Ntim, 2020) and on disclosure mandates (Downar et al., 2021; Tomar, 2023). In addition, we show that the explanatory power of litigation pressure varies with state economic conditions, highlighting when legal governance most strongly binds managerial behavior.

Third, we contribute to debates on corporate accountability by asking whether legal threats translate into lower emissions, not merely better reporting or generic ESG. Prior work suggests firms adjust practices to reduce legal exposure (Grabar et al., 2022); we connect that logic directly to emissions reduction and interpret it through stakeholder theory (Freeman, 1984) and strategic management theory (environmental performance as proactive risk mitigation and competitive advantage). Finally, rather than treating mechanisms as parallel, we organize them as moderators of the first link in the chain, industry carbon intensity, financing constraints, and IDD induced career concerns, which attenuate how far a given drop in litigation pressure can relax managerial constraints or reallocate budgets away from abatement.

The remainder of the paper is structured as follows: Section 2 discusses the relevant literature and specifies research hypotheses. Section 3 describes the empirical strategy of the paper. Section 4 presents the baseline results. Section 5 addresses endogeneity issues. Section 6 introduces additional robustness checks. Section 7 specifies channels of influence, and finally, Section 8 concludes the paper.

2. Related literature

2.1. Litigation pressure, managerial constraints, and resource allocation

A large theoretical and empirical literature indicates that shareholder litigation pressure functions as external governance that shapes what managers can do (decision constraints) and how firms allocate attention and resources, including toward environmental programs. From an agency theory perspective, litigation disciplines managerial myopia and helps align managers with long horizon shareholders, thereby encouraging actions consistent with emission reduction (Lundstrum, 2002; Treepongkaruna et al., 2022; Chung et al., 2020). Signaling and reputational views imply that, under higher legal exposure, firms invest in cleaner operations to signal compliance and reduce reputational/legal downside. Consistent evidence links litigation exposure to reputational penalties, disclosure choices, and contracting outcomes that bear on financing capacity (Wu et al., 2020; Abbott et al., 2017; Diamond, 2004; Hao, 2011). A litigation pressure (disciplining) hypothesis explicitly argues that credible legal threat pushes managers toward responsible conduct; by contrast, UD laws lower that threat and are associated with weaker environmental conduct (Lin et al., 2021; Bertrand and Mullainathan, 2003; Treepongkaruna et al., 2022).

Other frameworks map neatly into the same link. Trade off arguments predict managers balance legal/reputational exposure against other risks, elevating abatement under stronger litigation pressure (Hossain et al., 2023a,b; Bose et al., 2021; Nguyen et al., 2018). The quiet life view suggests legal scrutiny disrupts managerial complacency; when litigation pressure falls, innovation and productivity around environmental improvement may slacken (Treepongkaruna and Padungsaksawasdi, 2024; Bilokha and Gupta, 2024). Stakeholder and legitimacy perspectives broaden the constraint set: litigation pressure makes the costs of violating social norms more salient, increasing the payoff to emission control to maintain stakeholder trust and legitimacy (Freund et al., 2023; Aouadi and Marsat, 2018; Ahmed and Elnahass, 2024; Busch and Lewandowski, 2018). Still, governance design matters: e.g., in some high litigation settings, board independence can reduce climate disclosure, which is an important nuance for how constraints are implemented.

These perspectives imply a common mechanism: higher litigation pressure tightens managerial constraints and reallocates resources toward compliance/abatement; lower pressure loosens constraints, shifting resources away from abatement. This is the reduced form causal story we take to the data.

2.2. From constraints to emission reduction strategy

If litigation pressure channels managerial attention and budgets, the next step in the chain is how those inputs translate into corporate environmental performance (CEP), in our case, realized GHG emissions.

On determinants, evidence is mixed regarding internal governance levers: some work finds no robust link between boards/compensation and CEP (Haque, 2017), while others document non linearities and design features (e.g., independence, meeting frequency, ESG linked pay) that improve CEP, with CEO duality, gender diversity, and ESG committees sometimes associated with lower performance (Oyewo, 2023). Disclosure and strategic orientation matter: enhanced environmental disclosure can precede improvements in CEP, particularly for low energy intensity firms (Qian and Schaltegger, 2017); intangible, organization capital rich firms tend to perform better environmentally (Provaty et al, 2024); mandatory reporting can reduce emissions (Bauckloh et al., 2023); and formal strategies mediate governance to CEP links (Moussa et al., 2020). Institutions and social context also shape outcomes: political ties and China's social credit reforms shift emissions trajectories (Wang, 2023; Cui et al., 2023), and detailed disclosure is associated with lower reported emissions among large manufacturers (Tomar, 2023).

On consequences, CEP has financial salience. Emissions disclosure can raise stock volatility (Griffin et al., 2017); high emitters earn higher realized returns, consistent with priced transition risk (Bolton and Kacperczyk, 2021); weak CEP depresses valuation and accounting performance (Haque and Ntim, 2020; Choi and Luo, 2021; Adu et al., 2023; Orazalin et al., 2024; Siddique et al., 2021; Downar et al., 2021). This evidence supports the idea that what managers allocate to abatement, itself shaped by litigation constraints, shows up in emissions and in markets.

2.3. Evidence that litigation risk reconfigures constraints and budgets

A growing empirical literature shows that shifts in litigation risk, often identified via U.S. states' UD law adoptions, change corporate policies in ways consistent with re optimized constraints/budgets. Lower litigation risk is tied to more aggressive capital structure and corporate policies (Nguyen et al., 2020), value destroying acquisitions (Chung et al., 2020), greater real earnings management (Huang et al., 2020), and higher tax avoidance (Arena et al., 2021). It also affects transparency: litigation risk shapes corporate disclosure (Bourveau et al., 2017) and can increase concealment of severe bad news when legal threat is lower (Schantl and Wagenhofer, 2024); it interacts with financing terms (Arena, 2018) and payout policy (Arena and Julio, 2023). Beyond finance, reduced legal pressure can both stimulate innovation (Lin et al., 2021; Hassan et al., 2021) and undermine CSR (Freund et al., 2023), underscoring the resource reallocation nature of the mechanism. More broadly, litigation risk relates to performance, tail risk, incentive design, and even the composition of the top team (Wu et al., 2020; Obaydin et al., 2021; Degl'Innocenti et al., 2023). Collectively, these findings are consistent with the first link in our chain: legal pressure shapes managerial constraints and budgetary choices that plausibly carry through to environmental strategy.

2.4. Mechanisms that moderate the effect of litigation on emissions

Industry carbon intensity plays a role in the litigation-constraints link. Sectoral context changes both the bindingness of constraints and the marginal return to abatement dollars. Carbon intensive industries face stricter regulation and scrutiny, which can substitute for litigation pressure in constraining managers; these sectors also exhibit systematically higher emissions (Kim and Skinner, 2012; He et al., 2022; Provaty et al., 2024). Mandatory reporting regimes further tighten discipline where intensity is high (Bauckloh et al., 2023). We therefore expect the UD effect to be attenuated in high emission industries.

Financing constraints are also important. Litigation exposure interacts with external finance: legal shocks alter access to capital, loan contracting, and perceived distress risk (Autore et al., 2014; Wu et al., 2020). Because abatement is capital intensive, financially constrained firms may be unable to scale environmental investment regardless of legal pressure, muting the UD effect (Wang et al., 2021a; Bartram et al., 2022).

Institutional conditions, such as the Inevitable Disclosure Doctrine (IDD) and career concerns, play a role too. Court adoption of the IDD restricts mobility to protect trade secrets and can heighten executive career concerns (Klasa et al., 2018; Canil et al., 2023; Colak and Korkeamäki, 2021; Tandon and Toh, 2022; Chen et al., 2008). Where such concerns bite, they substitute for litigation in constraining managers, implying a weaker UD effect on emissions.

These moderators, industry, financing constraints, IDD, are thus mechanisms that regulate how far a given shift in litigation pressure relaxes managerial constraints or reassigns budgets away from abatement.

2.5. Boundary conditions: information environment and other determinants

Litigation risk also shapes the information environment and control, which can amplify or dampen our causal chain. Lower litigation risk increases information asymmetry and reduces stock price informativeness, potentially blunting market discipline (Boone et al., 2023; Le et al., 2021). Legal pressure influences disclosure readability (Humphery Jenner et al., 2024), ownership dynamics (Liu et al., 2022), and even workplace safety (Gong et al., 2023), signaling wider governance spillovers.

Internal and regional contexts provide additional constraints that may buffer or reinforce the effect of litigation pressure on emissions. Strong internal governance can sustain environmental standards even when legal threat declines (Irshad et al., 2023). Sectoral regulation and reputational attention in energy and manufacturing maintain pressure on abatement (Wegener et al., 2013; Deng et al., 2014). Creditor pressure can also encourage environmental responsibility, particularly for highly leveraged firms (Liu et al., 2022). At the state level, economic development and regulatory rigor, e.g., policy intensity in environmentally progressive states, can keep abatement on the agenda despite weaker litigation threats (Grabar et al., 2022). These forces all condition the central chain by supplying substitute constraints or complementary incentives.

2.6. Synthesis and hypotheses development

The literature therefore supports a unified story: when litigation pressure falls (e.g., after UD adoption), managerial constraints loosen and resources are reallocated away from abatement, raising emissions, with the magnitude of this effect moderated by (i) industry carbon intensity (attenuation where other constraints are already tight), (ii) financing constraints (attenuation where capital is scarce), and (iii) IDD induced career concerns (attenuation where personal labor market penalties substitute for litigation). These insights motivate our empirical design and the formal hypotheses presented in the next section.

Building on the unified chain: litigation pressure → managerial decision constraints & resource allocation → emission reduction strategy → realized GHG outcomes, we articulate three testable predictions. The first is the core reduced form effect of shareholder litigation pressure on emissions. The second and third treat industry context, financing frictions, and IDD induced career concerns as substitute constraints that moderate the first link of the chain by limiting how far a reduction in litigation pressure can loosen managerial constraints or reallocate budgets away from abatement. These hypotheses are stated as follows.

H1. Lower litigation pressure is associated with higher corporate emissions.

When shareholder litigation pressure is lower (e.g., following UD adoption), managerial constraints loosen and resources shift away from abatement; therefore, firm year GHG emissions increase on average.

H2. Industry plays a role as a substitute constraint.

In high emission/regulated industries, regulatory scrutiny,

stakeholder attention, and technical compliance demands already constrain managerial discretion. These sectoral forces substitute for litigation pressure, so the effect of lower litigation pressure on emissions is weaker in such industries.

H3. Financing frictions and career concerns mediate the litigation effect

Financially constrained firms have limited capacity to reallocate capital away from abatement even when litigation pressure falls; and (b) state court adoption of the Inevitable Disclosure Doctrine (IDD) elevates executive career concerns, supplying personal discipline that substitutes for litigation. Both mechanisms should dampen the UD effect on emissions.

These hypotheses map directly to our empirical implementation: H1 is the reduced form test of the litigation pressure channel, while H2–H3 probe the structure of that channel by testing whether sectoral discipline, capital frictions, and career concerns moderate the link from litigation pressure to abatement choices and, ultimately, to realized emissions.

3. Empirical strategy

3.1. Data

We collected annual data on all companies listed on the S&P 500 index from 1993 to 2020 from the DataSream database. The initial sample comprises 485 unique firms and 13,580 firm-year observations. GHG emissions data are collected from the Refinitiv ESG database. We estimated the earnings volatility as the standard deviation of five-year operating income over assets. This results in a loss of 1940 firm-year observations (from 1993 to 1996). We merged this data with U.S. State-level data from the Bureau of Economic Analysis, whereas CEO characteristics data are collected from several sources, such as Crunchbase, BoardEx, companies' webpages, Bloomberg profiles of top executives, and LinkedIn profiles. After matching the data, our final sample has 10,249 observations. We subjected all continuous variables to winsorization at 1 % and 99 % and take logarithms of large level variables to alleviate the potential harmful effect of outliers. We excluded the COVID-19 period from the data because during this period the world saw significant shifts in operational practices across industries, including reduced industrial activity, changes in workforce dynamics (e.g., remote work), and altered production schedules. These changes could have led to atypical variations in GHG emissions that are not representative of normal operational circumstances (Buchheim et al., 2022; Howe et al., 2021).

3.2. Key variables

Our dependent variable is the logarithm of the firm-level GHG emissions volume (in tons) disclosed by firms (denoted as *GHG*). It is computed as the total (sum) of indirect and direct emissions (Provaty et al., 2024; Downar et al., 2021; Haque, 2017). In the U.S., firm-level GHG emissions disclosure is primarily guided by the GHG Protocol established on the basis of the Clean Air Act as well as the S.E.C. and State-level regulations, which classify emissions into three scopes: direct emissions from owned sources (Scope 1), indirect emissions from purchased energy (Scope 2), and other indirect emissions across the company's value chain (Scope 3). Firms collect relevant data, such as energy and fuel usage, and apply emission factors from sources like the EPA or IPCC to convert this data into CO_2-equivalent emissions. Tools aligned with the GHG Protocol aid in aggregating and calculating these emissions accurately. The data is often verified by third parties and reported through frameworks such as the Carbon Disclosure Project or mandated by regulations like the EPA's Greenhouse Gas Reporting Program.

Our main independent variable is shareholder litigation risk (denoted as *Litigation_Risk*). We follow Bourveau et al. (2017), Appel (2019), and Gong et al. (2023) and utilize the staggered adoption of *UD* laws by some U.S. States, which raised the threshold for shareholder derivative litigation, as an exogenous shock to examine the net effect of the threat of shareholder litigation on GHG emissions. Typically, shareholders can bring two types of lawsuits against corporate directors and managers: class action and derivative lawsuits. Class action suits are generally used to recover financial losses incurred by shareholders due to securities law violations by companies, whereas derivative suits are often employed to demand policy changes and penalize directors and managers for failing to meet their fiduciary duties. These lawsuits can result in substantial financial costs, legal fees, and damages, along with reputational harm that can negatively impact stock prices and investor confidence. Since many agency problems affecting GHG emissions do not necessarily constitute securities law violations, derivative litigation is likely to pose a more significant threat to directors and managers than class actions in addressing these issues. Therefore, we use the UD law setting to study the impact of shareholder litigation on GHG emissions. As UD laws are adopted by State legislatures, they are unlikely to be correlated with changes in GHG emissions by individual firms. Additionally, the UD law in Pennsylvania was mandated by the State supreme court. Since court decisions are unlikely to be influenced by corporate lobbying, its adoption in Pennsylvania provides an even cleaner test of the causal effect of shareholder litigation on GHG emissions. We accordingly construct our shareholder litigation risk proxy as a binary variable that equals one if a firm is incorporated in a U.S. State that has adopted the UD laws in year t and zero otherwise. A firm's operation in a U.S. State that has adopted a UD law implies a decrease in shareholder litigation risk (threat). Table A1 (web appendix) shows the distribution of UD laws acrsoos the U.S. states.

3.3. Controls

Firms differ in their responses to State-level policies due to varying internal characteristics. To account for this heterogeneity in how shareholder litigation risk affects GHG emissions, we include firm-level controls from the DataStream database.

Firm size (log of market capitalization) captures both emissions scale and resource availability. Larger firms often have greater capacity to invest in emission-reducing technologies but may face political constraints (Haque and Ntim, 2020). Leverage (debt-to-equity ratio) reflects financial constraints; highly leveraged firms may lack flexibility for green investments and face greater stakeholder pressure (Wang and Gao, 2024; Liu et al., 2022). ROA (return on assets) indicates operational efficiency—profitable firms are more likely to fund environmental initiatives and manage risks proactively (Nadeem et al., 2021; Hossain et al., 2023a,b).

Tobin's Q (market-to-replacement value) proxies for growth potential and investor confidence. Higher values suggest better management and innovation capacity, often linked to proactive environmental strategies (Bolton and Kacperczyk, 2023). Tangibility (share of physical assets) reflects sectoral environmental exposure, as firms with more tangible assets often face stricter oversight (de Villiers et al., 2011). CAPEX (capital expenditures scaled by assets) captures investment in operational improvements, including green technologies (Nadeem et al., 2021).

CEO duality, a dummy variable indicating combined CEO and board chair roles, may weaken governance and reduce responsiveness to environmental risks (Aktas et al., 2019; Prado-Lorenzo and Garcia-Sanchez, 2010). Earnings volatility (standard deviation of operating income over assets) reflects financial stability; volatile firms may avoid long-term environmental investments (Zhu and Zhao, 2022; Francis et al., 2021). These controls help isolate the effect of litigation risk by accounting for differences in financial strength, governance, and industry exposure.

Table 1 provides a comprehensive overview of the descriptive statistics for various firm-level characteristics, revealing diverse patterns

Table 1
Descriptive statistics.

Variable	Obs	Mean	Median	Standard deviation	Minimum	Maximum
GHG emissions	10,249	13.400	13.280	2.310	5.598	18.927
Litigation risk	10,249	0.473	0.501	0.499	0.001	1.000
Size (log)	10,249	0.410	0.001	0.492	0.001	1.000
Leverage	10,249	16.504	16.482	1.457	3.478	21.535
Tobin Q	10,249	0.679	0.626	0.477	0.072	4.016
CAPEX	10,249	0.002	0.001	0.002	0.001	0.024
Tangibility	10,249	0.001	0.001	0.001	0.001	0.005
ROA	10,249	0.632	0.663	0.239	0.068	0.999
Earnings volatility	10,249	0.02	0.001	0.001	0.001	0.030
CEO duality	10,249	0.119	0.312	0.094	0.001	1.000

and degrees of variability. GHG emissions average natural logarithm of 13.400 tons with moderate variability (standard deviation 2.310), ranging from 5.598 to 18.927 natural logarithm of tons. Litigation risk, a binary variable, shows that approximately 47.3 % of firms face litigation risk (mean = 0.473, standard deviation = 0.499). Firm size (log) has a mean of 0.410, indicating smaller firms with moderate variability (standard deviation 0.492). Leverage is substantial, averaging 16.504 %, with low variability (standard deviation 1.457). Tobin's Q averages 0.679, reflecting firms' market values close to replacement costs, with moderate variability (standard deviation 0.477). CAPEX is minimal (mean 0.002) with low variability, while tangibility is very low (mean close to zero) with minimal variation. ROA indicates profitability (mean 0.632 %) with moderate variability (standard deviation 0.239). Earnings volatility is low and consistent across firms (mean 0.001, standard deviation 0.001). CEO duality, present in about 11.9 % of firms (mean 0.119, standard deviation 0.094), shows some variability. These statistics provide essential insights into the diverse characteristics of firms and their potential impact on GHG emissions and other outcomes. Table A2 (web appendix) shows the correlation matrix.

3.4. Estimation model

We employ an Ordinary Least Squares (OLS) regression as the baseline model to estimate the impact of shareholder litigation risk on firm-level greenhouse gas (GHG) emissions. Firms in U.S. States that adopted *UD* laws form the treatment group, while firms in non-UD States serve as the control group. The staggered adoption of UD laws introduces exogenous variation in litigation risk. While OLS offers simplicity and efficiency under classical assumptions, it does not account for unobserved heterogeneity or firm-level dynamics, which may lead to omitted variable bias (Angrist and Pischke, 2008). To address this, we follow Gong et al. (2023) and Bourveau et al. (2017), incorporating firm fixed effects (to control for time-invariant firm traits), industry-year fixed effects (to capture evolving industry-specific factors), and State and year fixed effects (to account for changing State-level conditions). The inclusion of joint State and year effects allows us to compare responses between States in any given year, isolating the treatment effect more precisely. We also cluster standard errors at the State level to correct for intrastate correlation in residuals due to shared regulatory and policy environments (Serfling, 2016; Bourveau et al., 2017). The full estimation model is presented as follows:

$$GHG_{ist} = \beta_0 + \beta_1 UD_{s,t} + +\beta_2 Controls_{ist} + \alpha_i + \theta_{st} + \gamma_{ft} + \varepsilon_{ist} \quad (1)$$

Subscripts *i, f, s,* and *t* refer to firm, industry, State, and year, respectively. GHG is the dependent variable, measured by the log volume of firm-level GHG emissions. UD is the key independent variable, capturing whether the State has adopted a UD law and serving as a proxy for shareholder litigation risk. The vector $Controls_{ist}$ captures all firm-level control variables. Finally, α_f captures firm fixed effects, θ_{st} captures State and year fixed effects, and γ_{ft} captures industry-year fixed effects, while ε_{ist} represents the regression's overall error term assumed to be normally distributed. We recognize the challenges of inferring causation from mere correlations. Therefore, we interpret our results as indicators of the strength of correlations rather than direct evidence of causation. This distinction is crucial for understanding the relationships among the variables without prematurely concluding that one variable directly influences another based solely on their correlation.

4. Analysis of results

4.1. Baseline effects

Table 2 presents the baseline effects of litigation risk on firm-level GHG emissions across five different models, revealing several key insights. Adoption of UD laws and litigation risk reduction consistently show a significant positive effect on firms' GHG emissions. This suggests that firms operating in U.S. States that have adopted the UD law, thereby facing lower litigation risk, are associated with higher firm-level GHG emissions across the board. This finding broadly confirms hypothesis H1. Specifically, since the outcome variable is measured in log value, in the full model (5) with a positive and significant UD coefficient (β = 0.385, t=5.35), a unit increase in UD (i.e., a firm's operation in a State that has adopted a UD law and the associated reduction in shareholder litigation risk), will be associated with an $(e^{0.385} - 1) \times 100 = 46.9$ % average increase in firm-level GHG emissions, indicating a large harmful effect on the environment. The large increase in firm-level GHG emissions following the adoption of UD laws could be attributed to the weakened corporate accountability. With less threat of litigation, firms may deprioritize costly environmental practices, including those that reduce GHG emissions. Deng et al. (2014) suggest that litigation risk encourages firms to adhere to stricter environmental standards, and without this pressure, companies might shift focus to short-term financial gains, neglecting sustainability efforts (Grabar et al., 2022). Additionally, Treepongkaruna and Padungsaksawasdi (2024)show that reduced litigation risk discourages environmental innovation considerably, further explaining the observed emissions increase. Companies may also exploit regulatory loopholes, knowing that they face fewer legal consequences, which emboldens them to relax environmental controls and increase emissions.

Moreover, firm size is also positively and significantly associated with GHG emissions across Models 2 to 5, with coefficients ranging from 0.543 to 0.841. This implies that larger firms tend to be associated with higher emissions. Similarly, leverage exhibits a positive and significant relationship with GHG emissions in all relevant models, with coefficients ranging from 0.341 in Model 3 to 1.207 in Model 5, indicating that higher debt levels correlate with increased emissions. In contrast, Tobin's Q consistently shows a negative and highly significant relationship with GHG emissions, with coefficients ranging from −1.889 in Model 4 to −3.127 in Model 2. This suggests that firms with higher market valuations relative to their asset values tend to have lower emissions. Capital expenditure (CAPEX) shows a negative but not consistently significant relationship, with coefficients ranging from −34.357 in Model 2 to −12.725 in Model 4, indicating a potential but uncertain negative impact on emissions. The effects of tangibility on

Table 2
Baseline effects.

Variable	(1)	(2)	(3)	(4)	(5)
Litigation risk	0.562*** (3.34)	0.757*** (2.35)	0.335*** (2.71)	0.291** (1.98)	0.385*** (5.35)
Size (log)		0.543*** (7.29)	0.793*** (9.53)	0.808*** (10.33)	0.841*** (10.44)
Leverage		0.484*** (2.27)	0.341*** (3.22)	1.207*** (5.29)	0.408*** (3.85)
Tobin Q		−3.127*** (−7.83)	−3.070*** (−10.97)	−1.889*** (−4.77)	−2.816*** (−10.67)
CAPEX		−34.357*** (−2.16)	−19.376 (−1.47)	−12.725 (−1.52)	−15.154 (−1.39)
Tangibility		3.460*** (7.61)	0.068 (0.23)	0.517* (1.77)	0.266 (0.87)
ROA		1.968 *** (2.27)	7.018 (1.19)	−2.921 (−0.00)	−36.947 (−0.06)
Earnings volatility		1.193*** (3.00)	0.267 (1.19)	0.445* (1.85)	0.037 (0.16)
CEO duality		0.177 (1.18)	0.074 (1.39)	0.075 (1.13)	0.046 (0.93)
Constant	13.217*** (213.90)	−0.583 (−0.45)	−0.138 (1.358)	−1.362 (−1.13)	−1.127 (−0.87)
Firm FE	Yes	No	Yes	Yes	Yes
Industry-year FE	Yes	Yes	No	Yes	Yes
State and year FE	Yes	Yes	Yes	No	Yes
Adj. R^2	21.21	32.82	40.22	41.16	44.61
F-statistic (P-value)	10.20 (0.000)	54.56 (0.000)	89.47 (0.000)	68.20 (0.000)	79.21 (0.000)
N	10,249	10,249	10,249	10,249	10,249

Notes: The table presents the baseline effects. T-statistic values are included in parentheses. The outcome variable is firm-level GHG emissions, with the key independent variable being shareholder litigation risk. Controls include firm-specific characteristics. A DiD based on OLS model with various fixed effects and state-clustered standard errors is used. Model (1) considers only the main litigation risk effect with fixed effects but without controls. Model (2) considers the effects of litigation risk and controls with industry-year and state year-fixed effects. Model (3) considers the effects of litigation risk and controls with firm and state and year effects. Model (4) considers the effects of litigation risk and controls with firm and industry-year effects. Model (5) considers the effects of litigation risk and controls with firm, industry-year, and state and year effects. Symbols ***, **, * denote significance at the 1 %, 5 %, and 10 % levels, respectively.

GHG emissions are mixed, with coefficients varying widely from 0.068 in Model 3 to 3.460 in Model 2, showing inconsistent significance. Return on assets (ROA) also presents inconsistent and largely insignificant effects, with coefficients ranging from −36.947 in Model 5 to 7.018 in Model 2. Earnings volatility, while generally positive, shows varying significance across models, with coefficients ranging from 0.037 in Model 5 to 1.193 in Model 2. CEO duality, typically positive but not significant, has coefficients ranging from 0.046 in Model 5 to 0.177 in Model 2, suggesting a potential but uncertain effect on emissions. These findings confirm the role of firm-specific characteristics as prescribed by hypothesis H2. Higher adjusted R^2 values in models with firm, industry-year, and State and year fixed effects suggest that controls enhance explanatory power. Later we also test the effect of State-level economic conditions.

These results imply that firms in States that have adopted the UD laws experience lower litigation risk and tend to have higher GHG emissions relative to those operating in States that did not adopt such laws. Higher shareholder litigation risk (threat) tends to prevent firms from producing higher GHG emissions. Our results are also robust to the exclusion of financial institutions (SIC codes 6000–6999) from the sample. These findings support our interrelated hypotheses. They support agency theory by highlighting how litigation risk can serve as an external governance mechanism to mitigate agency conflicts between shareholders and managers regarding corporate sustainability and are consistent with trade-off, quiet lift, and stakeholder theories as they can explain the positive and statistically significant relationship between litigation risk and corporate environmental performance, while disciplinary and signaling theories are less clearly supported.

5. Endogeneity

We employ several treatments to handle the potential endogeneity bias, including confounding factors, alternative measurements, dynamic DiD, additional control variables, the Oster (2019) test, and propensity score matching. First, we added firm, industry-year, and firm-State fixed effects to account for unobservable factors within each firm, industry, State, and year. Second, we employed alternative measures of GHG emissions to mitigate any concerns about measurement error. Third, we note that an important concern is that the positive influence of litigation risk on corporate environmental performance may be induced by reverse causality. Reverse causality means that corporate environmental performance may influence shareholder litigation risk. For instance, the excessive environmental emissions that characterize some industries may stimulate lawmakers to set UD laws to safeguard the top executives' liability. Contrary to other legal incidents that may have a direct influence on firm characteristics, performance, or behavior, the UD laws, approved by various States at different time points, are exogenous to business organization decisions. As a result, the reduced litigation risk stemming from the staggered adoption of the UD laws mitigates endogeneity bias and permits us to examine the causal relationship between litigation risk and corporate environmental performance.

We conducted several tests to address potential endogeneity bias. To mitigate the potential violation of the parallel trends assumption, we implemented a dynamic Difference-in-Differences (DiD) approach. This approach involves analyzing the timing of changes in greenhouse gas (GHG) emissions relative to the introduction of Universal Demand (UD) laws. If GHG emissions were to increase prior to the introduction of UD laws, it would suggest a violation of the parallel trends assumption, thus questioning our findings.

Identification in the Difference-in-Differences (DiD) approach hinges on the parallel trends assumption. In our context, the parallel trends assumption posits that the changes in GHG emissions for both the treatment group (affected by UD laws) and the control group (unaffected by UD laws) should be similar prior to the introduction of UD laws (treatment). To address this concern, we examined GHG emission changes over three years surrounding the introduction of UD laws. The

Table 3
Endogeneity: A Differences-in-Differences approach.

Variable	Parallel trend		
	$UD_{-3\ to\ 0}$	UD_{+1}	$UD_{+2\ to\ +3}$
Litigation risk	0.274 (1.30)	0.482*** (4.97)	0.477*** (5.05)
Constant	2.469 (1.50)	−0.592 (−0.49)	−0.593 (−0.49)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes
State and year FE	Yes	Yes	Yes
Adj. R^2	32.98	43.52	43.52
F-statistic (P-value)	62.20 (0.000)	120.00 (0.000)	122.80 (0.000)
N	10,249	10,249	10,249

Note. The table displays the DiD estimates that address the violation of the trend parallel assumption or reverse causality. Figures in parentheses are t-statistic. Symbols ***, **, * denote significance at the 1 %, 5 %, and 10 % levels, respectively.

results of this analysis are presented in Table 3. We focus on firms that eventually adopt to build event windows and generated three new variables: $UD_{-3\ to\ 0}$, UD_{+1}, and $UD_{+2\ to\ +3}$. These variables are dummy indicators that equal one if a firm's headquarters is located in a State that has adopted UD laws (e.g., Connecticut, Iowa, Idaho, Massachusetts, Rhode Island, Maine, Pennsylvania, and Texas) for the three-year period prior to the adoption of the UD law ($UD_{-3\ to\ 0}$), for the first effective year (UD_{+1}), and for the second and third years following the adoption of the UD law ($UD_{+2\ to\ +3}$), respectively. The dummy variables equal zero otherwise. The results indicate that the post-UD law adoption variables, UD_{+1} ($\beta = 0.482$, $t = 4.97$) and $UD_{+2\ to\ +3}$ ($\beta = 0.477$, $t = 5.05$), are both statistically significant and positive at the 1 % level, while the pre-adoption variable, $UD_{-3\ to\ 0}$, is statistically insignificant ($\beta = 0.274$, $t = 1.30$). This suggests that firms in States that have implemented UD laws exhibit an increase in GHG emissions only after the introduction of these laws. Thus, our findings are not driven by a violation of the parallel trends assumption.

To further ensure that our results are not affected by endogeneity, Table 4 presents the results of two additional endogeneity tests: the Oster test of coefficient stability (Panel A) and propensity score matching (Panel B). In both analyses, the outcome variable is firm-level GHG emissions, with the key regressor being whether the U.S. State in which the firm operates has adopted the UD law, which is associated with lower shareholder litigation risk.

The Oster (2019) test assesses the robustness of regression coefficients to omitted variable bias by comparing coefficient estimates and R^2 values from models with and without control variables. It involves examining the stability of coefficients, the increase in R^2 when controls are added, and estimating a bounded set for the coefficient that considers the maximum possible R^2, using a bias adjustment parameter δ set to 1. If the bounded set does not include zero, it indicates that the effect of the independent variable is robust to omitted variable bias, providing confidence in the causal inference. Panel A shows a controlled estimate of the coefficient for litigation risk β at 0.580, with a high R^2 of 0.801, indicating a strong model fit with control variables included. In contrast, the uncontrolled estimate is 0.736 with a low R^2 of 0.036, suggesting a weak model fit without controls. The identified set for β ranges from 0.580 to 0.591, which does not include zero, indicating robustness to potential omitted variable bias. The stability of the controlled estimate, despite the significant increase in the uncontrolled estimate, suggests that the model is robust to omitted variable bias. The high R^2 for the controlled model implies that most of the variance in GHG emissions is explained when including control variables, thus reducing concerns about endogeneity.

Propensity score matching (PSM) estimates the causal effect of a treatment by accounting for covariates that predict receiving the treatment. It involves estimating the propensity score (the probability of receiving the treatment given observed covariates) through logistic regression, matching treated and control units based on these scores, and ensuring covariate balance between groups. The average treatment effect on the treated is then estimated by comparing outcomes between matched groups, with significance testing to confirm the results. In this study, PSM compares GHG emissions between firms in States with and without UD laws, controlling for firm characteristics, to estimate the causal impact of reduced litigation risk on emissions. Panel B shows that the mean GHG emissions for firms in States with UD laws is 13.359, compared to 12.815 for firms in States without such laws, resulting in a significant difference of 0.544 (*p-value* = 0.000). The significant mean difference in GHG emissions suggests that State-level adoption of UD laws is associated with higher GHG emissions, supporting the hypothesis that reduced shareholder litigation risk leads to increased GHG emissions.

The combined evidence from the Oster test and propensity score matching suggests that the observed relationship between litigation risk and GHG emissions is less likely to be driven by endogeneity. These results highlight that State-level legal environments significantly impact firm-level environmental performance, with reduced litigation risk associated with higher GHG emissions. The web appendix provides the results of several robustness tests (Tables A3-A7), all of which broadly confirm the baseline results.

Table 4
Endogeneity: Oster test and propensity score matching.

Panel A: Oster test (2019)					
Variable	(1) Controlled		(2) Uncontrolled		(3) Parameters (δ=1; R_{max}=min (1.3*R^2,1)
	β	R^2	β	R^2	Identified set.
Litigation	0.580	0.801	0.736	0.036	(0.580, 0.591)
Panel B: Propensity score matching					
			Mean	Difference	P-Value of differences
GHG emissions					
Firms in UD states.			13.359	0.544 (5.23)	(0.000)
Firms in non-UD states.			12.815		

Notes: The table displays the results of the Oster test in Panel A and the results of propensity score matching in Panel B.

6. Channels of influence

We organize the channels into a two-step causal sequence. In Step 1, changes in shareholder litigation pressure reconfigure firms' organizational and financial frictions, via reputational exposure, stakeholder scrutiny, and tighter external finance, thereby shifting managerial attention and budgets away from (or toward) abatement (Wu et al., 2020; Donelson et al., 2024a,b; Autore et al., 2014). Because emissions reduction is capital- and attention-intensive, relaxing litigation pressure can free slack that raises realized emissions on average (Wang et al., 2021; Bartram et al., 2022). In Step 2, the manifestation of these frictions, and thus the size of the UD effect, varies systematically across contexts that already constrain managers: (i) industry carbon intensity and sectoral regulation (Kim and Skinner, 2012; He et al., 2022; Provaty et al., 2024; Bauckloh et al., 2023), (ii) financing capacity (measured by the Whited–Wu index), and (iii) managerial mobility and career concerns shaped by the Inevitable Disclosure Doctrine (IDD) (Klasa et al., 2018; Chen et al., 2008; Canil et al., 2023; Colak and Korkeamäki, 2021; Tandon and Toh, 2022). Table 5 implements this sequence empirically: Column (1) tests industry-based attenuation, Column (2) tests financing-constraint attenuation, and Column (3) tests IDD-based attenuation, each as moderators of the Step-1 link from litigation pressure to abatement effort.

In step 1, shareholder litigation pressure reshapes firms' internal and external constraints by elevating reputational exposure, disrupting commercial relationships, and tightening financing conditions. Lawsuits can damage credibility with customers and suppliers (Donelson et al., 2024a,b) and signal heightened distress risk to lenders, restricting access to external capital (Autore et al., 2014). These frictions are first order for emissions because abatement is capital and attention intensive: firms must fund infrastructure upgrades and low carbon technologies and dedicate managerial bandwidth to compliance. When legal pressure falls, these constraints loosen and resources can be reallocated away from abatement, raising realized emissions—whereas higher pressure maintains discipline (Wu et al., 2020; Wang et al., 2021b; Bartram et al., 2022). This step is reflected in the direct UD (litigation risk) coefficients across Table 5: Column (1) β = 0.485 (t = 3.24); Column (2) β = 0.535 (t = 3.88); Column (3) β = 0.325 (t = 4.01), all positive and significant, indicating that lower litigation pressure is associated with higher emissions, consistent with a loosening of organizational/financial constraints.

In step 2, these frictions manifest differently by industry, financing capacity, and managerial mobility. Although litigation induced frictions push emissions upward on average, their bindingness varies across

Table 5
Channels of influence.

Variable	Industry (1)	Financial constraints (2)	IDD adoption (3)
Litigation risk	0.485*** (3.24)	0.535*** (3.88)	0.325*** (4.01)
Industry	0.359*** (2.67)		
Litigation × Industry	−0.395** (−2.34)		
Financial constraints		0.192*** (3.34)	
Litigation × Constraints		−0.152** (−1.99)	
IDD adoption			0.350*** (2.69)
Litigation × IDD adoption			−0.435*** (−2.30)
Constant	0.415 (0.40)	0.441 (0.39)	0.749 (0.64)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes
State and year FE	Yes	Yes	Yes
Adj. R^2	44.52	43.75	41.84
F-statistic (P-value)	63.34 (0.000)	44.61 (0.000)	37.38 (0.000)
N	10,145	10,225	10,242

Notes: The table identifies economic channels through which litigation risk influences GHG emissions. T-statistic values are included in parentheses. The outcome variable is firm-level GHG emissions, and the key independent variable is our proxy for shareholder litigation risk. Controls include firm-specific characteristics. A DiD approach based on OLS model with fixed effects and State-clustered standard errors is used. Model (1) demonstrates the mediating effect of industry. Model (2) highlights the mediating effect of financial constraints. Model (3) examines the mediating effect of IDD adoption. Symbols ***, **, * denote significance at the 1 %, 5 %, and 10 % levels, respectively.

contexts that already discipline managers or limit capital reallocation. We examine three such contexts, industry carbon intensity, financing constraints, and managerial mobility (IDD), and test whether they attenuate the litigation effect, as predicted by the sequential mechanism. The updated estimation model with the moderating effects for each mechanism is presented as follows:

$$GHG_{ist} = \beta_0 + \beta_1 UD_{st} + \beta_2 Controls_{ist} + \beta_3 (UD_{st} \times M_{isft}) + \alpha_i + \theta_{st} + \gamma_{ft} + \varepsilon_{ist} \quad (2)$$

Subscripts *i, f, s,* and *t* refer to firm, industry, State, and year, respectively, and M_{isft} is the mechanism. GHG is the dependent variable, measured by the log volume of firm-level GHG emissions. UD is the key independent variable, capturing whether the State has adopted a UD law and serving as a proxy for shareholder litigation risk. Table 5 implements this specification three times by substituting M: (i) Environmental-intensive industry, (ii) High-constraints (Whited–Wu above median), and (iii) IDD (state-court adoption). The interaction coefficient β_3 tests whether the UD effect is attenuated ($\beta 3 < 0$) where sectoral scrutiny, capital frictions, or career-concern constraints bind.

6.1. Industry carbon intensity

Industries differ in regulatory exposure and baseline carbon intensity. Energy, manufacturing, and materials face stricter compliance and greater environmental scrutiny than many service sectors (Kim and Skinner, 2012), and climate legislation induces sector specific strategies (He et al., 2022). Consistent with this, manufacturing/materials/energy firms report higher emissions on average (Provaty et al., 2024), and mandatory reporting tightens discipline (Bauckloh et al., 2023).

Litigation risk has weaker effects in carbon-intensive industries. We code a dummy for Environmental-intensive industry = 1 (mining, metals, chemicals, oil, paper, and energy) and interact it with the litigation-risk indicator. Table 5, Column (1) shows a positive main effect of litigation risk ($\beta = 0.485$, $t = 3.24$), higher average emissions for environmental-intensive industries ($\beta = 0.359$, $t = 2.67$), and a negative, significant interaction (UD × Environmental-intensive: $\beta = -0.395$, $t = -2.34$). Carbon-intensive sectors face stricter compliance regimes and reputational scrutiny (Kim and Skinner, 2012; He et al., 2022), mandatory reporting tightens discipline (Bauckloh et al., 2023), and firms in manufacturing/materials/energy start from higher emissions baselines (Provaty et al., 2024). These forces substitute for litigation pressure, leaving less marginal slack to be created by a reduction in legal threat. Thus, litigation pressure primarily matters where baseline environmental incentives and scrutiny are weaker, which is why the UD effect is attenuated in high-emission industries).

6.2. Financing capacity

Litigation risk is tightly linked to financing frictions (Wu et al., 2020). Reputational damage can raise perceived risk and tighten external finance (Donelson et al., 2024a,b; Autore et al., 2014). Because emissions reduction requires large, upfront investment, financially constrained firms may be unable to scale abatement regardless of legal pressure (Wang et al., 2021a; Bartram et al., 2022). To operationalize our analysis, we construct the Whited–Wu (2006)index using DataStream variables, as follows:

$$WW\ index = 0.091\ CF_{it} - 0.062\ Div_{it} + 0.021 Lev_{it} - 0.044\ Size_{it} + 0.102\ IGrowth_{it} - 0.035\ Growth_{it}$$

where for state *i* and year *t*, *CF* is cash flow/total assets, Div is a dividend dummy, *Lev* is total debt/total assets, *Size* is ln(market cap), *IGrowth* is 2-digit SIC industry growth, and *Growth* is firm sales growth. Higher WW denotes stronger constraints. We then set *High constraints* = 1 if WW is above the sample median. Table 5, Column (2) reports a positive main effect of litigation risk ($\beta = 0.535$, $t = 3.88$), a positive direct effect of financial constraints on emissions ($\beta = 0.192$, $t = 3.34$), and a negative, significant interaction (UD × High-constraints: $\beta = -0.152$, $t = -1.99$). Litigation-related reputational shocks restrict external finance (Donelson et al., 2024a,b; Autore et al., 2014; Wu et al., 2020), and because abatement requires large, upfront investment, constrained firms have limited capacity to reallocate budgets away from abatement when legal pressure falls, yielding a smaller incremental effect (Wang et al., 2021a; Bartram et al., 2022). Thus, binding capital frictions substitute for litigation pressure in limiting managers' discretion, attenuating the UD effect where financing is tight.

6.3. Managerial mobility and career concerns: inevitable disclosure doctrine

Adoption of the Inevitable Disclosure Doctrine (IDD) restricts employee mobility to protect trade secrets and can intensify executive career concerns (Klasa et al., 2018; Chen et al., 2008). Where mobility is more limited and personal downside risks are salient, career concerns substitute for litigation pressure, adding discipline that can sustain abatement (Canil et al., 2023; Colak and Korkeamäki, 2021; Tandon and Toh, 2022).

Litigation risk has weaker effects where IDD heightens executive career concerns and limits mobility. We set IDD = 1 for states whose courts adopt the IDD and interact it with litigation risk. Table 5, Column (3) shows a positive main effect of litigation risk ($\beta = 0.325$, $t = 4.01$), a positive direct effect of IDD ($\beta = 0.350$, $t = 2.69$), and a negative, significant interaction (UD × IDD: $\beta = -0.435$, $t = -2.30$). By restricting mobility to protect trade secrets, IDD increases executives' personal downside risk (Klasa et al., 2018; Chen et al., 2008), so career concerns act as an alternative disciplining device, sustaining abatement even when litigation pressure weakens (Canil et al., 2023; Colak and Korkeamäki, 2021; Tandon and Toh, 2022). Thus, IDD supplies substitute constraints, so lower litigation pressure produces smaller increases in emissions in IDD states.

Step 1 above shows that a reduction in shareholder litigation pressure creates slack by relaxing organizational and financing constraints, raising emissions on average. Step 2 demonstrates that this incremental slack is smaller where other constraints already bind, in carbon intensive industries, under strong financing frictions, and where IDD heightens managerial career concerns, yielding the observed negative UD interactions in Table 5. These results integrate the mechanisms into a single, sequential causal narrative rather than parallel add-ons.

7. Conclusions

This study investigates the effect of shareholder litigation risk on firms' environmental performance, specifically measured by firm-level GHG emissions. The central takeaway is a big-picture, conditional one: litigation pressure alone does not guarantee better environmental performance. Its impact depends on context, in particular, industry environment, financing capacity, and managerial incentives. Using cross-state variation in U.S. Universal Demand (UD) laws, which raise the threshold for shareholder derivative litigation and thus lower litigation pressure, we show that reductions in litigation pressure are associated with higher GHG emissions. In other words, when the external legal constraint loosens, firms emit more on average.

Our analysis documents a positive and significant effect of UD adoption on emissions, indicating that lower shareholder litigation risk is associated with higher GHG emissions and, consequently, worse environmental performance. The dominance analysis further reveals that the relative contribution of litigation pressure exceeds that of some firm-level characteristics (e.g., leverage and return on assets), especially in high-income states, though it is smaller than others such as tangibility, market valuation, and earnings volatility. These patterns align with theoretical perspectives in which credible legal threat disciplines managerial behavior (disciplinary/pressure), managers weigh reputational/legal risk when making trade-offs (trade-off) and reduced external pressure can enable a "quiet life" that deprioritizes efficient environmental projects.

Our findings are robust to a broad set of checks: alternative measures of key variables, alternative estimation models, added controls, and endogeneity diagnostics. Importantly, we trace how litigation pressure operates by organizing mechanisms into a single, sequential flow: legal pressure creates organizational and financial frictions that shape abatement effort, and these frictions manifest differently across contexts. We identify three moderating contexts in which the UD effect is attenuated: (i) industry carbon intensity and sectoral scrutiny, (ii) financial constraints (measured by the Whited–Wu index), and (iii) managerial mobility and career concerns shaped by IDD adoption. Together, these results show that litigation pressure's environmental impact is conditional rather than universal.

Beyond contributing to the non-financial performance literature, the evidence strengthens the view of litigation pressure as an external governance mechanism that can mitigate agency conflicts and encourage environmental improvement, while also engaging stakeholder and strategic management perspectives: stakeholders and market participants use legal exposure to shape managerial attention, and proactive environmental management can serve as risk mitigation and competitive positioning.

The results point to a policy mix, not a single lever. Policymakers should design litigation rules alongside supporting institutional frameworks. In practice, this means (i) calibrating derivative-suit thresholds and related litigation rules to sustain meaningful accountability; (ii) pairing legal incentives with financing support for the green transition (e.g., credit guarantees, green lending facilities, accelerated depreciation for low-carbon capital) so constrained firms can actually invest in abatement; and (iii) adopting industry-specific policies and standards in carbon-intensive sectors where technical compliance needs and scrutiny are greatest. Because managerial incentives shape how legal pressure translates into action, complementary measures that tie executive pay and career concerns to credible climate targets can further enhance effectiveness. Within this policy mix, shareholder activism remains important—especially in contexts where baseline environmental incentives are weak—but it works best when embedded in a supportive financing and sectoral policy environment rather than relied upon in isolation.

Finally, our conclusions are bounded by design choices and scope. The study focuses on the U.S. setting and uses UD adoption as a proxy for litigation pressure; future work should examine other jurisdictions, alternative sources of legal variation, and richer measures of litigation risk. It would also be valuable to track investment in abatement more directly to illuminate the intermediate resource-allocation channel that links legal pressure to realized emissions.

CRediT authorship contribution statement

Mohamed Shaker Ahmed: Software, Investigation, Formal analysis, Conceptualization. **Charilaos Mertzanis:** Writing – review & editing, Supervision, Methodology, Data curation.

Declaration of competing interest

The authors declare no conflicts of interest in carrying out this research.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jenvman.2025.127990.

Data availability

Data will be made available on request.

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