Managerial Career Concerns and Corporate Environmental Policies

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Abstract

Utilizing quasi-exogenous contractions in CEOs' external job opportunities following the staggered adoption of the Inevitable Disclosure Doctrine (IDD) across U.S. state courts, we investigate the impact of CEO career concerns on corporate environmental policies. Our findings indicate that after IDD adoption in a firm's headquartered state, toxic chemical emissions from its affiliated facilities increase. This rise in emissions is particularly pronounced in firms where CEOs face significant dismissal risks and is positively associated with concurrent improvements in financial performance. Additionally, firms respond to IDD by strategically increasing emissions in states with lax environmental regulations. We also examine the moderating effects of CEOs' tenure, pre-IDD job mobility, past financial performance, financial constraints, corporate governance, and institutional ownership. Overall, our results suggest that the fear of job loss drives CEOs to prioritize short-term financial gains over long-term value and reputation.

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Keywords: Corporate environmental responsibility, Job mobility, Inevitable disclosure doctrine, Managerial career concern

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1 Introduction

CEOs hold a pivotal role in shaping corporate strategies, with their incentives primarily influenced by potential financial and non-financial rewards. Among these, implicit incentives arising from career concerns, particularly those linked to the dynamics of the managerial labor market, stand out as crucial determinants. The impact of these labor market incentives on various corporate outcomes has been well-documented, including their influence on acquisitions (Jenter and Lewellen, 2015), the timing of news disclosures (Baginski et al., 2018), and innovation activities (Tian and Wang, 2011). Notably, surveys of executives reveal that opportunities for career progression in the labor market often outweigh the importance of their current compensation packages (Graham, Harvey, and Rajgopal, 2005).

In today's business landscape, where strong Environmental, Social, and Governance (ESG) performance is a critical shareholder expectation, our study delves into the effect of managerial labor market conditions on Corporate Environmental Responsibility (CER) initiatives. Specifically, we examine how shifts in external job opportunities affect managerial decision-making in CER. Our empirical analysis centers on quasi-exogenous variations in CEOs' career opportunities, stemming from the staggered adoption or rejection of the Inevitable Disclosure Doctrine (IDD) injunctions in U.S. state courts. The IDD restricts departing employees from joining competitors or assuming specific roles in new organizations if such moves could inevitably lead to the revealing of proprietary information. Consequently, IDD adoption significantly influences job mobility, particularly for top executives and key knowledge workers (Seaman, 2015; Png, 2017).

We quantify a CEO's engagement and resource allocations toward CER using corporate toxic emissions as a proxy. Assessing a company's commitments to CER principles often requires access to proprietary information not disclosed externally. To address this challenge, we utilize data from the Environmental Protection Agency's (EPA) Toxics Release Inventory (TRI) program. The EPA's stringent oversight ensures the reliability of the toxic emissions data reported by production facilities, providing us with an accurate measure of the resources companies dedicate to CER initiatives (Xu and Kim, 2022). To reduce toxic emissions, plants need to invest significant financial, operational, and human resources, including the use of greener inputs, modification of production processes, or installation of clean-up technologies.

The quantity of final disposal of toxic emissions reflects the deliberate decisions of a firm's abatement strategies.

In assessing the influence of CEOs' career concerns on corporate environmental practices, we conduct a difference-in-differences (DiD) panel regression analysis using plant-level toxic emissions data. We compare the changes in the level of corporate toxic emissions following the adoption of IDD in state courts between firms headquartered in states that recognize IDD (treated) and firms headquartered in states where IDD does not apply (control). The results align with the prediction derived from career concern models, revealing a significant increase in toxic emissions from companies after the implementation of IDD in the states where their headquarters are located. Our findings suggest that the introduction of IDD weakens the effectiveness of CER initiatives. This implication points to a potential realignment in corporate priorities, which could be a response to the altered labor market conditions for CEOs triggered by IDD.

Existing literature highlights how changes in external job opportunities can distinctly influence two key aspects of career concerns for CEOs: the prospects for career advancement ("upward career concern") and the threat of losing their current role ("downside career concern"). Ali et al. (2019) found that the adoption of IDD, which limits job mobility, tends to shift CEOs' focus away from upward career progression and towards heightened job security concerns. This shift in focus can lead CEOs to prioritize short-term financial performance over long-term value or reputational gains, due to the prevailing criteria used in CEO evaluations and replacement decisions (Stein, 1988; Weisbach, 1988; Huson, Malatesta, and Parrino, 2004). This evaluation framework sets financial performance as the primary benchmark and uses other performance metrics including ESG as supplementary criteria (Hubbard et al., 2017).

Faced with decisions about CER initiatives, which may adversely impact short-term financial outcomes, CEOs are confronted with a challenging trade-off. They must consider the potential benefits of demonstrating high-quality leadership for career advancement against the risks associated with potential job loss. Consequently, the adoption of IDD could discourage CEOs from pursuing CER efforts that are oriented towards building long-term reputational capital. Instead, they may be inclined to focus on short-term financial achievements as a strategy to secure their current positions.

Exploring the economic mechanisms through which IDD adoption impacts CER practices, we examine three distinct scenarios that significantly intensify incumbent CEOs' career concerns.

First, we hypothesize that CEOs who underperform compared to their industry peers are more likely to curtail CER investment to enhance financial performance, a primary factor in CEO evaluation. Prior studies have shown that these CEOs are particularly mindful of their career prospects and job security (Kothari, Shu, and Wysocki, 2009; Pae, Song, and Yi, 2016). Second, we posit that shorter-tenured CEOs are more focused on financial performance following IDD adoption, since their retention is more reliant on short-term financial results. These CEOs tend to possess less authority for entrenchments (Finkelstein, 1992) and are subject to boards that lack a complete understanding of their managerial effectiveness (Gibbons and Murphy, 1992). Finally, we propose that the impact of IDD adoption in curtailing job opportunities for outgoing CEOs is more pronounced in industries where generalist skills are required. Without IDD restrictions, these CEOs are more likely to secure alternative positions in other firms (Cremers and Grinstein, 2014). Our findings indicate a marked increase in toxic emissions in these scenarios, underscoring CEOs' career concerns as a key economic driver.

We delve deeper into the relationship between CEOs' dismissal risks (or downside career concerns) and CER policies, using the forced CEO turnover data from Peters and Wagner (2014). In the preliminary analysis, we observe that IDD adoption leads to a notable increase in toxic emissions in the final firm-years of tenure for CEOs who are subsequently dismissed. To address potential endogeneity issues, we conduct a two-stage least squares regression, employing industry-level return volatility as an instrumental variable for predicting forced turnover events, following the approach of Peters and Wagner (2014). In the first stage estimation, a positive relationship emerges between industry-level return volatility and the likelihood of forced CEO turnover. In the second stage estimation, we find that firms with a higher risk of CEO turnover exhibit a more substantial increase in toxic emissions following IDD adoption. This underscores the adverse impact of dismissal risks associated with underperforming CEOs on corporate ESG engagements.

Our findings indicate that the increased toxic emissions following IDD adoption are primarily attributable to underperforming CEOs prioritizing short-term performance to secure their current positions, rather than outperforming CEOs aiming to enhance reputation capital for future career advancements. Essentially, the pivotal economic driver behind the heightened emissions is the downside career concerns of CEOs. Furthermore, our results suggest that the reduction in CEOs' external job opportunities tends to intensify managerial myopic behavior, where there is a prioritization of short-term performance at the expense of long-term value, including CER initiatives. This impact of IDD becomes more pronounced in circumstances where CEOs at a higher dismissal risk. The constraints on their ability to move to other firms heightens the value of their current positions, thereby discouraging them from embracing a long-term perspective.

We perform several robustness checks to further substantiate our findings. First, we hypothesize that the decline in CER investment following IDD adoptions could be more severe under tighter financial constraints. In situations where financial flexibility is limited, managers might be compelled to curtail pollution abatement expenditures in order to sustain strong earnings figures. Aligning with the hypothesis that managers divert resources away from CER investments, our analysis reveals that the rise in toxic emissions after IDD adoption is significantly greater in firms experiencing heightened financial constraints.

Next, we predict that the impact of IDD is more pronounced in firms where IDD adoptions more significantly restrict the labor markets for existing CEOs or in cases where CER initiatives present a substantial trade-off with financial performance. Our findings are in line with these predictions. We observe that IDD adoptions lead to a more substantial increase in toxic emissions in firms with intensive R&D activities, where the protection of trade secrets is critical to business operations. Additionally, we find that IDD adoption is particularly effective in elevating toxic emissions in heavily polluting firms, where CEOs encounter a heightened tension between maintaining financial performance and reducing toxic chemical emissions.

Furthermore, we investigate the role of governance mechanisms in counteracting the effects of IDD adoption on CER initiatives. Our findings indicate that effective managerial monitoring by boards and shareholders can mitigate the shift towards short-term performance management at the expense of CER. In terms of board monitoring, we discover that IDD adoption prompts an increase in toxic emissions primarily in firms where the board has a high fraction of co-opted independent directors, who are perceived to have weaker monitoring incentives (Coles et al. 2014). Regarding shareholder monitoring, our analysis reveals that a significant rise in toxic emissions following IDD adoption occurs mainly in firms where shareholders are highly distracted from firm management (Kempf et al., 2017). However, shareholders' pressures could have detrimental effects on CER adjustments. Specifically, we find that the IDD-induced rise in toxic emissions is more pronounced in firms with a substantial presence of transient investors, which typically prioritize short-term financial performance, or hedge funds, which may threaten the job security of underperforming CEOs.

Finally, we assess whether firms strategically adjust toxic emissions across different facilities. Our findings indicate that, following the adoption of IDD, firms tend to increase toxic emission solely in facilities located in states with lenient environment regulations. This suggests that the implementation of IDD prompts CEOs to evaluate CER initiatives primarily in terms of short-term financial costs, such as regulatory fines, rather than considering long-term reputational impacts.

As a validity check for our empirical setting, we further examine the effect of IDD on firms' short-term financial performance and its relationship to toxic emissions. We find that the IDD leads to short-term performance enhancements exclusively in firms that were lagging behind their industry peers in the previous year. This result suggests that the adoption of IDD encourages CEOs to focus more on financial performance, especially in financially underperforming firms. Additionally, we find that toxic emissions are positively associated with financial performance in firms that locate their headquarters in states adopting the IDD. This relationship is not observed in other firms, indicating that firms tend to compromise CER activities for short-term financial gains after adopting IDD.

We make several contributions to the existing literature. Firstly, we extend the literature by examining how managerial incentives impact firms' ESG activities. In the realm of managerial career concerns, while prior studies have noted that upside career concerns promote corporate social responsibility activities (e.g., Dai et al., 2023; Jia, Gao, and Fang, 2023), our novel evidence reveals that downside career concerns create myopic incentives that deter ESG investments. Furthermore, our perspective adds to the growing body of research emphasizing the inefficiencies associated with 'short-termism' in corporate decision-making. By highlighting the potential conflict between short-term and long-term effects of ESG actions, our study underscores the importance of managerial perspectives. Managers with a short-term focus may undervalue ESG intangibles, potentially resulting in an underinvestment in ESG initiatives, whereas shareholders stand to benefit in the long term from appropriately prioritized ESG actions. This nuanced understanding contributes to a deeper comprehension of the multifaceted dynamics influencing corporate sustainability practices.

We also add to the literature by exploring the ongoing discussion concerning why firms engage in ESG actions. ESG actions can be a result of proper corporate governance in which ESG initiatives are employed for the benefit of stakeholders, including shareholders. Our findings indicate that managers indeed possess considerable flexibility in modifying ESG actions, and managerial career concerns can force them to underinvest in corporate ESG actions, possibly at the shareholders' expense. Our findings differentiate from the strand of literature arguing ESG initiatives represent an agency cost (Benabou and Tirole, 2010; Cheng et al., 2016; and Masulis and Reza, 2015). According to the agency problem theory, managers engage (over-invest) in ESG initiatives to serve their personal interests.

Our findings also add value to the literature on the practice of incorporating ESG targets into CEO compensation contracts (e.g., Cohen, Kadach, Ormazabal, and Reichelstein, 2023). Our results suggest that the board of directors should consider how CEOs’ implicit incentives influenced by the CEOs’ career concerns influence ESG outcomes when they design the compensation contract. The adoption of ESG metrics may be more impactful in situations where CEOs are likely to have greater downside career concerns.

The paper is organized as follows: Section 2 provides institutional background and develops testing hypotheses. Section 3 describes the data and sample. Section 4 introduces the empirical methodology. Section 5 presents the main results, while Section 6 provides the results of robustness checks. Finally, Section 7 concludes.

2 Institutional Background and Hypotheses Development

2.1 Inevitable Disclosure Doctrine

The IDD is a legal principle rooted in trade secrets and intellectual property law. First introduced in the Uniform Trade Secrets Act by the National Conference of Commissioners on Uniform State Laws in 1979, this doctrine has since been adopted and codified in varying forms by the majority of U.S. states. Under the IDD, an employer in a trade secrets case can establish a threat of misappropriation by asserting that the new role of a former employee will inevitably require them to rely on the employer's trade secrets. The concept of threatened misappropriation, crucial to understanding the IDD, arises when an employee with knowledge of a company's trade secrets takes up a comparable position with a competitor (Klasa et al., 2018; Chen et al., 2022).

The IDD grants state courts the authority to prohibit employees from taking up a new position if it is deemed that they would inevitably disclose or utilize trade secrets from their former employer during their tenure. Acknowledging the IDD allows a court to infer that a former employee is likely to disclose confidential information in their new role, even in the absence of explicit evidence supporting such disclosure. This recognition offers a company the means to assert a crucial claim, particularly when direct evidence of misconduct may be lacking.

The doctrine is contentious as it could oblige a court to enforce an implied non-compete agreement, thereby binding the former employee, even without an explicit agreement. It is important to acknowledge that employees possess the autonomy to switch jobs and apply their skills in new settings. The acceptance and application of the IDD vary across states within the U.S., with not all jurisdictions recognizing it.

The application of the IDD typically necessitates demonstrating that the trade secrets in question are genuine secrets—information not widely known or easily obtainable—and that they hold significant value for the business. Additionally, it must be shown that the previous employer took reasonable precautions to maintain confidentiality. The doctrine is mainly invoked in cases where a highly skilled or knowledgeable employee transitions from their job to a similar role with a competitor. There is a significant concern that this employee might intentionally or unintentionally disclose the former employer's trade secrets or leverage them in their new capacity.

The landmark case that established the precedent for the IDD is PepsiCo, Inc. v. Redmond. In this case, the defendant Redmond, a former upper management member at PepsiCo, had signed a confidentiality agreement but not a non-compete agreement. Upon leaving PepsiCo for a similar role at competitor Quaker, PepsiCo sought an injunction to prevent Redmond from assuming his duties or disclosing trade secrets, primarily involving strategic sales, marketing, logistics, and financial information. The court observed that unless Redmond had an exceptional ability to compartmentalize information, he would inevitably make decisions based on his knowledge of PepsiCo's trade secrets. Given that Quaker directly competed in the same "sports drinks" market, and Redmond's new role mirrored his old one at PepsiCo, the court granted an injunction preventing Redmond from starting his new role at the competing company.

It is noteworthy that the events of IDD adoption or rejection are quasi-exogenous to individual firms. The staggered judicial decisions made by state courts are likely not anticipated or influenced by corporations headquartered nearby. Unlike legislative events, which involve many rounds of discussions and negotiations, court decisions are largely determined by the merits of each case and the judgment of court judges. Moreover, court decisions are unlikely to be driven by local economic conditions or captured by lobbying efforts of local industries. The decisions regarding the adoption of the IDD are unlikely to aim to alter corporate environmental policies. Thus, the events of IDD adoption or rejection provide an ideal laboratory to explore the causal relationship between managerial labor market incentives and CER.

We refer to Klasa et al. (2018) and Chen et al. (2022) to compile details on IDD adoption and subsequent rejection cases. As outlined in Table A2, New York was the first U.S. state to adopt the IDD in 1919. Throughout our sample period, a total of 21 states had at some point adopted the IDD. However, 10 states subsequently rejected the IDD after its initial adoption by the court (Chen et al., 2022).

2.2 Hypotheses Development

IDD adoption heightens CEO career concerns by limiting their future job mobility. In terms of upside career concerns, IDD adoption reduces CEOs' opportunities to transition to other firms in pursuit of higher compensation or social prestige. Concerning downside career concerns, IDD adoption increases the cost of dismissal from the current position by making it challenging for CEOs to secure their next job after leaving the firm. One might argue that incumbent CEOs become more entrenched post IDD adoption, creating challenges for firms to hire externally. However, evidence presented in Table A3 of the appendix suggests that IDD adoptions do not significantly impact the likelihood of forced turnover. Additionally, according to Chen et al. (2022), the likelihood of internal promotion increases following IDD adoption. Taken together, these findings suggest that IDD adoption amplifies the downside career concern for underperforming CEOs rather than reinforcing their entrenchment.

Given that CEOs are significantly influenced by their perceptions of outside opportunities and the resulting career path consequences (Watts and Zimmerman, 1978; Graham, Harvey, and Rajgopal, 2005), we anticipate that IDD will significantly alter managers' incentive schemes. The substantial restrictions on future career movement imposed by IDD markedly diminish the value of building CEOs' reputation capital, which, as shown by Dai et al. (2023), facilitates CEOs in securing their executive positions.

Moreover, the job mobility constraints imposed by IDD may shorten the time horizon of CEOs' management decisions, especially those teetering on the brink of dismissal, compelling them to prioritize immediate financial performance to mitigate the risk of being dismissed. Jenter and Lewellen (2021) reported that approximately 38%–55% of CEO turnovers are performance-induced. In line with these findings, survey results presented by Graham, Harvey, and Rajgopal (2005) reveal that CEOs' primary motivations to surpass earnings benchmarks stem from concerns about career progression. Chen et al. (2022) find that, as departing CEOs are likely to face challenges in securing the next job under IDD, they become more risk-averse in corporate decisions to mitigate dismissal risks. Given that IDD adoption amplifies the value of the current position, reduced job mobility can incentivize CEOs to prioritize short-term earnings or financial performance to avert the risk of job loss.

Based on the preceding discussions, we posit that IDD adoptions prompt CEOs to allocate fewer resources to CER initiatives. These initiatives, aimed at building long-term value or reputational capital, often involve activities such as using cleaner inputs, improving chemical treatment to reduce the toxicity of final disposals, and installing abatement facilities—all of which require financial resources (U.S. Census Bureau, 2005; Xu and Kim, 2022). Edmans (2011) emphasizes that actions tied to corporate ESG practices significantly impact long-term stock prices. Similarly, Stark, Venkat, and Zhu (2022) demonstrate that investors with a broader investment scope are attracted to robust ESG-performing stocks. As IDD adoptions increase the risk of job dismissal and diminish career advancement opportunities, CEOs have incentives to reallocate resources from long-term investments to projects that enhance short-term earnings and stock prices. We hereby formalize the following hypothesis:

Hypothesis 1 (Change in CER after the IDD Adoption) *Following the court's adoption of IDD in the state where a firm's headquarters is located, there is a reduction in spending on CER which results in an increase in toxic emissions.*

We additionally hypothesize that the impact of IDD on CER is particularly pronounced when CEOs face a heightened demand or increased opportunities for external job positions. We consider three specific scenarios indicative of strong job transition demand and opportunities for CEOs. Firstly, we predict that CEOs trailing industry peers in short-term financial performance are more likely to actively seek external career opportunities due to the discussed dismissal risks. Secondly, we anticipate that CEOs find more job transition opportunities in industries where outside hires are prevalent. Cremers and Grinstein (2014) emphasize that in such industries, CEOs are often required to possess general skills, facilitating their movement to other firms within the same sector. Finally, we expect that CEOs in the early stages of their tenure exhibit a greater demand for external career opportunities. Gibbons and Murphy (1992) highlight that career-related concerns are less pronounced as managers approach retirement. Yim (2013) and Li, Low, and Makhija (2017) reported empirical evidence about young CEOs' stronger incentives for seeking career advancements. In summary, we hereby articulate the following hypothesis:

Hypothesis 2 (Career concerns and IDD-induced effect) *The IDD-induced effect on CER investments is more pronounced among firms facing diminished short-term earnings, operating in industries where external CEO hires are more common, or led by shorter-tenured CEOs.*

While both upside and downside career concerns can contribute to the IDD-induced effect on CER, we delve deeper into the significance of downside career concerns and dismissal risks. Previous studies have highlighted the positive relationship between CEOs promoting ESG-related investments and building reputational capital for their career advancement, reflecting upside career concerns (e.g., Dai et al., 2023; Jia, Gao, and Fang, 2023). Conversely, the impact of downside career concerns on corporate ESG activities has been relatively unexplored. Considering that IDD adoption heightens the downside career concerns of CEOs, we anticipate that those on the brink of dismissal would exhibit a more aggressive reduction in spending on CER. Formally, we hypothesize as follows:

Hypothesis 3 (Dismissal risks and IDD-induced effect) *The IDD-induced effect on CER investments is more pronounced among firms where CEOs are on the verge of dismissal.*

Additionally, we hypothesize that the tighter a firm's financial constraints are, the stronger the incentives to redirect resources from pollution abatement to other operational activities become. Pollution abatement practices involve modifying production processes to produce less toxic waste, using less toxic fuels and chemical inputs, or installing clean-up technologies. Developing and implementing these abatement strategies requires financial investment. When a firm faces greater financial limitations, it is more likely to prioritize cost-cutting measures in pollution abatement, potentially leading to higher levels of toxic emissions. We thus hypothesize as follows:

Hypothesis 4 (Financial constraints and IDD-induced effect) *The IDD-induced effect on CER investments is more pronounced for financially constrained firms.*

Finally, given that the IDD imposes mobility restrictions on employees with vital proprietary information (trade secrets), we anticipate these restrictions to be more binding in sectors where such proprietary information holds greater significance. We hypothesize that the adoption of the IDD would lead to a more pronounced change in corporate environmental policies, particularly in sectors where this proprietary information is of higher relevance. We thus formalize the following hypothesis.

Hypothesis 5 (Trade secrecy and IDD-induced effect) *The IDD-induced effect on CER investments is more pronounced among firms where trade secrets are more valuable.*

3 Data and Summary Statistics

3.1 Pollution Abatement Data

The EPA, established in 1970, is a federal government agency dedicated to safeguarding human health and the environment. Among its programs, the TRI program monitors facilities in TRI-reportable industries engaged in the manufacture or processing of specific chemicals. Facilities meeting certain criteria, such as ten or more employees and surpassing EPA-prescribed chemical thresholds, must submit a TRI report. The EPA conducts rigorous quality analyses of TRI-reported data, rectifies errors with facilities. Enforcement of TRI reporting rules occurs through EPA regional offices and state governments to ensure compliance with environmental laws. Violations of reporting laws can lead to civil or criminal penalties.

This study concentrates on the total quantity of toxic chemicals disposed of by production facilities owned by publicly listed U.S. companies. To elucidate the waste management process, the study adheres to the EPA's hierarchy, urging organizations to prioritize 'source reduction'—minimizing chemical use and waste generation. Source reduction involves altering processes contributing to pollution and necessitates capital budgeting. Tactics include substituting materials, product redesign, equipment or technology adjustments, and modifying processes or procedures. Companies adopt various waste management forms, including recycling, energy recovery, waste treatment, or disposal. Final disposal, the least preferred option, should be considered only after exhausting other strategies. Thus, the total volume of final emissions considers all waste management practices.

To address changes in the list of monitored toxic chemicals over time, we focus on the core set consistently included in the TRI program since its inception. The EPA oversees the selection of chemicals in this core set, ensuring data accuracy. Our direct data acquisition from the EPA's data administrator avoids survival bias present in data downloaded from the EPA's website, as it includes observations from facilities that have ceased operations.

3.1.1 Non-attainment Data

Under the Clean Air Act Amendments of 1970 (P.L. 91-604, Sec. 109), the EPA sets national ambient air quality standards and classifies each county as non-attainment when an area fails to meet these standards. In non-attainment areas, more stringent requirements are imposed. The lowest achievable emission rate is required in non-attainment areas, while the best available control technology considering economic impacts and other costs is the standard in attainment areas. The EPA also imposes higher penalties in areas with worse pollution. To reduce the volume of toxic emissions, facilities operating in non-attainment areas need to incur additional capital, operational, administrative, and regulatory costs associated with pollution abatement (Jaffe et al., 1995). We obtain county-level attainment status data from the EPA.

3.2 Firm and CEO characteristics

We utilize various datasets to compile information on firm and CEO characteristics. Financial and accounting data at the firm level are sourced from S&P's Compustat annual tape. Historical stock return information is obtained from the Center for Research in Security Prices database. Institutional ownership details for each firm are collected from Thomson-Reuters' 13F Holdings database. Transient investor classification data is sourced from Brian Bushee's website, while hedge fund holdings data is retrieved from Thomson-Reuters Global Ownership database. Industry-level data regarding the likelihood of hiring external CEOs is acquired from Cremers and Grinstein (2014). Additionally, we obtain detailed information on CEO tenure and age from Standard & Poor's (S&P) Execucomp database, and data on CEO forced turnover is derived from Peters and Wagner (2014). Estimates of firm-level intangible capital based on market prices of firm exits are from Ewen, Peters, and Wang (2024).

3.3 Sample construction

Our sample spans the period from 1994 to 2015, utilizing data from the EPA TRI database.[1] To establish links between EPA TRI parent company information and the Compustat databases, we employ a historical name-matching algorithm, following the approach outlined by Xu and Kim (2022). We augment this information by merging CEO tenure and age data from Execucomp, historical headquarters state data from 10-K Header Data, and text-based financial constraint measures from Bodnaruk, Loughran, and McDonald (2015). For each state's IDD adoption or rejection decision, we retain firm-years from states that adopted or rejected within the preceding or subsequent five years, excluding observations from the year of the decision. Additionally, we include all firm-years from states that did not alter IDD status during the sample period (i.e., never adopted, adopted before 1994 and not rejected until 2015, or rejected before 1994). To mitigate potential confounding effects, consistent with Chen et al. (2022), we construct the sample by using the five years before and after each IDD event year.

3.4 Summary Statistics

[1] The sample with hedge funds' holdings starts from 1997.

Table 1 provides summary statistics at both the plant and firm levels for non-utility and utility firms. At the plant level for non-utility firms, the mean natural logarithm of core TRI releases is 7.081, with a standard deviation of 4.266 and a median of 7.949. In contrast, utility firms exhibit a higher mean natural logarithm of core TRI releases at 10.144, a larger standard deviation of 4.969, and a median of 12.181. For non-utility firms, the mean value of the Plant IDD variable is 0.451, with a standard deviation of 0.498 and a median of zero, indicating that slightly less than half of the plants in our sample are located in states that have adopted IDD. Conversely, utility firms show a lower mean value of 0.376 for the Plant IDD variable, along with a standard deviation of 0.485 and a median of zero, suggesting a smaller proportion of these firms are situated in IDD-adopting states. The plant-level natural logarithm of sales for an average firm in the sample is 3.535.

At the firm level, non-utility companies display a mean of 0.481 for the Firm IDD variable, a standard deviation of 0.500, and a median of zero, indicating that slightly less than half of our sampled firms' headquarters are located in states that have adopted IDD. The natural logarithm of total assets has a mean value of 6.765, with a standard deviation of 1.878 and a median of 6.747. The ratios for *Cash/assets* and *CAPEX/assets* have mean values of 0.094 and 0.061 respectively, accompanied by standard deviations of 0.118 and 0.055. Compared to the Compustat universe, companies in our sample have low *Tobin's Q* and high *Tangibility*. The mean value for *Tobin's Q* is 1.659, with a standard deviation of 0.921 and a median of 1.389.

4 Empirical Design

We leverage the quasi-exogenous nature of the IDD adoption and subsequent rejection timing to pinpoint the effects of managerial incentives on corporate environmental policies. Employing the staggered adoption and rejection of the IDD across states, we scrutinize alterations in the corporate environmental policies of firms headquartered in states that adopt or reject the IDD in their state courts. Specifically, we perform DiD regressions at the plant-firm-year level. Our objective is to assess the impact of the IDD by comparing the levels of corporate toxic emissions between firms headquartered in states that recognize IDD (treated) and firms headquartered in states where IDD does not apply (control).

To test whether firms in IDD-adopting states exhibit differential changes in their toxic emissions behavior, we estimate the following panel regression models:

$$\text{Ln(Toxic)}_{i,j,t} = \alpha + \beta\ \text{IDD}_{j,t} + \delta\ \text{Ctrls} + \text{Firm FE} + \text{HQ State FE} + \text{ET State FE} + \text{Ind-year FE} + \varepsilon_{i,j,t}, \quad (1)$$

$$\text{Ln(Toxic)}_{i,j,t} = \alpha + \beta\ \text{IDD}_{j,t} + \delta\ \text{Ctrls} + \text{Plant FE} + \text{HQ State FE} + \text{Ind-year FE} + \varepsilon_{i,j,t}, \quad (2)$$

where Ln(Toxic) represents the natural logarithm of toxic emissions of plant i of firm j in year t; IDD serves as an indicator for the applicability of IDD in the firm's headquarters state in year t; Control variables (Ctrls) contains an indicator for the applicability of IDD in the plant's located state in year t and one-year lagged firm-level control variables such as the natural logarithm of the book value of total assets, Tobin's Q, cash holdings, capital investment, tangibility, and financial constraint. Following the approach of Klasa et al. (2018) and Chen et al. (2022), for firms headquartered in a state that recognized the IDD in year t, we assign a value of one to IDD from year t + 1 to t + 5. Prior to the ruling, all plants in the same state are assigned a value of zero for IDD. When a state court establishes a precedent rejecting the IDD in year t, we set IDD to one from year t − 5 to t − 1, and zero from year t + 1 onwards. To mitigate potential confounding effects, we exclude firm-plant-year observations in the year of adoption or rejection and plants traded across states (i.e., traded between firms headquartered in different states).

The panel regression model in Eq (1) incorporates firm-, headquarters state-, plant location states-, and industry-year-level fixed effects, while the model in Eq (2) includes plant-, headquarters state-, and year-level fixed effects. State fixed effects, defined by headquarters location or plant location, are included to ensure that variations in local economic conditions do not drive our results. Industry-year fixed effects are included to account for common time trends or macroeconomic conditions within sectors. Standard errors are adjusted for clustering at the state-IDD status level, following Chen et al. (2022). For model (1), we also consider a variation that includes firm-, headquarters state-, plant location states-, and year-level fixed effects.

Subsequently, we examine how firms react to statewide job mobility constraints concerning managerial career concerns. The coefficient estimates denoted as β in our estimation models above may vary across firms with different levels of career concerns, as predicted in Hypotheses 2–5. To capture heterogeneity in managerial incentives at the firm level, we utilize CEO tenure, Return on Assets (ROA) as the firm's financial performance measure, the prevalence of external CEO hires in each industry, and financial constraint indices. The sample is divided based on these measures to test whether IDD status influences corporate toxic releases more in subsamples where managerial career concerns are stronger.

5 Main Results

5.1 Effect of IDD status on Toxic Emissions

In our regression analysis, we work with a sample at the plant level. Table 2 presents the baseline results of our regression. The dependent variable is the natural logarithm of the total amount of toxic emissions, measured in tons. In column (1), we employ fixed effects at the levels of Firm, Year, Headquarters State, and Plant State. Standard errors are clustered at the State-IDD level.

The IDD significantly influences a firm's toxic emissions when adopted in the state court where the firm's headquarters are located. This result can be attributed to the proximity of CEOs and executives to the headquarters, exposing them to court decisions made in that state. When the IDD is adopted in the state court where a company's headquarters are situated, it substantially restricts the future job mobility of CEOs. The coefficient of the firm's state IDD dummy is 0.223, displaying statistical significance at the 1% level. In terms of economic magnitude, this suggests IDD adoption increases toxic emission releases by 25%. Consequently, there is a notable rise in the level of toxic emissions released from facilities owned by the parent company located in states adopting the IDD. The adoption of IDD in the headquarters' state court appears to be directly linked to the limitation of CEO job mobility and the subsequent increase in toxic emissions from the company's facilities.

Conversely, we do not observe a significant change in toxic emissions when the court in the state where the production facility is situated adopted the IDD. The Plant's state IDD dummy is not significant, with a coefficient of 0.0489. This suggests that the job mobility restriction primarily affects CEOs rather than manufacturing workers, as the IDD applies to knowledge workers who share the valuable trade secrets of the employers. In summary, our findings indicate that the restriction on CEO job mobility plays a dominant role in influencing the level of toxic emissions from the company's facilities, while the impact on manufacturing workers is less significant.

In column (2), we replace year fixed effects with industry-year fixed effects. The estimate of the IDD-induced effect on toxic emissions turns out to be even stronger with this adjustment. The coefficient estimate of the firms' state IDD dummy is 0.265, implying that toxic emissions increase by more than 30.3% following IDD adoption. In contrast, the IDD status of the plant's located state does not exhibit a significant impact on toxic emissions.

In columns (3), we examine within-plant-level variations by including the plant-level fixed effect. While the fixed effect explains a substantial part of variations in the sample, it does not fully subsume the effect of firms' state IDD status. The coefficient estimate of the firm's state IDD dummy is 0.128, which is statistically significant at a 5% level. The estimate indicates that firms increase toxic emissions by 13.7% after IDD adoption. Overall, our results support Hypothesis 1.

5.2 CEO Career Concerns and IDD-induced Effects

We then delve into a subsample analysis focused on the intensity of CEO career concerns. Specifically, we hypothesize that the magnitude of change in toxic emissions in response to the IDD is positively correlated with the level of CEOs' career concerns, or equivalently, their demand for a transition to other firms. We consider three specific cases where CEOs are likely to have heightened career concerns: (i) CEOs trailing industry peers in short-term financial performance, (ii) CEOs who have more opportunities to transition to other firms without IDD, and (iii) CEOs who have shorter tenure.

Table 3 reports the estimation results. We present the estimated impacts of IDD adoptions on corporate toxic emissions for the subsamples with stronger career concerns of CEOs in columns (1)–(3) and those with weaker concerns in columns (4)–(6). In all estimations, we include plant, firms' headquartered state, and industry-year fixed effects.

Columns (1) and (4) report the estimation results of the firm-years where short-term financial performance measured by the 3-year moving average of ROA is below and above the industry-year median, respectively. The industry is classified by the SIC 2-digit code. We observe that the effect of firm IDD is more pronounced among CEOs with weaker short-term earnings performance. The coefficient estimate of the firm's state IDD dummy is 0.259 in the low ROA subsample (column (1)), which is statistically significant at a 1% level, implying that toxic emissions increase by 29.6% following IDD adoptions. Conversely, the coefficient in the high ROA subsample (column (4)) is merely -0.0338 and statistically insignificant.

Columns (2) and (5) report the estimation results of the industries where the proportion of externally hired CEOs is above and below the median, respectively. CEOs in the former industries have more opportunities to transition to other firms without IDD because the firms seek CEOs with general skills (Cremers and Grinstein, 2014). We find that IDD adoptions increase toxic emissions more effectively in the industries where external CEO hires are more prevalent. The coefficient estimate of the firm's state IDD dummy in these sectors is 0.2 (column (2)), which is statistically significant at a 5% level, as opposed to the estimate of 0.042 (column (4)) in the industries where external hires are rare. This result can be attributed to both upside and downside career concerns: regarding upside concerns, capable CEOs might deprioritize ESG management, diminishing their prospects of enhancing their reputation to transition elsewhere; regarding downside concerns, underperforming CEOs might concentrate on short-term gains, knowing that any impending forced exit from their present company would deter moves to another firm.

Columns (3) and (6) report the estimation results of the firm-years where the tenure of CEOs is below and above the sample median (4.92 years), respectively. CEOs early in their tenure tend to have a longer horizon and stronger career concerns. IDD adoptions, however, materially shorten the horizon of these CEOs and increase the cost of dismissals from the current position. We, therefore, predict a larger change in how they manage toxic emissions. Supporting the prediction, IDD adoption significantly increases toxic emissions in the shorter-tenured CEO subsample but not in the longer-tenured subsample. In column (3), the coefficient estimate of the firm's state IDD dummy is 0.129, which is statistically significant at a 5% level, implying that firms increase toxic emissions by 13.8% following IDD adoption. Conversely, in column (6), the estimate is only 0.063 and statistically insignificant. Taken together, the results indicate that career concern motives play a vital role in the manifestation of the IDD's effect.

Next, we check the robustness of our results using stacked regression techniques suggested by Cengiz et al. (2019). Recent studies demonstrated that the DiD estimators employing staggered events may be prone to biases because the treated group in an event can be used as the control group in events occurring later (Cengiz et al., 2019; Goodman-Bacon, 2021; Sun and Abraham, 2021). Stacked regression techniques address the concern by restricting the control groups as those never been treated and comparing them with the treated group of each event. Our stacked regressions set the control group as the firms headquartered in the states where IDD has never been adopted until the end of the sample period. For each IDD adoption event, the stacked sample includes the observations of the treated and the control groups between 5 years before and after the event.

Table 4 presents the estimation results. Column (1) reports the results for the full sample while columns (2)–(4) display the estimates for the subsamples of strong career concerns, namely, the firms with lower short-term performance, the industries with prevalent external CEO hiring, and the CEOs with shorter tenure, respectively. The classifications of strong career concern subsamples are the same as in columns (1)–(3) in Table 3. In all estimations, the plant, the firm headquarter state, and the industry-year fixed effects are included. The standard errors are adjusted for clusters at the IDD status of the headquarter state. All estimation results show that the differences in toxic emissions between treated and control groups before IDD adoption are not discernable from the difference in the adoption year, verifying the parallel trend assumption. Meanwhile, treated firms increase toxic emissions significantly more than control groups after IDD adoption. The post-IDD changes are statistically significant from one year after the adoption in all estimations except those of lower CEO tenure subsample where the changes are significant from two years after the adoption. Figure 1 depicts the coefficient estimates of year dummies in the full sample analysis. Overall, the results confirm the robustness of the baseline estimation results.

5.3 CEO Dismissal Risks and IDD-induced Effects

We extend the empirical analysis to the role of CEO dismissal risks in corporate environmental policies. We analyze CEO forced turnover data to discern whether the rise in toxic releases post-IDD is largely attributed to proficient CEOs considering upside mobility or underperforming CEOs considering dismissal risks. The forced turnover indicator was obtained from Peters and Wagner (2014) who read press reports and record the value of the indicator as one if a forced turnover occurred in a specific firm-year and zero if there was none. We set the value of the forced turnover indicator equal to one for the final fiscal year during which a dismissed CEO is in office for the majority of that year.

Making use of the findings presented in Peters and Wagner (2014), we focus on the effect of industry-level return volatility in determining an individual firm's CEO. Industry-level return volatility predicts individual firms' CEO forced turnover. Yet, it is unlikely that the managerial ability of an individual CEO or dismissal risks of an individual CEO affect industry-wide stock volatility.

We use a linear probability model for the first stage estimates using industry stock volatility as a main independent variable. We estimate the forced turnover likelihood of firms in our sample and categorize firms based on high or low expected dismissal probabilities. In the second stage regression, we perform subsample analysis based on the predicted forced turnover likelihood in the first stage and test the impact of the IDD on corporate environmental policies when the predicted dismissal risk is high.

In the first stage regression, we use the actual forced turnover indicator as the dependent variable to obtain the expected forced turnover probability. The first stage takes into account the effect of dismissal risk measured by industry return volatility on forced turnover. To capture stock performance, we use stock returns measured over the past 12 months. We break these down into market, industry, and idiosyncratic components. The industry component is the equally weighted industry return minus the CRSP equally weighted market return. The idiosyncratic return is calculated by subtracting the industry return from the individual return. We classify industries into 48 groups using the Fama-French classification and use the industry returns provided by Ken French. Stock return volatility is computed using monthly return data over the past 48 months. Industry-level volatility is defined as the equal-weighted average of the Fama-French 48 industries. We also include other explanatory variables considered in Peters and Wagner (2014) as independent variables in the first stage. We adjust standard errors for clustering at the CEO-firm level as in Peters and Wagner (2014).

The estimation results presented in Table 5A confirm that volatile industry conditions amplify the likelihood of dismissal. The coefficient on industry stock return volatility is significantly positive, while both idiosyncratic return and market-adjusted industry return are significantly negative. In line with Peters and Wagner (2014), our results indicate that weakened firm performance and risks associated with the industry heighten the likelihood of forced turnovers.

In Tables 5B, we report the second stage estimation results using the expected forced turnover probability derived from the linear model in Table 5A. Estimation results presented in Columns (1) and (2) of Table 5B indicate that the effects of IDD on toxic emissions are pronounced among firms that are subject to the application of the IDD. Results suggest that firms with a greater likelihood of forced turnover tend to magnify toxic releases post-IDD, highlighting the influence of an underperforming CEO’s downside career concerns on CER. The results suggest the IDD heightens the CEO's incentives driven by job dismissal risks. In summation, the short-term motivation to increase financial performance compromises environmental sustainability.

5.4 Financial Constraints and IDD-induced Effects

Next, we test whether a firm’s financial constraints materially change the impact of IDD adoptions on environmental performance. We perform a subsample analysis based on the degree of a firm's financial constraints. We categorize the sample based on whether the firm's financial constraint measure is above or below the industry-year median. Industries are classified using the SIC 2-digit code. As proxies for financial constraints, we use the modified KZ index (Baker, Stein, and Wurgler, 2003), an indicator of whether a firm pays a dividend, and text-based financial constraint measures introduced by Hoberg and Maksimovic (2015). Hoberg and Maksimovic (2015) develops four financial constraint measures. The definitions of HM Delay, HM Debt, HM Equity, and HM PP are as follows: HM Delay (Delay Investment Score) reflects a firm's overall financial constraints, which may lead to investment delays. HM Equity (Equity-focused score) focuses on equity market constraints that impact firms' growth funding, often intensified by unexpected shocks and informational asymmetries. HM Debt (Debt-focused score) relates to debt market constraints, particularly those associated with covenant violations. Lastly, HM PP (Private-placement focused score) addresses constraints in issuing securities via private placements, highlighting the distinct challenges of private capital raising.

Table 6 presents the estimation results. In Panel A, which represents the financially constrained group of firms, the effect of IDD on toxic releases is positively significant. This indicates that financially strained firms respond to IDD by significantly increasing their toxic releases, possibly as a cost-saving measure. In contrast, Panel B, representing the financially unconstrained group of firms, shows that for these firms, the impact of IDD on toxic releases is not substantial and lacks statistical significance. This suggests that less-constrained firms do not significantly alter their levels of toxic releases in response to IDD.

5.5 Trade Secrets and IDD-induced Effects

Finally, we investigate whether the effects of IDD vary in relation to the importance of trade secrets. Our hypothesis is that IDD significantly curtails the job mobility of CEOs possessing highly valuable trade secrets, which consequently intensifies the rise in toxic emissions for these CEOs following the adoption of IDD. The results are in line with this hypothesis. We divide the subsample based on a firm's R&D investment. We categorize the sample based on whether the firm’s R&D investment is above the industry-year median or below the median. Industry classifications are based on the 2-digit SIC code. Table 7 reports the estimation results. The first column displays the subsample analysis for the group of firms considered to possess highly important trade secrets. In contrast, the third column represents the group of firms with comparatively less important trade. We group the firms based on the intensity of R&D expenditures and find that the coefficient estimates of IDD on toxic emissions are statistically significant and positive among firms spending more on R&D.

Additionally, we test whether the effects of IDD differ for firms with high intangibles compared to those with low intangibles based on the value of firm-level intangibles (Ewens, Peters, and Wang (2024).[2] We then sort firms into two groups: high intangible and low intangible. We present the results in columns (2) and (4) of Table 7. We find that the effects of IDD on toxic emissions are only statistically significantly positive among the group of firms with high intangibles. For firms with relatively low levels of R&D or intangible capital, the impact of IDD on toxic releases is not economically or statistically significant. This suggests that firms

[2] To obtain an estimate for a firm’s intangible capital, we use the estimates provided by Ewens, Peters, and Wang (2024), which are based on market prices of firm exits. Their parameter estimates imply an average 33% annual depreciation rate of R&D investment in knowledge capital and 28% the fraction of SG&A that represents an investment into organizational capital. We measure a firm’s level of intangible capital as a total of knowledge capital and organization capital.

where knowledge and organizational capital are more important notably alter their environmental policy in response to IDD, indicating that IDD matters more for these firms

6. Robustness checks

6.1 Heavy Polluters and IDD-induced Effects

For robustness checks, we first assess whether the impact of IDD intensifies in companies where CEOs have greater flexibility to balance enhancements in financial performance with reductions in toxic chemical emissions, particularly among heavy polluters. Heavy polluters are categorized as firms with significant ESG concerns, placed in the top quartile for toxic emissions annually. Since these firms inevitably emit chemicals during production, diminishing such emissions necessitates a substantial forfeit of financial performance. Consequently, we postulate that heavy polluters are more likely to increase emissions when their CEOs are pressured to ameliorate financial results.

Table 8 presents estimation results. Column (1) shows that IDD adoption increases toxic emission significantly in heavy polluters. The coefficient estimate of the firm state IDD dummy is 0.221, which is statistically significant at the 5% level. Conversely, IDD adoption does not lead to an increase in toxic emissions in the low emission group. Overall, our findings support the hypothesis.

6.2 Capital Market Pressures for Financial Performance and IDD-induced Effects

Next, we investigate whether the adoption of IDD has varying effects on toxic emissions based on the level of capital-market pressure for short-term performance. Specifically, we posit that when CEOs are under intense capital-market pressure to demonstrate strong short-term financial performance, the CEO becomes more inclined to pursuing short-term performance at the expense of long-term reputational capital. In our empirical setting, we hypothesize that firms experiencing strong capital-market pressure will exhibit a larger increase in toxic emissions in response to the adoption of IDD. As proxies for capital market pressures for financial performance, we use the ownership of transient institutional investors classified by Bushee (1998) and the ownership of hedge funds.

Table 9 presents the estimation results. Our findings indicate that firms increase toxic emissions to a greater extent when they have a higher ownership (i.e., above the industry median) of transient institutional investors or hedge funds. These investors could induce CEOs to prioritize financial performance over environmental performance. The estimated coefficients are statistically significant only among the group of firms with CEOs under this pressure. The magnitude of the coefficient suggests that, for an average plant, the IDD-induced effects imply an increase in toxic emissions by 14.8% for the subsample with higher ownership of transient investors and 13.8% for the subsample with higher ownership of hedge funds, respectively.

6.3 Managerial Monitoring and IDD-induced Effects

We then investigate whether managerial monitoring by the board of directors or shareholders mitigates the impact of IDD on toxic emissions. Regarding board monitoring, Coles et al. (2014) noted that directors appointed after the CEO's appointment, referred to as co-opted directors, do not effectively monitor the CEO. Subsequently, Cassell et al. (2018) discovered that an audit committee with co-option allows earnings manipulations, while Zaman et al. (2021) found a positive correlation between a board with a higher proportion of co-opted directors and managerial misconduct. Following these studies, we use the fraction of co-opted independent directors as a proxy for the effectiveness of board monitoring. Regarding shareholders' monitoring, Kempf et al. (2017) proposed a measure of shareholders' distraction in each firm-year. We employ this measure as an indicator for shareholders' monitoring intensity.

Table 10 reports the estimation results. Columns (1) and (2) present the outcomes for the subsample characterized by weak board monitoring, which is defined as the firm-years where the fraction of co-opted independent directors and the tenure-weighted fraction of these directors are both above the industry-year median, respectively. Likewise, column (3) display results for the subsample with weaker institutional investors' monitoring, defined as the firm-years where the institutional investors' distraction measure is above the industry-median. In all three subsamples, firms increase toxic emissions significantly after the adoption of the IDD.

By contrast, IDD adoption does not enhance toxic emissions in the complement subsamples. Columns (4) and (5) present results of the subsamples where the fraction of co-opted independent directors and the tenure-weighted fraction are below the industry-year median, respectively, while column (6) displays results of the subsample where the shareholders' distraction is below the industry-year median. Overall, the findings suggest that board monitoring plays a role in mitigating short-term performance management through the relaxation of CER.

6.4 Differentiated Effect of IDD Adoption and Rejection

Subsequently, we test whether IDD adoption and rejection have distinct effects on firms' toxic emissions. To estimate the effect of IDD adoption (rejection), we run panel regressions by excluding the treated firm-years around IDD rejection (adoption) from the sample. Table 11 provides the estimation results. Columns (1) and (2) show that, in the full sample, IDD adoption increases toxic emissions significantly while IDD reject does not exert a prominent influence on CER. The coefficient estimates of the firm state IDD dummy variable are 0.334 for the adoptions, as opposed to 0.028 for the rejections.

The distinctive effect between IDD adoption and rejection is also observed in the subsamples with stronger CEO career concerns. Columns (3) and (4) show that, in the subsample with low short-term financial performance (3-year average ROA), only IDD adoption induces firms to increase toxic emissions significantly. Likewise, columns (5) and (6) display that, in the industries with a higher likelihood of hiring external CEOs, only IDD adoption leads to a significant increase in toxic emissions. Finally, columns (7) and (8) show that, in the low-tenured CEO subsample, both IDD adoption and rejection exhibit insignificant influences on toxic emissions, though IDD adoption's effect is of nearly twice higher economic magnitude. It is noteworthy that the stacked DiD estimation reported in Table 4 yields a significant effect of IDD adoption in the shorter-tenured CEO subsample. The insignificant result in the staggered DiD estimation may be associated with the estimation bias that previous papers point out (Cengiz et al., 2019; Goodman-Bacon, 2021; Sun and Abraham, 2021).

We find it challenging to interpret the results as conclusive evidence that IDD rejection does not influence CEO career concerns. As presented in Table A2 of the appendix, most rejections occurred in the late 2000s, while adoptions took place much earlier. In the past decade, firms have encountered mounting pressures concerning CER, marking a significant shift in the business landscape. The late 2000s witnessed a substantial surge in societal awareness and concern regarding environmental issues, fueled by a growing acknowledgment of climate change, resource depletion, and environmental degradation. Stakeholders, encompassing consumers, investors, and regulatory bodies, have heightened their scrutiny of corporate environmental practices. Increased media coverage and amplified public discourse on sustainability matters have further contributed to the heightened expectations placed upon businesses to adopt and adhere to environmentally responsible practices. The escalating pressures may incentivize CEOs to prioritize CER considerations for their career concerns. In this context, our results suggest that the amplified social attention and scrutiny on firms' ESG performance could potentially mitigate the perverse short-term incentives posed by CEOs' dismissal risks.

6.5 Strategic adjustments of toxic emissions across facilities

We further investigate whether, after the adoption of IDD, firms strategically increase toxic emissions of facilities located in states with lax environmental regulations. Table 12 provides the estimation results. Columns (1)–(4) present the outcomes of facilities located in lenient environmental regulations while columns (5)–(8) report the results of other facilities. Column (1) shows that, after IDD adoption, firms increase toxic emissions significantly in states with lax environmental regulations. Contrastingly, column (5) reveals that firms do not change toxic emission of plants located in states with strict environmental regulations.

The strategic adjustments of toxic emissions are also observed in the subsamples with stronger CEO career concerns. Columns (2) and (6) show that, in the subsample with low short-term financial performance (3-year average ROA), IDD adoption induces firms to increase toxic emissions significantly only in states with lax regulations. Likewise, columns (3) and (7) display that, in the industries with a higher likelihood of hiring external CEOs, IDD adoption leads to a significant increase in toxic emissions exclusively in these states. Finally, columns (4) and (8) show that, in the low-tenured CEO subsample, firms increase toxic emissions solely in these states after the adoption of IDD. Overall, the findings suggest that firms strategically adjust CER activities by considering the regulatory circumstances of their plants.

6.6 Trade-offs Between Short-Term Financial Performance and Toxic Emissions

Finally, we examine whether IDD influences firms' short-term financial performance and its relationship to the amount of toxic release. In developing our hypotheses, we presume that IDD induces firms trailing their industry peers to manage short-term financial performance. We check the validity of this assumption by running the following regression model: for firm j and year t,

$$ROA_{j,t} = \alpha + \beta_1 \, IDD_{j,t} + \delta \, Ctrls + Firm \, FE + HQ \, State \, FE + Ind\text{-}year \, FE + \varepsilon_{j,t}, \quad (3)$$

where the dependent variable $ROA_{j,t}$ is the return on assets. All other variables are the same as the model in (2).

Table 13 provides the estimation results. The sample of column (1) includes firms whose ROA is below the industry median in the previous year while the sample of column (2) contains those which recorded ROA above the industry median. The estimation results show that the coefficient estimates of $IDD_{j,t}$ is positive and statistically significantly only in the subsample firms with lower ROA in the previous year, suggesting that underperforming firms strive to increase ROA after the adoption of IDD. Overall, the findings confirm the validity of our empirical setting.

We further examine whether and how the toxic emission policy is related to the financial performance. We posit that, if the IDD induces CEOs to adjust toxic emission releases for the short-term financial performance, a positive relationship between toxic release amount and the firm's short-term financial performance becomes stronger after adopting the IDD. We test this prediction by running the following model in the IDD and non-IDD subsamples, respectively: for firm j and year t,

$$ROA_{j,t} = \alpha + \beta_1 \, Ln(Toxic_{j,t}) + \delta \, Ctrls + Firm \, FE + HQ \, State \, FE + Ind\text{-}year \, FE + \varepsilon_{j,t}. \quad (4)$$

All variables and notations are defined as in the equations (2) and (3). We predict a positive β_1 and a negative β_3.

In Table 13, columns (3) and (4) present the estimation results of the IDD and non-IDD subsample, respectively. We exclude the firms that have never reported the toxic emissions. The results show that the toxic emission amount is positively associated with the contemporaneous ROA only in the subsample where the headquartered state adopts the IDD. The coefficient estimate of the logarithm of toxic emissions is positive and statistically significant in the IDD subsample while that in the non-IDD subsample is insignificant. Overall, these findings support our predictions.

7. Conclusion

This study explores the relationship between managerial career incentives and corporate ESG actions. Leveraging the staggered adoption of IDD in state courts, we estimate the causal impacts of managerial career concerns on corporate toxic chemical emissions. Our research reveals that the adoption of IDD, which restricts CEOs' job mobility and increases the cost of dismissal, significantly influences corporate environmental responsibilities.

Our findings suggest that the adoption of IDD is associated with a decrease in ESG investments, particularly in scenarios where CEOs face heightened career concerns. This is evident in firms with poor financial performance and among CEOs early in their tenure. These results underscore the trade-offs that CEOs navigate between short-term financial performance and long-term value creation. The potential sacrifice of short-term performance becomes more costly for CEOs when their chances of securing a position in another company are severely restricted due to the adoption of IDD. For CEOs subject to IDD in the courts, the value of their current position increases, while the value of building reputation capital for future opportunities diminishes.

This study contributes to the literature by highlighting the role of downside career concerns in discouraging ESG investments, in contrast to previous studies emphasizing the promotion of ESG activities through upside career concerns. This perspective opens a new avenue for understanding the motivations behind ESG actions, moving beyond traditional views of agency problems where ESG initiatives were seen either as a benefit to stakeholders or as an agency cost serving managers' personal interests.

Furthermore, we emphasize the importance of aligning CEOs’ compensation packages with ESG performance metrics, considering their varied career concerns and labor market conditions. This approach could potentially reconcile the short-term focus of managers with the long-term benefits of ESG investments for shareholders. Policymakers can leverage this understanding to guide corporations in situations where ESG investments are undervalued due to managerial career concerns, especially given the significant social and environmental implications of climate risk.

In summary, our research provides a deeper understanding of how managerial incentives, shaped by labor market dynamics and career concerns, play a crucial role in influencing corporate ESG activities. This insight can be valuable for shareholders, investors, and policymakers aiming to enhance ESG implementation and mitigate the risks of short-termism in corporate decision-making.

References

Albuquerque, R. A., Y. J. Koskinen, and C. Zhang. 2018. Corporate Social Responsibility and Firm Risk: Theory and Empirical Evidence. Management Science 65(10):4451-4469.

Ali, A., N. Li, and W. Zhang. 2019. Restrictions on managers' outside employment opportunities and asymmetric disclosure of bad news relative to good news. The Accounting Review 94: 1–25.

Baginski, S. P., J. L. Campbell, L. A. Hinson, D. S. Koo. 2018. Do career concerns affect the delay of bad news disclosure?. *The Accounting Review* 93: 61–95

Baker, M., J. C. Stein, and J. Wurgler. 2003. When Does the Market Matter? Stock Prices and the Investment of Equity-Dependent Firms. Quarterly Journal of Economics 118(3): 969-1005

Bebchuk, L. A., and R. Tallarita. 2022. The perils and questionable promise of ESG-based compensation. Journal of Corporation Law 48:37–76.

Bénabou, R. and J. Tirole. 2010. Individual and Corporate Social Responsibility. Economica 77(305): 1-19.

Brav, A., Jiang, W., Partnoy, F. and Thomas, R. (2008), Hedge Fund Activism, Corporate Governance, and Firm Performance. The Journal of Finance, 63: 1729-1775.

Brown, K. E. 2015. Ex ante severance agreements and earnings management. Contemporary Accounting Research 32:897–940.

Bushee, B. 1998. The influence of institutional investors on myopic R&D investment behavior. The Accounting Review 73:305–333.

Chen, W., S. Jung, X. Peng, and I. X. Zhang. 2022. Outside opportunities, managerial risk taking, and CEO compensation. The Accounting Review 97:135–60.

Cheng, I.-H., H. Hong, and K. Shue. 2023. Do Managers Do Good with Other People's Money?. The Review of Corporate Finance Studies 12 (3): 443–487.

Cohen, S., I. Kadach, G. Ormazabal, and S. Reichelstein. 2023. Executive compensation tied to ESG performance: International evidence. Journal of Accounting Research 61:805–53.

Cengiz, D., Dube, A., Lindner, A., Zipperer, B., 2019. The effect of minimum wages on low-wage Jobs. Quartely Journal of Economics 134:1405-1454.

Cremers, M. K. J., and Y. Grinstein. 2014. Does the market for CEO talent explain controversial CEO pay practices? Review of Finance 18:921–60.

Dai, X., F. Gao, L. L. Lisic, and I. X. Zhang. 2023. Corporate social performance and the managerial labor market. Review of Accounting Studies 28:307–39.

Edmans, A. 2011. Does the stock market fully value intangibles? employee satisfaction and equity prices. Journal of Financial Economics 101:621–40.

Fee, C. E., and C. J. Hadlock. 2003. Raids, rewards, and reputations in the market for managerial talent. Review of Financial Studies 16:1315–57.

Finkelstein, S. 1992. Power in Top Management Teams: Dimensions, Measurement, and Validation. Academy of Management Journal, *35*: 505–538.

Flammer, C., and A. Kacperczyk. 2019. Corporate social responsibility as a defense against knowledge spillovers: Evidence from the inevitable disclosure doctrine. Strategic Management Journal 40:1243–67.

Gibbons, R., and K. J. Murphy. 1992. Optimal incentive contracts in the presence of career concerns: Theory and evidence. Journal of Political Economy 100:468–505.

Goodman-Bacon A. 2021. Difference-in-differences with variation in treatment timing. Journal of Econometrics 225:254–277.

Graham, J. R., C. R. Harvey, and S. Rajgopal. 2005. The economic implications of corporate financial reporting. Journal of Accounting and Economics 40:3–73.

Hoberg, G., and V. Maksimovic. 2015. Redefining Financial Constraints: A Text-Based Analysis. Review of Financial Studies 28:1312–1352.

Hong, H. and L. Kostovetsky. 2012. Red and blue investing: Values and finance. Journal of Financial Economics 103(1): 1-19.

Hubbard, T. D., D. M. Christensen, and S. D. Graffin. 2017. Higher highs and lower lows: The role of corporate social responsibility in CEO dismissal. Strategic Management Journal 38:2255–65.

Huson, M. R., P. H. Malatesta, and R. Parrino. 2004. Managerial succession and firm performance. Journal of Financial Economics 74:237–75.

Jenter, D., and K. Lewellen. 2015. CEO preferences and acquisitions. Journal of Finance 70:2813–51.

Jaffe, A.B., Peterson, S.R., Portney, P.R., Stavins, R.N., 1995. Environmental regulation and the competitiveness of u.s. manufacturing: What does the evidence tell us? Journal of Economic Literature 33, 132–163.

Jenter, D., and K. Lewellen. 2021. Performance-induced CEO turnover. Review of Financial Studies 34:569–617.

Jia, Y., X. Gao, and L. Fang. 2023. Managerial Labor Market Mobility and Corporate Social Responsibility. Journal of Management Accounting Research: 1-20.

Kempf, E., A. Manconi, and O. Spalt. 2017. "Distracted Shareholders and Corporate Actions" Review of Financial Studies 30 (5): 1660-1695.

Klasa, S., H. Ortiz-Molina, M. Serfling, and S. Srinivasan. 2018. Protection of trade secrets and capital structure decisions. Journal of Financial Economics 128:266–86.

Kothari, S.P., S. Shu, and P.D. Wysocki. 2009. Do Managers Withhold Bad News?. Journal of Accounting Research, 47: 241-276.

Li, X., A. Low, and A. K. Makhija. 2017. Career concerns and the busy life of the young CEO. Journal of Corporate Finance 47:88-109.

Masulis, R. and S. W. Reza. 2015. Agency Problems of Corporate Philanthropy. Review of Financial Studies 28 (2): 592-636.

Pae, S., C. J. Song, and A.C. Yi. 2016. Career Concerns and Management Earnings Guidance. Contemporary Accounting Research, 33: 1172-1198.

Peters, F. S., and A. F. Wagner. 2014. The executive turnover risk premium. Journal of Finance 69 (4): 1529–1563.

Png, I.P., 2017. Law and innovation: evidence from state trade secrets laws. Review of Economics and Statistics, 99: 167–179.

Seaman, C. B. 2015. The case against federalizing trade secrecy. Virginia Law Review 101:317-394.

Sun, L., S. Abraham. 2021. Estimating dynamic treatment effects in event studies with heterogeneous treatment effects, Journal of Econometrics, 225:175-199.

Stark, L., P. Venkat, and Q. Zhu. 2022. Corporate ESG profiles and investor horizons. Working Paper University of Texas.

Stein, J. C. 1988. Takeover threats and managerial myopia. Journal of Political Economy 96:61–80.

Swanson, E., G. M. Young, and C. G. Yust. 2022. Are All Activists Created Equal? The Effect of Interventions by Hedge Funds and Other Private Activists on Long-term Shareholder Value, Journal of Corporate Finance 72: 102144

Riedl, A. and P. Smeets. 2017. Why Do Investors Hold Socially Responsible Mutual Funds? The Journal of Finance 72(6): 2505-2550.

Tian, X., and T. Y. Wang. 2011. Tolerance for failure and corporate innovation. Review of Financial Studies 27:211–55.

U.S. Census Bureau (2005) Pollution Abatement Costs and Expenditures (PACE) Survey: 2005. Technical Report MA200(05), U.S. Census Bureau, Suitland, MD.

Watts, R. L., and J. L. Zimmerman. 1978. Towards a positive theory of the determination of accounting standards. The Accounting Review 53:112–34. ISSN 00014826.

Weisbach, M. S. 1988. Outside directors and CEO turnover. Journal of Financial Economics 20:431–60..

Xu, Q., and T. Kim. 2022. Financial constraints and corporate environmental policies. Review of Financial Studies 35:576–635.

Yim, S. 2013. The acquisitiveness of youth: CEO age and acquisition behavior. Journal of Financial Economics 108:250–73.

Figure 1

This figure depicts the average effect of IDD adoption. X-axis represents the period around IDD adoption events, from 4 years earlier than an event to 4 years later. Y-axis represents the coefficient estimate of the period dummy variable in column (1) of Table 4, which reports the estimation results of stacked DiD regressions for the full sample. The t-statistics of each coefficient estimate is reported in parenthesis.

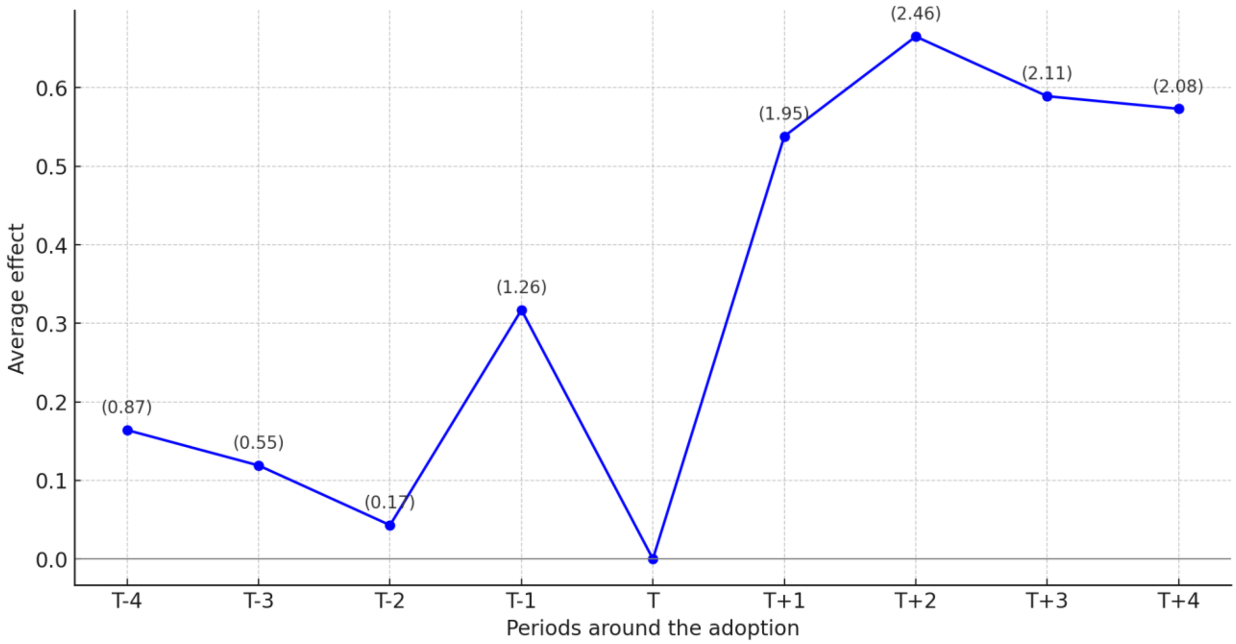

Table 1: Summary Statistics

This table presents summary statistics of the status of Inevitable Disclosure Doctrine (IDD), toxic release, and financial/accounting variables of sample firms and plants. Variable definitions and IDD adoption/rejection years across states are provided in Table A1 and A2 in the appendix.

Sample	Non-Utility				Utility			
	mean	p50	sd	N	mean	p50	sd	N
				Plant Level				
Log(core TRI releases)	7.081	7.949	4.266	43403	10.144	12.181	4.969	2607
Plant IDD	0.451	0	0.498	43403	0.376	0	0.485	2607
Log(Plant Sales)	3.535	3.562	1.419	43403	4.33	4.273	1.774	2607
				Firm Level				
Firm IDD	0.481	0	0.500	8088	0.294	0	0.456	513
Log(Assets)	6.765	6.747	1.878	8088	8.63	8.995	1.782	513
Cash/assets	0.094	0.05	0.118	8088	0.033	0.018	0.047	513
CAPEX/assets	0.061	0.045	0.055	8088	0.073	0.067	0.04	513
Tangible	0.315	0.281	0.175	8088	0.595	0.634	0.158	513
Tobin's Q	1.659	1.389	0.921	8088	1.166	1.061	0.408	513
Text FC	0.677	0.662	0.200	8088	0.841	0.840	0.148	513

Table 2: Impact of the IDD on Total Toxic Releases

This table presents regression estimates of the impact of the Inevitable Disclosure Doctrine (IDD) on the total amount of toxic releases. The dependent variable is the log of one plus core Toxic Release Inventory releases. The key independent variables are dummy variables indicating the presence of IDD in the state of the firm (Firm IDD) and the state of the plant (Plant IDD). Additionally, we further differentiate the Firm IDD variable into Firm IDD Adoption and Firm IDD Rejection. Controls include firm-level factors such as the log of lagged assets, the ratio of cash to assets, the ratio of Capital Expenditure to assets, Tangible assets, and Tobin's Q, along with a textual financial constraint measure (Text FC). Clustered standard errors are computed at the State - IDD level and are indicated in parentheses.

	(1)	(2)	(3)
Firm IDD	0.223***	0.265***	0.128**
	(2.98)	(4.27)	(2.38)
Plant IDD	0.0489	0.0543	-0.0519
	(0.35)	(0.40)	(-0.55)
Log(Assets)	-0.169	-0.0856	0.0480
	(-1.34)	(-1.02)	(0.67)
Cash/assets	0.107	0.332	-0.00879
	(0.18)	(0.52)	(-0.02)
CAPEX/assets	-0.0684	-0.272	-0.0833
	(-0.13)	(-0.45)	(-0.14)
Tangible	0.196	1.483**	0.596
	(0.21)	(2.63)	(1.21)
Tobin's Q	0.0565	0.0327	0.0752*
	(1.09)	(0.67)	(1.75)
Text FC	0.216	0.173	0.268***
	(1.43)	(1.20)	(3.04)
Log(Plant Sales)	0.330***	0.343***	0.075***
	(7.85)	(7.63)	(2.70)
Constant	7.128***	6.014***	6.231***
	(6.02)	(7.50)	(8.89)
N	33376	33266	32303
adj. R-sq	0.467	0.466	0.875
Firm FE	Yes	Yes	No
Plant FE	No	No	Yes
Year FE	Yes	No	No
Ind*Year FE	No	Yes	Yes
Firm State FE	Yes	Yes	Yes
Plant State FE	Yes	Yes	Subsumed

Table 3: Subsample Analysis Based on CEO Career Concerns

This table presents subsample analysis based on firm performance, illustrating the impact of IDD on Total Toxic Releases. Samples are split into two groups based on pre-IDD level of managerial career concerns. We consider three ways to measure the degree of career concerns: short-term earnings measured as 3-year average ROA, likelihood of external hires, or the length of tenure. Columns (1) through (3) display results for the subsample of firms with strong managerial career concerns. Columns (4) through (6) present results for the low managerial career concerns. The dependent variable is the log of one plus core TRI toxic chemical releases. Principal independent variables are dummy variables indicating the presence of IDD in the state of the firm (Firm IDD) and the state of the plant (Plant IDD). Controls include firm-level factors such as the log of lagged assets, the ratio of cash to assets, the ratio of Capital Expenditure to assets, Tangible assets, Tobin's Q, and a textual financial constraint measure (Text FC). We include plant-level sales in the model (Log(Plant Sales)). Clustered standard errors, computed at the State - IDD level, are indicated in parentheses.

	More Career Concern			Less Career Concern		
	Low ROA	High Outside Hire	Low Tenure	High ROA	Low Outside Hire	High Tenure
	(1)	(2)	(3)	(4)	(5)	(6)
Firm IDD	0.259***	0.200**	0.129**	-0.0338	0.042	0.063
	(2.92)	(2.116)	(2.015)	(-0.40)	(0.547)	(0.642)
Plant IDD	0.00556	-0.085	-0.075	-0.146	-0.007	-0.098
	(0.03)	(-0.701)	(-0.586)	(-1.46)	(-0.061)	(-0.776)
Log(Assets)	0.0278	0.092	-0.213	0.0902	0.016	0.142*
	(0.24)	(0.789)	(-1.668)	(0.99)	(0.111)	(1.807)
Cash/assets	-0.857	-0.542	-0.448	0.343	0.394	-0.259
	(-0.99)	(-0.763)	(-0.700)	(0.51)	(0.513)	(-0.320)
CAPEX/assets	-0.314	-0.034	1.062	-0.699	-0.756	0.140
	(-0.40)	(-0.050)	(1.084)	(-0.52)	(-0.788)	(0.132)
Tangibility	0.927	0.469	-0.494	0.621	0.656	1.025
	(1.24)	(0.723)	(-0.740)	(0.94)	(1.187)	(1.027)
Tobin's Q	0.0716	0.119***	0.220**	0.0358	0.014	-0.103
	(0.98)	(2.902)	(2.131)	(0.52)	(0.133)	(-0.868)
Text FC	0.260	0.392***	0.453**	0.262*	0.195*	0.296**
	(1.38)	(3.342)	(2.563)	(1.92)	(1.714)	(2.137)
Log(Plant Sales)	0.0639*	0.082***	0.056*	0.0813*	0.056	0.071**
	(1.75)	(2.704)	(1.822)	(1.71)	(1.302)	(2.331)
Constant	6.448***	5.656***	8.805***	5.968***	6.782***	5.449***
	(5.82)	(5.23)	(6.93)	(6.57)	(5.51)	(6.04)
N	13226	14951	13533	17481	17322	13118
adj. R-sq	0.884	0.876	0.891	0.879	0.877	0.886
Plant FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm State FE	Yes	Yes	Yes	Yes	Yes	Yes
Plant State FE	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed

Table 4: Stacked IDD

This table presents stacked DID analysis. Column (1) reports results for the full sample while columns (2) through (4) display results for the three subsamples of strong career concerns measured by 3-year average ROA, likelihood of external hires, and the length of tenure, respectively. The dependent variable is the log of one plus core TRI toxic chemical releases. Principal independent variables are dummy variables indicating the presence of IDD in the state of the firm (Firm IDD) and the state of the plant (Plant IDD). Controls include plant -level sales (Log(Plant Sales)) and firm-level factors such as the log of lagged assets, the ratio of cash to assets, the ratio of Capital Expenditure to assets, Tangible assets, Tobin's Q, and a textual financial constraint measure (Text FC). Clustered standard errors, computed at the State - IDD level, are indicated in parentheses.

	Full sample	Low ROA	High Outside Hire	Low Tenure
	(1)	(2)	(3)	(4)
T-4	0.164	0.377	-0.0414	0.130
	(0.87)	(0.66)	(-0.18)	(0.54)
T-3	0.119	0.201	-0.119	-0.069
	(0.55)	(0.32)	(-0.59)	(-0.21)
T-2	0.0430	0.608	-0.0142	0.007
	(0.17)	(0.95)	(-0.06)	(0.02)
T-1	0.317	0.593	0.197	-0.241
	(1.26)	(0.95)	(0.91)	(-0.73)
T+1	0.538*	1.352*	0.401**	0.569
	(1.95)	(1.92)	(2.18)	(1.60)
T+2	0.665**	1.349*	0.609***	0.672**
	(2.46)	(1.96)	(3.70)	(2.01)
T+3	0.589**	1.418**	0.692***	0.675*
	(2.11)	(2.00)	(4.26)	(1.94)
T+4	0.573**	1.525**	0.715***	0.835**
	(2.08)	(2.19)	(3.64)	(2.35)
T+5	0.546**	1.489**	0.689***	0.775**
	(1.97)	(2.12)	(3.77)	(2.08)
Constant	6.172***	5.201***	0.401**	4.353***
	(22.46)	(10.29)	(2.18)	(11.73)
N	93829	32502	41439	30720
adj. R-sq	0.902	0.917	0.905	0.922
Controls	Yes	Yes	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes
Firm State FE	Yes	Yes	Yes	Yes

Table 5A: The 1st Stage Results for Forced Turnover

This table shows the estimates of linear probability model. Forced Turnover is an indicator variable that is equal to value of one for the firm-years in which a dismissed CEO is in office for the greater part of the fiscal year (Peters and Wagner (2014)). CEO turnover is classified as forced based on the press reports. The dependent variable Forced Turnover. Explanatory variables are measured at t-1. Standard errors are clustered at executive-firm level. Standard errors are reported in parentheses. We cluster standard errors at executive-firm level for the first stage regression.

Dependent Var. =	Forced Turnover	
	(1)	(2)
Ind Volatility	2.335***	2.637***
	(2.96)	(2.89)
Idio Ret	-0.0202***	-0.0212***
	(-4.69)	(-4.54)
Mkt Adj Idio Ret	-0.0289**	-0.0259**
	(-2.52)	(-2.13)
Ind-Adj Volatility	0.299	0.218
	(1.50)	(1.03)
Log Assets	0.0222	0.0287
	(1.54)	(1.60)
Tobin Q	-0.00514*	-0.00419
	(-1.94)	(-1.19)
Age>=60		-0.0110**
		(-2.43)
Ln(Tenure)		-0.00368
		(-1.32)
Ln(Delta)		-0.00225
		(-0.96)
Equity Pay		-0.00992
		(-0.62)
Constant	-0.0285	-0.0198
	(-0.92)	(-0.58)
Observations	4875	4206
Adjusted R-squared	0.012	0.016
Year FE	Yes	Yes

Table 5B: 2nd Stage Results Using Predicted Likelihood of Forced Turnover

This table presents regression estimates the differential effects of forced turnover on the impact of IDD on the total amount of toxic releases. Forced Turnover is an indicator variable that is equal to value of one for the firm-years in which a dismissed CEO is in office for the greater part of the fiscal year (Peters and Wagner (2014)). CEO turnover is classified as forced based on the press reports. The dependent variable is the log of one plus core Toxic Release Inventory releases. Control Variables are measured at t-1. Clustered standard errors are computed at the State - IDD level for the second stage regressions. Clustered standard errors are reported in parentheses.

Dependent Var. ==	Ln(TRI Release)	
	High Forced Prob.	Low Forced Prob
	(1)	(2)
Firm IDD	0.229***	0.005
	(2.93)	(0.06)
Ind Volatility	-13.642	0.892
	(-0.99)	(0.06)
Idio Ret	-0.064	0.047
	(-0.58)	(0.89)
Mkt-Adj Idio Ret	0.018	0.045
	(0.14)	(0.45)
Ind-Adj Volatility	-4.719*	-5.127
	(-1.85)	(-1.41)
Log Assets	0.010	1.349**
	(0.36)	(2.20)
Tobin Q	0.199	0.101
	(1.38)	(1.13)
Ln(Tenure)	0.000	-0.064
	(0.01)	(-0.99)
Age>=60	0.051	-0.117**
	(0.89)	(-2.63)
Ln(Delta)	0.009	-0.091**
	(0.23)	(-2.55)
Equity Pay Dummy	0.063	-0.034
	(0.37)	(-0.34)
Ln(Compensation)	0.050	-0.024
	(1.12)	(-0.65)
Cash/assets	-1.066	-0.749
	(-1.35)	(-1.45)
CAPEX/Assets	-1.266*	-0.343
	(-1.91)	(-0.51)
Tangible	0.285	-0.130
	(0.50)	(-0.22)
Text FC	0.257**	-0.280***
	(2.07)	(-3.06)
Log(Plant Sales)	0.054**	0.022
	(2.57)	(0.86)
Constant	6.668***	5.309***
	(14.88)	(3.40)
Observations	16084	15707
Adjusted R-squared	0.875	0.876
Plant FE	Yes	Yes
Ind*Year FE	Yes	Yes
Firm State FE	Yes	Yes
Plant State FE	Subsumed	Subsumed

Table 6: Subsample Analysis Based on Firm's Financial Constraints

This table presents a subsample analysis based on a firm's financial constraints, illustrating the impact of the Inevitable Disclosure Doctrine (IDD) on Total Toxic Releases. Panel A displays results for Financially Constrained Firms, while Panel B presents results for Financially Unconstrained Firms. The categorization into financially constrained and unconstrained groups is based on multiple financial constraint measures, including the modified KZ index, Pay Div, HM Delay, HM Debt, HM Equity, and HM PP. HM Delay, HM Debt, HM Equity, and HM PP refer Delay Investment Score, Debt-focused score, Equity-focused score, and Private-placement focused score of Hoberg and Maksimovic (2015), respectively. The dependent variable is the log of one plus core Toxic Release Inventory releases. The principal independent variables are dummy variables indicating the presence of IDD in the state of the firm (Firm IDD) and the state of the plant (Plant IDD). Control variables include firm-level factors such as the log of lagged assets, the ratio of cash to assets, the ratio of Capital Expenditure to assets, Tangible assets, Tobin's Q, and a textual financial constraint measure (Text FC). We include plant-level sales (Log(Plant Sales)) in the model. Clustered standard errors, computed at the State - IDD level, are indicated in parentheses.

Panel A: Financially Constrained Firms

	KZ	Pay Div	HM Delay	HM Debt	HM Equity	HM PP
	(1)	(2)	(3)	(4)	(5)	(6)
Firm IDD	0.184**	0.418**	0.357***	0.195*	0.275***	0.275***
	(2.02)	(2.45)	(3.86)	(1.73)	(4.17)	(2.75)
Plant IDD	0.122	-0.0509	-0.143	0.142	-0.0802	-0.136
	(0.89)	(-0.33)	(-1.61)	(1.51)	(-1.14)	(-1.19)
Log(Assets)	0.144	0.196	0.201	0.193	0.158	0.245*
	(1.01)	(1.55)	(1.11)	(1.38)	(1.02)	(1.98)
Cash/assets	0.497	-0.171	-0.233	0.242	-0.605	-0.230
	(0.60)	(-0.29)	(-0.33)	(0.54)	(-0.95)	(-0.40)
CAPEX/assets	0.835	-0.344	-0.235	-0.0437	-0.378	-0.655
	(1.30)	(-0.60)	(-0.23)	(-0.06)	(-0.41)	(-0.85)
Tangibility	0.801	0.395	1.231	0.977	0.737	1.706
	(1.16)	(0.42)	(1.22)	(1.06)	(0.74)	(1.64)
Tobin's Q	0.0398	-0.0102	0.137*	0.133	0.221***	0.218***
	(0.58)	(-0.21)	(1.81)	(1.19)	(2.70)	(3.61)
Log(Plant Sales)	0.015	0.063	0.028	0.123**	-0.020	0.025
	(0.45)	(0.80)	(0.67)	(2.25)	(-0.44)	(0.54)
Constant	5.711***	5.426***	4.855***	4.680***	5.357***	4.425***
	(4.62)	(5.05)	(2.84)	(4.05)	(3.56)	(3.55)
N	13833	9054	8381	8401	9113	9110
adj. R-sq	0.891	0.853	0.904	0.894	0.902	0.905
Plant FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm State FE	Yes	Yes	Yes	Yes	Yes	Yes
Plant State FE	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed

Panel B: Financially Unconstrained Firms

	KZ	Pay Div	HM Delay	HM Debt	HM Equity	HM PP
	(1)	(2)	(3)	(4)	(5)	(6)
Firm IDD	0.055	-0.016	0.101	0.138	-0.002	0.105
	(0.491)	(-0.225)	(0.641)	(1.643)	(-0.017)	(0.880)
Plant IDD	-0.097	-0.004	-0.034	-0.277**	-0.116	-0.034
	(-0.817)	(-0.044)	(-0.220)	(-2.340)	(-0.742)	(-0.245)
Log(Assets)	0.016	-0.093	0.251	0.150	0.205	0.189
	(0.136)	(-1.179)	(1.059)	(1.130)	(0.933)	(0.746)
Cash/assets	-0.183	-0.206	-0.030	-0.230	0.140	-0.065
	(-0.249)	(-0.348)	(-0.035)	(-0.286)	(0.217)	(-0.085)
CAPEX/assets	-1.511	-0.071	1.095*	-0.206	1.576*	1.077
	(-1.033)	(-0.109)	(1.716)	(-0.172)	(1.883)	(0.936)
Tangibility	0.241	-0.292	0.426	1.814**	0.586	0.313
	(0.493)	(-0.602)	(0.493)	(2.326)	(0.739)	(0.277)
Tobin's Q	0.091	0.067	0.247***	0.208***	0.153*	0.031
	(0.956)	(1.111)	(3.277)	(2.939)	(1.738)	(0.275)
Log(Plant Sales)	0.035	0.086***	0.118***	-0.029	0.166***	0.123***
	(0.926)	(3.208)	(3.199)	(-0.600)	(4.352)	(2.695)
Constant	7.017***	7.999***	4.520**	5.532***	4.982***	5.153**
	(6.288)	(10.851)	(2.384)	(4.363)	(2.864)	(2.498)
N	17120	40147	9027	8912	8297	8225
adj. R-sq	0.876	0.868	0.908	0.905	0.900	0.894
Plant FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm State FE	Yes	Yes	Yes	Yes	Yes	Yes
Plant State FE	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed

Table 7: Subsample Analysis Based on Firm's Trade Secrets

This table presents subsample analysis based on firm's trade secrets to evaluate differential effects of IDD on Total Toxic Releases depending on the significance of trade secrets. We use R&D expenditure as a proxy for the significance of trade secrets (TS). Samples are split into two groups based on whether R&D expenditure is above the industry-year median. Low TS group includes the firms having R&D expenditure below or equal to the industry-year median. For the results based on intangible capital, we use firm-level intangible capital as a proxy for the significance of TS. Samples are split into two groups based on whether the level of intangible is above the industry-year median. Columns (1) and (3) display results for the groups based on TS, while Columns (2) and (4) present results for the groups based on intangible capital. The dependent variable is the log of one plus core Toxic Release Inventory releases. Principal independent variables are dummy variables indicating the presence of IDD in the state of the firm (Firm IDD) and the state of the plant (Plant IDD). Controls include firm-level factors such as the log of lagged assets, the ratio of cash to assets, the ratio of Capital Expenditure to assets, Tangible assets, Tobin's Q, and a textual financial constraint measure (Text FC). We include plant-level sales (Log(Plant Sales)) in the model. Clustered standard errors, computed at the State - IDD level, are indicated in parentheses.

	High TS		Low TS	
	High R&D (1)	High Intangibles (2)	Low R&D (3)	Low Intangibles (4)
Firm IDD	0.250***	0.141***	0.0550	-0.0191
	(3.24)	(2.79)	(0.44)	(-0.13)
Plant IDD	-0.041	-0.0500	-0.079	0.0352
	(-0.34)	(-0.44)	(-0.78)	(0.19)
Log(Assets)	-0.086	0.00418	0.135	0.225
	(-0.66)	(0.05)	(0.85)	(1.05)
Cash/assets	0.112	0.146	0.511	0.105
	(0.14)	(0.17)	(0.77)	(0.19)
CAPEX/assets	-0.845	-1.270	0.327	0.145
	(-0.86)	(-1.18)	(0.40)	(0.14)
Tangible	0.114	0.409	1.043*	1.523**
	(0.21)	(0.63)	(1.84)	(2.01)
Tobin's Q	0.107***	0.0269	0.0236	0.177**
	(2.94)	(0.41)	(0.21)	(2.23)
Text FC	0.326**	0.286***	0.085	0.343*
	(2.52)	(2.73)	(0.79)	(1.81)
Log(Plant Sales)	0.100***	0.0757**	0.0498	0.0316
	(2.99)	(2.37)	(1.47)	(0.62)
Constant	7.316***	6.638***	5.669***	5.003***
	(5.92)	(7.80)	(4.36)	(3.04)
N	15567	23395	16127	8065
adj. R-sq	0.869	0.874	0.888	0.890
Firm FE	No	No	No	No
Plant FE	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes
Firm State FE	Yes	Yes	Yes	Yes
Plant State FE	Subsumed	Subsumed	Subsumed	Subsumed

Table 8: Subsample Analysis for Heavy Polluters

This table presents the estimation results showing impact of IDD on Total Toxic Releases for firms considered as high ESG concerns. We classify firms as heavy polluters when their annual toxic emissions exceed the top quartile threshold. We divide the sample into heavy polluters and non-heavy polluters for each year. The dependent variable is the log of one plus core Toxic Release Inventory releases. Principal independent variables are dummy variables indicating the presence of IDD in the state of the firm (Firm IDD) and the state of the plant (Plant IDD). Controls include firm-level factors such as the log of lagged assets, the ratio of cash to assets, the ratio of Capital Expenditure to assets, Tangible assets, Tobin's Q, and a textual financial constraint measure (Text FC). We include plant-level sales (Log(Plant Sales)) in the model. Clustered standard errors, computed at the State - IDD level, are indicated in parentheses.

	High Emission	Low Emission
	(1)	(2)
Firm IDD	0.221**	0.076
	(2.40)	(0.94)
Plant IDD	0.058	0.012
	(0.68)	(0.10)
Log(Assets)	0.009	0.021
	(0.11)	(0.19)
Cash/assets	-0.297	0.242
	(-0.55)	(0.40)
CAPEX/assets	0.253	-0.447
	(0.37)	(-0.53)
Tangible	0.682	0.545
	(1.13)	(0.90)
Tobin's Q	0.016	0.083
	(0.32)	(1.33)
Text FC	0.138	0.279**
	(1.48)	(2.59)
Log(Plant Sales)	0.059**	0.0689*
	(2.29)	(1.97)
Constant	10.850***	4.461***
	(11.47)	(4.54)
N	10094	21661
adj. R-sq	0.880	0.799
Firm FE	No	No
Plant FE	Yes	Yes
Ind*Year FE	Yes	Yes
Firm State FE	Yes	Yes
Plant State FE	Subsumed	Subsumed

Table 9: Short-term Capital Market Pressure and the Impacts of IDD

This table examines the heterogeneous impact of IDD adoption on Total Toxic Releases depending on the intensity of short-term pressure from the capital market. The dependent variable is the log of one plus core Toxic Release Inventory releases. We define the "more short-term pressure" subsample as firm-years where the ownership of transient institutional investors (column 1) or hedge funds (column 2) is above the industry-year sample median. The complement firm-years are referred to as the "less short-term pressure" subsample (column 3 and 4). Principal independent variables are dummy variables indicating the presence of IDD in the state of the firm (Firm IDD) and the state of the plant (Plant IDD). Controls include firm-level factors such as the log of lagged assets, the ratio of cash to assets, the ratio of Capital Expenditure to assets, Tangible assets, Tobin's Q, and a textual financial constraint measure (Text FC). We include plant-level sales (Log(Plant Sales)) in the model. Clustered standard errors, computed at the State-IDD level, are indicated in parentheses.

	More Short-term Pressure		Less Short-term Pressure	
	High Transient	High HFs	Low Transient	Low HFs
	(1)	(2)	(3)	(4)
Firm IDD	0.138***	0.129**	0.0273	0.0882
	(3.11)	(2.21)	(0.32)	(1.11)
Plant IDD	0.0512	-0.0653	-0.153	-0.00301
	(0.60)	(-0.60)	(-0.96)	(-0.02)
Log(Assets)	-0.00122	0.266**	0.0567	0.139
	(-0.01)	(2.05)	(0.47)	(1.20)
Cash/assets	-0.0441	-0.973	-0.0290	-0.500
	(-0.06)	(-1.38)	(-0.03)	(-0.53)
CAPEX/assets	0.473	0.787	-0.284	-2.753**
	(0.64)	(0.90)	(-0.23)	(-2.03)
Tangibility	-0.0929	-0.139	1.320**	0.595
	(-0.13)	(-0.20)	(2.06)	(0.88)
Tobin's Q	0.0162	0.117	0.158	0.130
	(0.18)	(1.15)	(1.59)	(1.04)
Text FC	0.263**	0.344**	0.237	0.339**
	(2.48)	(2.41)	(1.49)	(2.21)
Log(Plant Sales)	0.110***	0.0863	0.0144	0.0177
	(2.99)	(1.58)	(0.37)	(0.59)
Constant	6.746***	4.500***	6.187***	5.437***
	(7.74)	(4.09)	(5.30)	(4.43)
Observations	17009	9762	14198	12639
Adjusted R-squared	0.891	0.885	0.878	0.889
Plant FE	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes
Firm State FE	Yes	Yes	Yes	Yes
Plant State FE	Subsumed	Subsumed	Subsumed	Subsumed

Table 10: Managerial Monitoring and the Impacts of IDD

This table examines the heterogeneous impact of IDD adoption on Total Toxic Releases depending on the intensity of monitoring by boards and shareholders. The dependent variable is the log of one plus core Toxic Release Inventory releases. Principal independent variables are dummy variables indicating the presence of IDD in the state of the firm (Firm IDD) and the state of the plant (Plant IDD). We define the "weak board monitoring" subsample as firm-years where the (tenure-weighted) fraction of co-opted directors is above the industry-year sample median in column 1 (2). Likewise, we define "weak shareholder monitoring" subsample in column (3) as firm-years where shareholders' distraction measure is above the industry-year sample median. The complement firm-years are referred to as the "strong board monitoring" subsample (columns 4 and 5) and the "strong shareholder monitoring" subsample (column 6). Controls include firm-level factors such as the log of lagged assets, the ratio of cash to assets, the ratio of Capital Expenditure to assets, Tangible assets, Tobin's Q, and a textual financial constraint measure (Text FC). We include plant-level sales (Log(Plant Sales)) in the model. Clustered standard errors, computed at the State-IDD level, are indicated in parentheses.

	Weak Monitoring			Strong Monitoring		
	Co-opted Directors Fraction		Shareholder Distraction	Co-opted Directors Fraction		Shareholder Distraction
	Unadjusted	Tenure-weighted		Unadjusted	Tenure-weighted	
	(1)	(2)	(3)	(4)	(5)	(6)
Firm IDD	0.233**	0.212**	0.215*	0.0892	0.0608	0.0191
	(2.31)	(2.04)	(1.92)	(0.79)	(0.46)	(0.26)
Plant IDD	0.0614	0.0795	0.0517	-0.0172	-0.0421	-0.170**
	(0.31)	(0.38)	(0.39)	(-0.11)	(-0.29)	(-2.12)
Log(Assets)	0.153	0.0482	0.0159	-0.0179	-0.0243	-0.257
	(0.93)	(0.27)	(0.11)	(-0.11)	(-0.14)	(-1.62)
Cash/assets	-0.605	-0.323	-0.182	-0.0662	-0.195	0.802
	(-0.69)	(-0.43)	(-0.15)	(-0.05)	(-0.16)	(1.38)
CAPEX/assets	-0.0766	1.244	0.253	0.443	1.212	1.759
	(-0.06)	(1.10)	(0.25)	(0.35)	(0.80)	(1.57)
Tangibility	0.00441	-0.166	-0.200	-0.899	-0.961	-0.862
	(0.00)	(-0.19)	(-0.23)	(-0.78)	(-0.66)	(-1.28)
Tobin's Q	0.00470	0.0623	0.129	0.185*	0.185	-0.00761
	(0.04)	(0.56)	(1.23)	(1.93)	(1.59)	(-0.10)
Text FC	0.120	0.240	0.293*	0.648***	0.631**	0.272
	(0.73)	(1.37)	(1.88)	(3.67)	(2.38)	(1.54)
Log(Plant Sales)	0.0777*	0.0867*	0.0702*	0.0745*	0.0655*	0.0823**
	(1.93)	(1.98)	(1.71)	(1.80)	(1.77)	(2.56)
Constant	5.568***	6.182***	6.622***	6.839***	6.984***	9.515***
	(3.93)	(4.23)	(4.53)	(4.06)	(3.80)	(6.66)
Observations	7975	8304	10094	11007	10741	9922
Adjusted R-squared	0.905	0.902	0.897	0.897	0.898	0.889
Plant FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm State FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 11: Rejection and Adoption of IDD

This table examines the impact of IDD adoption and rejection on Total Toxic Releases for the full sample (columns 1 and 2), firms with low ROA (columns 3 and 4), industries with higher likelihood of hiring external CEOs (columns 5 and 6), and firms with shorter-tenured CEOs (columns 7 and 8). Odd-numbered columns display results for IDD adoption sample, while even-numbered columns present results for IDD rejection sample. The dependent variable is the log of one plus core Toxic Release Inventory releases. Principal independent variables are dummy variables indicating the presence of IDD in the state of the firm (Firm IDD) and the state of the plant (Plant IDD). Controls include firm-level factors such as the log of lagged assets, the ratio of cash to assets, the ratio of Capital Expenditure to assets, Tangible assets, Tobin's Q, and a textual financial constraint measure (Text FC). We include plant-level sales (Log(Plant Sales)) in the model. Clustered standard errors, computed at the State - IDD level, are indicated in parentheses

Subsample	Full sample		Low ROA		High outside hire		Low tenure	
IDD	Adopt	Reject	Adopt	Reject	Adopt	Reject	Adopt	Reject
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm IDD Adp	0.334***		0.466***		0.481***		0.202	
	(3.99)		(4.47)		(3.51)		(1.34)	
Firm IDD Rej		0.0228		0.0687		-0.0324		0.102
		(0.36)		(0.64)		(-0.29)		(0.91)
Plant IDD	-0.0132	-0.0188	0.200	0.139	-0.0441	-0.0111	-0.00340	-0.0666
	(-0.13)	(-0.17)	(1.21)	(0.73)	(-0.30)	(-0.08)	(-0.02)	(-0.37)
Log(Assets)	0.0985	0.0992	-0.00960	0.0832	0.178	0.132	-0.150	-0.130
	(1.04)	(1.19)	(-0.07)	(0.57)	(1.08)	(0.86)	(-1.02)	(-0.90)
Cash/assets	-0.168	-0.181	-1.383	-1.154	-0.873	-0.775	-0.512	-0.533
	(-0.25)	(-0.33)	(-1.28)	(-1.25)	(-0.92)	(-1.02)	(-0.68)	(-0.74)
CAPEX/assets	-0.271	0.0499	0.708	-0.429	0.488	0.255	0.536	1.334
	(-0.36)	(0.07)	(0.84)	(-0.47)	(0.71)	(0.33)	(0.47)	(1.29)
Tangibility	0.580	0.393	0.985	0.948	0.234	0.458	-0.0795	-0.0420
	(1.14)	(0.78)	(1.00)	(0.98)	(0.31)	(0.66)	(-0.10)	(-0.06)
Tobin's Q	0.0812*	0.0735	0.0433	0.139	0.149**	0.120**	0.303***	0.260**
	(1.81)	(1.64)	(0.68)	(1.64)	(2.40)	(2.37)	(2.83)	(2.23)
Text FC	0.346***	0.276***	0.300	0.280	0.421***	0.345***	0.414*	0.525**
	(3.31)	(3.24)	(1.41)	(1.40)	(3.41)	(2.98)	(2.01)	(2.39)
Log(Plant Sales)	0.0747**	0.0729**	0.0727*	0.0352	0.0982**	0.0588	0.0623*	0.0349
	(2.02)	(2.23)	(1.71)	(1.15)	(2.53)	(1.66)	(1.69)	(1.03)
Constant	5.773***	5.910***	6.613***	6.034***	4.736***	5.456***	7.970***	7.898***
	(6.48)	(7.80)	(5.23)	(4.36)	(3.19)	(4.08)	(5.48)	(5.52)
N	25244	26552	10134	10870	12004	11801	10930	11112
adj. R-sq	0.874	0.882	0.883	0.888	0.875	0.881	0.887	0.892
Plant FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plant State FE	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed

Table 12 Regional Environmental Regulation and the Impacts of IDD

This table shows that the impact of IDD on Total Toxic Releases depends on the strictness of regional environmental regulations. Columns (1) through (4) present results for the production plants located in counties with lax environmental regulation (see section 3.1.1). Columns (5) through (8) display results for the production plants located in counties with strict environmental regulation. The dependent variable is the log of one plus core Toxic Release Inventory releases. Principal independent variables are dummy variables indicating the presence of IDD in the state of the firm (Firm IDD) and the state of the plant (Plant IDD). Controls include firm-level factors such as the log of lagged assets, the ratio of cash to assets, the ratio of Capital Expenditure to assets, Tangible assets, Tobin's Q, and a textual financial constraint measure (Text FC). We include plant-level sales (Log(plant sales)) in the model. Clustered standard errors, computed at the State - IDD level, are indicated in parentheses.

State regulation	Lax Regulation				Strict Regulation			
Subsample	Full Sample	Low ROA	High outside hire	Low tenure	Full Sample	Low ROA	High outside hire	Low tenure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm IDD	0.226***	0.265***	0.325**	0.241**	-0.018	0.196	-0.009	-0.017
	(3.948)	(3.120)	(2.472)	(2.278)	(-0.191)	(1.343)	(-0.070)	(-0.097)
Plant IDD	0.016	0.310*	-0.020	0.050	-0.096	-0.063	0.015	-0.083
	(0.157)	(1.903)	(-0.143)	(0.345)	(-1.009)	(-0.358)	(0.097)	(-0.459)
Log(Assets)	-0.010	0.079	0.132	-0.247	-0.053	-0.016	-0.193	-0.413**
	(-0.065)	(0.333)	(0.847)	(-1.321)	(-0.439)	(-0.103)	(-0.937)	(-2.503)
Cash/assets	-0.656	-1.076	-1.973**	-1.229	0.783	-0.231	0.655	0.847
	(-0.886)	(-1.165)	(-2.310)	(-0.865)	(1.662)	(-0.237)	(1.232)	(0.892)
CAPEX/assets	0.458	0.319	-0.544	0.751	0.039	1.821**	1.092	1.992
	(0.578)	(0.280)	(-0.536)	(0.605)	(0.069)	(2.120)	(1.162)	(1.418)
Tangibility	0.551	0.924	0.621	-1.010	0.471	-1.057	-0.538	-0.449
	(0.866)	(1.044)	(0.653)	(-1.075)	(0.713)	(-1.241)	(-0.942)	(-0.573)
Tobin's Q	0.098	0.285	0.247***	0.385**	-0.009	-0.093	-0.053	0.029
	(1.304)	(1.416)	(3.647)	(2.025)	(-0.151)	(-0.899)	(-0.726)	(0.275)
Text FC	0.361***	0.492**	0.657***	0.946***	0.151	0.168	0.130	-0.065
	(2.666)	(2.381)	(3.917)	(3.377)	(1.281)	(0.911)	(0.963)	(-0.212)
Log(Plant Sales)	0.029	0.066*	0.019	0.044	0.157***	0.131**	0.178***	0.093**
	(0.736)	(1.681)	(0.518)	(1.084)	(4.092)	(2.129)	(4.230)	(2.121)
Constant	6.940***	5.540***	5.370***	8.987***	6.756***	7.125***	8.071***	10.536***
	(5.040)	(2.858)	(3.882)	(5.320)	(6.413)	(5.616)	(4.658)	(6.518)
N	19066	7815	8698	8133	12850	5070	6041	5172
adj. R-sq	0.878	0.888	0.884	0.890	0.881	0.885	0.877	0.901
Plant FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plant State FE	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed	Subsumed

Table 13: IDD, Toxic Releases, and Financial Performance

This table presents how the shot-term financial performance is associated with the status of IDD and the toxic release. The dependent variable is the return on assets (ROA). In column (1) and (2), the principal independent variable is the dummy variable indicating the presence of IDD in the state of the firm (Firm IDD). In column (3) and (4), the principal independent variable is the log of one plus core Toxic Release Inventory amount. The analysis sample of each column is specified in the second row. Control variables include firm-level factors such as the log of lagged assets, the ratio of cash to assets, the ratio of Capital Expenditure to assets, Tangible assets, Tobin’s Q, and a textual financial constraint measure (Text FC). Clustered standard errors, computed at the State-IDD level, are indicated in parentheses.

Dependent variable	ROA			
Sample	Low ROA (t-1)	High ROA (t-1)	IDD	No IDD
	(1)	(2)	(3)	(4)
Firm IDD	0.0314**	-0.00617		
	(2.05)	(-0.82)		
Log(Toxic)			0.00297**	0.000751
			(2.14)	(0.39)
Log(Assets)	-0.0492*	-0.0309***	-0.0280***	-0.0342**
	(-1.88)	(-3.43)	(-3.83)	(-2.62)
Cash/assets	-0.405	0.00202	0.0273	-0.181
	(-0.70)	(0.09)	(0.25)	(-0.53)
CAPEX/assets	0.754	-0.0655	-0.168	0.348
	(0.78)	(-1.14)	(-1.53)	(0.75)
Tangibility	-0.355	0.00192	-0.0594	-0.259
	(-0.93)	(0.06)	(-1.10)	(-0.92)
Tobin's Q	0.0105	0.0393***	0.0290***	0.0290***
	(0.74)	(11.29)	(5.17)	(4.19)
Text FC	-0.00933	-0.00707	-0.0290***	-0.0257
	(-0.38)	(-0.88)	(-3.73)	(-1.22)
Constant	0.419	0.237***	0.199***	0.310*
	(1.41)	(3.67)	(3.20)	(1.75)
Observations	2136	2563	2863	2992
Adjusted R-squared	0.605	0.534	0.632	0.565
Firm FE	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes
Firm State FE	Yes	Yes	Yes	Yes

Appendix

Table A1: Definition of Variables

Variable	Description
Firm IDD	Presence of Inevitable Disclosure Doctrine (IDD) in the state of the firm's location
Plant IDD	Presence of IDD in the state of the plant's location
log(assets)	Natural log of one plus total assets
Cash/assets	Cash and Short-term investment to lagged total assets
CAPEX/assets	Capital expenditures to lagged total assets
Tangible	Tangible assets (PPENT) to lagged total assets
Tobin's Q	(Total asset + Common shares outstanding × Closing price (Fiscal year) − Common equity − Deferred taxes)/Asset
Text FC	Textual financial-constraint measure by Bodnaruk, Loughran, and McDonald (2015)
log(CEO's age)	Natural log of one plus the CEO's age
Tenure	CEO's tenure
KZ index	Kaplan-Zingales index, a measure of financial constraint, $-1.002\frac{CF_{it}}{A_{it-1}} - 39.368\frac{DIV_{it}}{A_{it-1}} - 1.315\frac{C_{it}}{A_{it-1}} + 3.139LEV_{it} + 0.283Q_{it}$
Modified KZ index	Modified KZ index, following Baker, Stein, and Wurgler (2003), $-1.002\frac{CF_{it}}{A_{it-1}} - 39.368\frac{DIV_{it}}{A_{it-1}} - 1.315\frac{C_{it}}{A_{it-1}} + 3.139LEV_{it}$
ROA	Return on Assets

Table A2: History of IDD Adoption and Rejection

State	Year	Case
Adoption		
Arkansas (AR)	1997	Southwestern Energy Co. v. Eickenhorst, 955 F. Supp. 1078 (W.D. Ark. 1997)
Connecticut (CT)	1996	Branson Ultrasonics Corp. v. Stratman, 921 F. Supp. 909 (D. Conn. 1996)
Delaware (DE)	1964	E.I. duPont de Nemours & Co. v. American Potash & Chem. Corp., 200 A. 2d 428 (Del. Ch. 1964)
Florida (FL)	1960	Fountain v. Hudson Cush-N-Foam Corp., 122 So. 2d 232 (Fla. Dist. Ct. App. 1960)
Georgia (GA)	1998	Essex Group Inc. v. Southwire Co., 501 S.E. 2d 501 (Ga. 1998)
Illinois (IL)	1989	Teradyne Inc. v. Clear Communications Corp., 707 F. Supp. 353 (N.D. 111. 1989)
Indiana (IN)	1995	Ackerman v. Kimball Int'l Inc., 652 N.E. 2d 507 (Ind. 1995)
Iowa (IA)	1996	Uncle B's Bakery v. O'Rourke, 920 F. Supp. 1405 (N.D. Iowa 1996)
Kansas (KS)	2006	Bradbury Co. v. Teissier-duCros, 413 F. Supp. 2d 1203 (D. Kan. 2006)
Massachusetts (MA)	1994	Bard v. Intoccia, 1994 U.S. Dist. (D. Mass. 1994)
Michigan (MI)	1966	Allis-Chalmers Manuf. Co. v. Continental Aviation & Eng. Corp., 255 F. Supp. 645 (E.D. Mich. 1966)
Minnesota (MN)	1986	Surgidev Corp. v. Eye Technology Inc., 648 F. Supp. 661 (D. Minn. 1986)
Missouri (MO)	2000	H&R Block Eastern Tax Servs. Inc. v. Enchura, 122 F. Supp. 2d 1067 (W.D. Mo. 2000)
New Jersey (NJ)	1987	Nat'l Starch & Chem. Corp. v. Parker Chem. Corp., 530 A. 2d 31 (N.J. Super. Ct. 1987)
New York (NY)	1919	Eastman Kodak Co. v. Powers Film Prod., 189 A.D. 556 (N.Y.A.D. 1919)
North Carolina (NC)	1976	Travenol Laboratories Inc. v. Turner, 228 S.E. 2d 478 (N.C. Ct. App. 1976)
Ohio (OH)	2000	Procter & Gamble Co. v. Stoneham, 747 N.E. 2d 268 (Ohio Ct. App. 2000)
Pennsylvania (PA)	1982	Air Products & Chemical Inc. v. Johnson, 442 A. 2d 1114 (Pa. Super. Ct. 1982)
Texas (TX)	1993	Rugen v. Interactive Business Systems Inc., 864 S.W. 2d 548 (Tex. App. 1993)
Utah (UT)	1998	Novell Inc. v. Timpanogos Research Group Inc., 46 U.S.P.Q. 2d 1197 (Utah D.C. 1998)
Washington (WA)	1997	Solutec Corp. Inc. v. Agnew, 88 Wash. App. 1067 (Wash. Ct. App. 1997)
Rejection		
Arkansas (AR)	2009	Cellco Partnership v. Langston, No. 4:09CV00928 JMM (W.D. Ark. 2009)
Florida (FL)	2001	Del Monte Fresh Produce Co. v. Dole Food Co. Inc., 148 F. Supp. 2d 1326 (S.D. Fla. 2001)
Georgia (GA)	2013	Holton v. Physician Oncology Services, LP. (Ga. 2013)
Massachusetts (MA)	2012	U.S. Electrical Services, Inc. v. Schmidt, et al., C.A. No. 12-10845 (D. Mass. 2012)
Michigan (MI)	2002	CMI Int'l, Inc. v. Intermet Int'l Corp., 649 N.W. 2d 808 (Mich. Ct. App. 2002)
New Jersey (NJ)	2012	SCS Healthcare Marketing, LLC v. Allergan U.S., Inc., N.J. Super. Unpub. (N.J. Sup. Ct. Ch. Div. 2012)
New York (NY)	2009	American Airlines, Inc. v. Imhof, U.S. Dist. (S.D.N.Y. 2009)
Ohio (OH)	2008	Hydrofarm, Inc. v. Orendorff, Ohio App. (Ohio App. Ct. 2008)
Texas (TX)	2003	Cardinal Health Staffing Network Inc. v. Bowen, 106 S.W. 3d 230 (Tex. App. 2003)
Washington (WA)	2012	Amazon.com, Inc. v. Powers, Case No. C12-1911RAJ (W.D. Wash. 2012)

The table is taken from Chen et al. (2022).

Table A3: Impact of the IDD on Total Toxic Releases

This table presents regression estimates of the impact of the IDD on the total amount of toxic releases. The dependent variable is the log of one plus core Toxic Release Inventory releases. The key independent variables are dummy variables indicating the presence of IDD in the state of the firm (Firm IDD) and the state of the plant (Plant IDD). Controls include firm-level factors such as the log of lagged assets, the ratio of cash to assets, the ratio of Capital Expenditure to assets, Tangible assets, and Tobin's Q, along with a textual financial constraint measure (Text FC). Clustered standard errors are computed at the State - IDD level and are indicated in parentheses.

	(1)	(2)	(3)	(4)
Firm IDD	0.180**	0.0505	0.174**	0.0508
	(2.11)	(0.65)	(2.27)	(0.65)
Plant IDD	0.0740	-0.0351	0.0882	-0.0583
	(0.52)	(-0.30)	(0.65)	(-0.54)
log(assets)	-0.116	0.0706	-0.130	0.0895
	(-0.90)	(1.09)	(-1.08)	(1.47)
Cash/assets	-0.223	-0.0980	-0.139	0.00809
	(-0.37)	(-0.17)	(-0.24)	(0.01)
CAPEX/assets	-0.610	-0.360	0.0723	0.0590
	(-1.05)	(-0.70)	(0.11)	(0.11)
Tangible	0.212	-0.126	-0.00719	-0.172
	(0.22)	(-0.18)	(-0.01)	(-0.26)
Tobin's Q	0.0474	0.0544	0.0234	0.0399
	(0.86)	(0.98)	(0.46)	(0.76)
Text FC	0.0953	0.250**	0.175	0.278***
	(0.60)	(2.19)	(1.19)	(2.71)
Log(Plant Employment)	0.311***	0.0575***		
	(7.65)	(2.70)		
Log(Plant Sales)			0.346***	0.0648***
			(8.02)	(3.05)
Constant	6.194***	6.188***	6.674***	6.025***
	(5.12)	(9.10)	(5.85)	(9.27)
N	30631	29750	31551	30599
adj. R-sq	0.449	0.868	0.445	0.865
Firm FE	Yes	No	Yes	No
Plant FE	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
Firm State FE	Yes	Yes	Yes	Yes
Plant State FE	Yes	Subsumed	Yes	Subsumed

Table A4: Impact of IDD on Forced Turnover

This table presents cross-sectional regression estimates of the impact of the IDD on the forced turnover of CEOs. The dependent variable, Forced Turnover, is an indicator variable that is equal to value of one for the firm-years in which a dismissed CEO is in office for the greater part of the fiscal year (Peters and Wagner (2014)). CEO turnover is classified as forced based on the press reports. The key independent variables are dummy variables indicating the presence of IDD in the state of the firm (Firm IDD) and the state of the plant (Plant IDD). Controls include firm-level factors such as the log of lagged assets, Tobin's Q, an indicator variable that is equal to one when the age of an CEO is more than 60, log of pay delta, an indicator variable that is equal to one when CEO pay includes equity awards. Clustered standard errors are computed at the year level and are indicated in parentheses.

Dependent Var. =	Forced Turnover	
	(1)	(2)
Firm IDD	-0.001	-0.002
	(-0.198)	(-0.414)
Ind Volatility	2.329***	2.626***
	(2.936)	(3.011)
Idio Ret	-0.020***	-0.021***
	(-4.665)	(-4.520)
Mkt Adj Idio Ret	-0.029**	-0.026**
	(-2.517)	(-2.116)
Ind-Adj Volatility	0.296	0.213
	(1.508)	(1.034)
log(assets)	0.022	0.029
	(1.543)	(1.604)
Tobin Q	-0.005*	-0.004
	(-1.934)	(-1.221)
Age>=60		-0.011**
		(-2.517)
Ln(Tenure)		-0.004
		(-1.362)
Ln(Delta)		-0.002
		(-0.973)
Equity Pay		-0.010
		(-0.629)
Constant	-0.028	-0.019
	(-0.914)	(-0.559)
Observations	4875	4206
Adjusted R-squared	0.017	0.024
Year FE	Yes	Yes