Does Anti-Greenwashing Regulatory Deterrence Drive Decarbonization? [1]

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Abstract

This study examines whether anti-greenwashing regulatory deterrence induces corporate decarbonization. We exploit the SEC's establishment of the Climate and ESG Task Force in 2021 as a shock that increased the cost of decoupling climate disclosures from actual environmental performance. We employ a triple-difference design and identify high-exposure firms as those with both pre-shock climate-related 10-K disclosures and a history of environmental incidents. We find the effect on reducing carbon emission intensity only concentrates on high-exposure firms meeting both identification criteria. Furthermore, the absence of a corresponding decline in environmental disclosure does not support the strategic silence explanation. Further analyses show the decarbonization effect is concentrated in larger firms, firms with sustainability-linked executive compensation, firms with a history of receiving more SEC comment letters and firms with extensive voluntary ESG rhetoric. Our findings show that an enforcement agency with no direct environmental mandate can produce real environmental outcomes by regulating what firms say, rather than what they emit.

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1. Introduction

Corporate commitments to environmental, social, and governance (ESG) initiatives have increasingly surged, driven by mounting pressure from investors and other stakeholders (Krueger et al., 2020). However, greenwashing has also been growing with the proliferation of ESG integration. The literature documents that firms frequently engage in symbolic compliance, strategically inflating their environmental credentials while failing to implement substantive operational changes (e.g., Delmas and Burbano, 2011; Kim and Lyon, 2015; Marquis, Toffel, and Zhou 2016; Christensen et al., 2021; Bingler et al., 2024). This growing discrepancy between corporate climate rhetoric and actual environmental performance undermines market efficiency by creating information barriers and misleads stakeholders who rely on these disclosures for decision making (e.g., Goldstein et al., 2022; Raghunandan and Rajgopal, 2022; Ilhan et al., 2023).

Against the backdrop of increasingly prevalent greenwashing, regulators have significantly intensified their scrutiny. On March 4, 2021, the U.S. Securities and Exchange Commission (SEC, 2021a) announced the Climate and ESG Task Force to proactively identify ESG-related misconduct and material gaps in disclosures. In an unprecedented move following its establishment, the SEC issued sample letters warning companies about their climate change disclosures and launched a series of aggressive enforcement actions (SEC, 2021b). Although the specific task force was later disbanded amid broader political backlash, this intense period of enforcement established an era of anti-greenwashing regulatory deterrence.

A compelling question emerges with the heightened regulatory deterrence: How do high-profile firms respond when the "cheap talk" in environmental commitment becomes more expensive? A large body of literature documents the effects of ESG regulations and the factors shaping their effectiveness (e.g., Grewal et al., 2019; Christensen et al., 2021; Krueger et al., 2024). However, regulators do not monitor all firms equally. Firms with explicit climate-related disclosures become salient, high-risk targets for regulatory screening precisely because their formal statements create a verifiable baseline that can be readily cross-checked against their actual environmental track records. Prior studies have shown that firms may respond to these higher disclosure costs by saying less (Zakota, 2025). However, it remains unclear whether anti-greenwashing scrutiny compels these highly exposed firms to undertake substantive environmental efforts, notably in terms of decarbonization. Indeed, firms may

also improve their environmental performance so that their claims can better withstand regulatory scrutiny. In this sense, making environmental talk more costly may shape not only what firms say, but also how they act.

Answering this question carries important implications for both policymakers and market participants. If intensified regulatory scrutiny only pushes firms to refrain from inconsistent environmental disclosures, its primary effect would be limited to curbing misleading claims and improving the information environment. Conversely, if anti-greenwashing deterrence forces these highly exposed firms to make substantive environmental improvements, it would constitute critical evidence that targeted regulatory oversight can generate tangible impacts and correct market failures arising from symbolic compliance.

A major challenge in answering this question is that both disclosure decisions and improvements in environmental performance may be endogenously determined by a firm's environmental strategies (e.g., Kim and Lyon, 2015). In specific, firms may voluntarily choose to honour their prior pledges, meaning observed post shock improvements in environmental performance could simply reflect strategic choices coinciding with disclosure rather than regulatory pressure. Similarly, firms with environmental incident records may also receive the pressure to improve their environmental performance regardless of the regulatory shock. In this study, we employ a triple-difference (DDD) framework to address this identification challenge and examine the impact of the SEC Climate and ESG Task Force establishment in 2021 on firms highly exposed to this anti-greenwashing scrutiny.

We argue that firms combining explicit climate-related disclosures in their statutory filings with a recent history of environmental incidents face heightened exposure to SEC enforcement scrutiny. We focus on 10-K filings, rather than voluntary sustainability reports or third-party ESG ratings (e.g., Bloomberg or Trucost), because the SEC's enforcement authority is anchored in statutory filings carrying strict legal liability. Under the SEC's existing principles-based framework, climate-related disclosures in Form 10-K are required only when management deems climate risks to be material (SEC, 2010), and prior evidence shows that such disclosures serve as a credible signal of acknowledged climate-risk materiality (Matsumura et al., 2024). Importantly, while non-disclosure alongside environmental incidents may reflect a pure omission, identifying and pursuing omission cases across a vast universe of silent registrants under pre-existing rules is both costly to screen and

legally difficult, as regulators must first establish that climate risk was material to the issuer. By contrast, when a firm explicitly addresses climate issues in its 10-K, it establishes an auditable statutory baseline acknowledging climate-related exposure. If the firm concurrently experiences severe, verifiable environmental incidents, this juxtaposition raises immediate regulatory scrutiny over whether its 10-K disclosures were incomplete, selectively framed, or materially misleading, which consistent with the broader notion of selective disclosure masking underlying environmental harm (Marquis et al., 2016). Indeed, because the newly formed Task Force explicitly relied on "sophisticated data analysis to mine and assess information across registrants" to identify "material gaps or misstatements in issuers' disclosure of climate risks under existing rules" (SEC, 2021a), firms with both statutory climate disclosures and concurrent environmental incidents represent high-visibility, readily auditable targets. We therefore define the primary treatment group, firms with high exposure to greenwashing scrutiny, as those that explicitly provided climate-related disclosures in their pre-shock 10-K filings (*Disclosure10K*) and also experienced environmental incidents (*E_incidents*) during the 2019-2020 period. We focus on firms' real decarbonization performance, measured by carbon emission intensity (corporate carbon emissions scaled by revenue), which distinguishes a firm's carbon efficiency from short-term fluctuations in firm size and production scale (e.g., Aswani et al., 2024; Zhang, 2025). Our baseline findings reveal that, following the regulatory shock, highly exposed firms significantly reduce their corporate carbon emission intensities, measured by both direct Scope 1 emissions and combined Scope 1 & 2 emissions scaled by total revenue. Importantly, the insignificant interaction terms for each standalone criterion confirm that the effect only emerges for firms with both pre-shock disclosure and environmental incidents. If the results were merely driven by simultaneity between firm disclosure and environmental performance or by firms' pressure to improve after incident record, we would expect little difference between disclosing firms with versus without prior environmental incident records. We then show parallel trends prior to the task force's establishment to confirm the validity of our design. Furthermore, our results remain robust to entropy-balanced matching, suggesting that our results are not confounded by pre-existing differences in observable characteristics.

We also conduct a battery of robustness checks to rule out alternative explanations. First, to confirm that our identification captures a firm's regulatory exposure, we show null results in rigorous

component-wise spatial placebo tests in which a firm's disclosure decision or incident record is randomly assigned. Second, we further control for year-industry and year-state fixed effects to wash out any industry-specific or state-specific time-varying factors such as industry trend or state-level laws, and our results still hold. Third, as our baseline specifications include firms' estimated carbon emissions by Trucost, we also replicate the baseline regressions using self-disclosed carbon emissions from Trucost and LSEG, respectively. Fourth, as our incident data is from RepRisk, we mitigate the sample selection bias by including firms that are not covered by RepRisk and treat them as control observations without any incident record. Our results still hold with the expanded sample. Fifth, we show our findings are robust after excluding financial and utility industries. Sixth, we demonstrate further robustness in a strongly balanced panel subsample with non-missing observations throughout the sample period. Finally, to rule out the possibility that the results are simply driven by some firms that have incident records and decide to substantively improve their environmental performance as well as disclose their commitments, we conduct a set of falsification tests that use identifications based on different years before the shock and different pseudo shock years. We find no significant results in these tests.

While our baseline findings indicate high-profile firms tend to reduce their carbon emission intensities after the regulatory shock, firms may prefer to tone down and reduce their disclosures to lower their propensity to be scrutinized. However, we find no evidence supporting the presence of strategic silence as a potential alternative reaction.

Once our baseline results are established, we examine the economic forces explaining them. We posit that anti-greenwashing regulation should have a stronger deterrent effect when the expected cost of being labelled a "greenwasher" is higher. Cross-sectional analyses reveal that the reduction in carbon emission intensity is more pronounced among larger firms, which are highly visible and face stronger reputational concerns, and among firms where executive compensation is explicitly tied to sustainability performance. Firms with more ex-ante SEC comment letters also exhibit stronger effects. Under the SEC's risk-based review process, historically flagged firms attract concentrated and continuous regulatory attention (Cassell et al., 2013; Heese et al., 2017), while prior interactions equip regulators with firm-specific knowledge that significantly enhances the rigor of subsequent scrutiny (Kubic and Toynbee, 2023). Overall, these results support our conjecture: anti-greenwashing

regulation has a stronger effect on decarbonization when either regulatory action is more likely or its consequences are more costly, raising the expected cost of greenwashing.

This study contributes to several strands of literature. First, it advances the literature on ESG and greenwashing by providing causal evidence that anti-greenwashing regulatory deterrence drives substantive corporate decarbonization (real effects), rather than merely altering reporting behaviors as documented in prior studies (e.g., Delmas and Burbano, 2011; Kim and Lyon, 2015; Marquis, Toffel, and Zhou 2016; Christensen et al., 2021; Bingler et al., 2024). By distinguishing carbon reductions and strategic silence, we confirm firms' responses are mainly through the discipline effect, which motivates high-exposure firms to lower their carbon emission intensities substantively. Whereas Bingler et al. (2024) measure the prevalence of climate-related cheap talk in corporate disclosures, we examine whether an active enforcement threat causes firms to abandon cheap talk in favor of genuine operational change, speaking directly to the economic consequences of greenwashing rather than only to its detection.

Second, this study contributes to the literature on the real effects of SEC regulation and disclosure enforcement. Previous studies document various findings regarding the efficacy of regulatory oversight. For example, Christensen et al. (2016) show that the effectiveness of securities regulation relies heavily on institutional contexts, and while prior work (e.g., Johnston and Petacchi, 2017) confirms that SEC comment letters improve financial reporting quality, causal evidence on whether such anti-greenwashing scrutiny shapes substantive environmental actions remains scarce. We develop a novel identification strategy incorporating double criteria, which enables us to provide causal evidence on the targeted deterrence of SEC regulation. We find that prior climate-related disclosures, when coupled with a history of environmental incidents, can interact with unexpected regulatory shocks to generate positive real outcomes. More importantly, we extend prior literature on the real effects of disclosure regulations (e.g., Christensen et al., 2016; Fiechter et al., 2022) by revealing an unintended yet positive consequence of symbolic climate-related disclosures: regulating what firms say ultimately shapes how they act.

2. Institutional background

Before 2021, the SEC addressed climate risk mainly through its 2010 interpretive guidance and the

ordinary filing-review process (SEC, 2010). This earlier regime was unevenly enforced, with relatively few SEC comment letters focused specifically on climate risk, leaving firms with significant uncertainty regarding how much information should be disclosed and how the disclosed information would be assessed by regulators and the market (Matsumura et al., 2024). In addition, firms had alternative responses to SEC comment letters, including remedying disclosure deficiencies or avoiding substantive disclosure changes by requesting that certain information be treated as confidential or by further negotiating with the SEC (Bozanic et al., 2017). Moreover, SEC comment letters also tended to focus on certain issues that the staff were familiar with, often overlooking other areas of potential deficiencies (Kubic and Toynbee, 2023).

The regulatory landscape shifted dramatically on March 4, 2021, when the SEC established the Climate and ESG Task Force inside the Division of Enforcement. It was initiated to proactively identify climate- and ESG-related misconduct under existing securities laws, initially emphasizing material gaps or misstatements in issuers' climate-risk disclosures (SEC, 2021a). Following its establishment, the SEC substantially intensified its scrutiny by cross-checking firms' legally binding filings, voluntary non-financial reporting and actual environmental conduct against. This regulatory deterrence is vividly illustrated by a series of high-profile enforcement actions. Although the Task Force's actions against financial institutions garnered significant attention, its enforcement mandate placed equivalent weight on operating companies responsible for real-world environmental footprints. Legal and regulatory experts point out that landmark actions against corporate issuers (e.g., the mining giant Vale S.A. and the beverage company Keurig Dr Pepper Inc.) to the Task Force's enforcement portfolio (Beller et al., 2024). The SEC heavily penalized Vale for making false environmental safety claims in its statutory filings prior to a catastrophic dam collapse (SEC, 2022a). Similarly, the SEC charged Keurig Dr Pepper for highlighting the recyclability of its products in its 10-K filings while failing to disclose material negative feedback from major commercial recycling facilities (SEC, 2024). The SEC deployed this exact "material gap" logic against other domestic issuers as well, such as Compass Minerals International, whose deficient statutory disclosures masked severe underlying operational and environmental compliance risks (SEC, 2022b). By treating already-materialized incidents as mere "hypothetical" risks or providing false assurances of material compliance in legally binding filings, these firms triggered severe anti-fraud litigation under

provisions such as Rule 10b-5, rather than simple disclosure remedies.

On September 12, 2024, an SEC spokesperson confirmed that the Enforcement Division had disbanded the Task Force within the preceding months (Ramonas, 2024). Although the organizational unit operated for roughly three years, its active tenure fundamentally increased the proprietary cost of symbolic compliance, making the decoupling of formal 10-K climate disclosures from actual environmental performance a highly actionable offense. Accordingly, to cleanly capture the real effects of this targeted regulatory deterrence without the confounding influence of its subsequent dissolution, our empirical analysis specifically focuses on the sample period up to 2023.

3. Hypothesis development

The anti-greenwashing enforcement threat generates distinct predictions about how firms respond to credible regulatory scrutiny. In practice, corporate climate-related disclosures in 10-K filings are primarily driven by the need to address material business risks, such as regulatory compliance, operational hazards, and transition costs. When firms discuss these issues, they construct a legally binding narrative regarding how they identify, manage, and mitigate environmental risks. However, a critical divergence emerges when a firm's operational reality contradicts this narrative. Environmental incidents, such as pollution events or severe compliance failures, serve as undeniable signals of underlying operational deficiencies. For a firm that has explicitly discussed its climate and environmental risk management in its 10-K, the occurrence of these incidents exposes a salient "material gap", suggesting that the disclosed risks were either severely understated or that the firm's mitigation claims were misleading. This precise contradiction between statutory risk disclosures and actual environmental conduct is the primary target of the SEC Climate and ESG Task Force (SEC, 2021a).

We conjecture that firms with high ex-ante exposure, those exhibiting both explicit 10-K climate disclosures and a record of environmental incidents, can react to this regulatory shock through two non-competing mechanisms. First, the heightened litigation risk may discipline these firms, motivating them to close the material gap by improving their actual environmental performance. By undertaking substantive decarbonization, high-exposure firms can align their operational reality with their statutory disclosures (e.g., Chen et al., 2018; Downar et al., 2021). Second, the enforcement

threat may induce strategic silence. If firms find it excessively costly to achieve substantive carbon reductions, they may instead opt to lower the tone or specificity of their climate disclosures to minimize regulatory scrutiny (Fiechter et al., 2022; Zakota, 2025; Zatini et al., 2026). Under this strategy, firms may cease disclosing relevant information while their actual environmental performance remains unchanged. We develop our baseline hypotheses accordingly:

H1 (Discipline hypothesis): Following the establishment of the SEC Climate and ESG Task Force, firms with high ex-ante exposure to greenwashing scrutiny reduce their carbon emission intensity more than other firms.

H2 (Strategic silence hypothesis): Following the establishment of the SEC Climate and ESG Task Force, firms with high ex-ante exposure to greenwashing scrutiny are less likely to disclose relevant information than other firms.

4. Data and identification strategy

4.1 Sample selection

We begin with the universe of RUSSELL 3000 U.S. listed firms covered by Compustat NA and CERES climate-related disclosure dataset (include Russell 3000 firms). We then merge this sample with firm-level carbon emissions data from Trucost, the environmental incident data from Reprisk, and firm governance data from LSEG. Details of variables are provided in Section 4.2 and variable definitions are found in Table A1. After excluding observations with missing values in the variables used in the baseline specification, we end up with 12,314 firm-year observations from 1,971 firms during 2017-2023. Panel A of Table 1 details the sample construction.

[Insert Table 1 here]

4.2 Variable construction

All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers.

4.2.1 Dependent variables

Our primary outcome variable is corporate carbon emission intensity, sourced from Trucost. We

construct two measures: Intensity scope 1 (scope 1 carbon emissions scaled by total revenue) and Intensity Scope 12 (Scopes 1 and 2 carbon emissions scaled by total revenue). The unit of our dependent variables is kilograms of CO2 equivalent emission per dollar.

4.2.2 Identification variables

The SEC Climate and ESG Task Force was initiated to proactively identify climate- and ESG-related misconduct under existing securities laws, initially emphasizing material gaps or misstatements in issuers' climate-risk disclosures (SEC, 2021a). We therefore construct two indicators for high-exposure firms, on the same two dimensions the Task Force itself would plausibly use. The first one, *Disclosure10K*, captures whether a firm discusses climate-related risks in its 10-K filing for the fiscal year preceding the Task Force's announcement. It is a dummy variable equal to one if a firm has any climate-related disclosure in its 10-K filings in 2020 and zero otherwise. The second one, *E_incidents*, captures a firm's environmental incident record in the past. It is a dummy variable equal to one if a firm experienced environmental incidents during the 2019-2020 period and zero if the firm has no record but is included in the 2020 RepRisk rating universe[2].

4.2.3 Control variables

Following prior studies (e.g., Chen et al., 2018; Downar et al., 2021), we include a broad set of firm-level controls to account for financial characteristics and corporate governance in our baseline specifications. Following prior literature (e.g.,), we control firm size (natural logarithm of total assets), leverage (the sum of long-term debt and current liabilities over total assets), return on assets (ROA, net income over total assets), Tobin's Q (the market value of equity plus the book value of assets minus the book value of equity, scaled by total assets), cash holdings (cash and short-term investment over total assets), PPE (net property, plant, and equipment over total assets), capex (capital expenditures over total assets), and R&D (a dummy variable equal to one if a firm reports non-zero

[2] We specify a two-year look-back window (2019–2020) in strict alignment with RepRisk's proprietary methodological framework. According to RepRisk, the severity and reputational impact of an ESG controversy are subject to a 24-month decay period. Under this methodology, past incidents fully decay and drop out of a firm's current risk profile after two years unless new issues arise. Therefore, capturing incidents within this exact two-year window accurately reflects a firm's active environmental risk exposure at the time of the Task Force's inception in early 2021.

R&D expenses and zero otherwise). To account for governance and sustainability oversight, we also include controls for board independence (the percentage of independent board members), CEO-chairman separation (a dummy variable equal to one if a CEO does NOT serve as the chairman and zero otherwise), and the presence of a CSR committee (a dummy variable equal to one if a firm has a CSR or sustainability committee and zero otherwise.).

4.3 Identification strategy

We identify a firm as high-exposure if its *Disclosure10K* and *E_incidents* are both equal to one. We then estimate the following triple-difference (DDD) specification to identify the effect of SEC's establishment of the Climate and ESG Task Force on corporate decarbonization of high-exposure firms.

$$Intensity_{i,t} = \alpha + \beta_1(Post_t \times Disclosure10K_i \times E_incidents_i) + \beta_2(Post_t \times Disclosure10K_i) + \beta_3(Post_t \times E_incidents_i) + \gamma Controls_{i,t-1} + Firm_i + Year_t + \varepsilon_{i,t} \quad (1)$$

where i indexes firm and t indexes year. $Intensity_{i,t}$ is either $Intensity_scope1_{i,t}$ or $Intensity_scope12_{i,t}$. $Post_t$ is an indicator equal to one for fiscal years after 2021, and zero otherwise. $Disclosure10K_i$ and $E_incidents_i$ are the two time-invariant exposure indicators defined in Section 4.2, and their interaction term identifies firms with high ex-ante exposure to greenwashing scrutiny. $Controls_{i,t-1}$ is a vector of firm characteristics described in Section 4.2. $Firm_i$ and $Year_t$ denote firm and year fixed effects, respectively.

4.4. Summary statistics

Summary statistics of variables are reported in Panel B of Table 1. The mean values for $Intensity_scope1$ and $Intensity_scope12$ are 0.109 and 0.135, respectively. Both variables exhibit right-skewness, as their means are substantially higher than their medians (0.011 and 0.031), which is typical for corporate carbon emission data. Approximately 22.2% of the sample observations are associated with firms that experienced environmental incidents. Meanwhile, 62.2% of the sample provided climate-related disclosures in their pre-shock 10-K filings. Notably, prior to the regulatory shock ($Post = 0$), the average emission intensities for the high-exposure treatment group ($E_incidents = 1$ and $Disclosure10K = 1$) are 0.411 (Scope 1) and 0.459 (Scope 1 & 2).

5. Results

This section reports the baseline triple-difference (DDD) estimates of the impact of the SEC Climate and ESG Task Force establishment on corporate carbon emission intensity, along with a series of robustness tests that address endogeneity issues and rule out alternative explanations.

5.1 Baseline results

5.1.1 Do high-exposure firms lower emission intensity after the shock?

Table 2 displays the baseline results. The coefficient estimates on *E_incidents* × *Disclosure10K* × *Post* is -0.049 and statistically significant at the 1% level across both columns, indicating that firms with high ex-ante exposure to greenwashing scrutiny significantly lowered their carbon emission intensity more than other firms following the establishment of the SEC Climate and ESG Task Force. The scale of this effect is 0.049 kilograms (or 49 grams) per dollar of revenue. The insignificant interaction terms *E_incidents* × *Post and Disclosure10K* × *Post* suggest the effect concentrates on firms meeting both identification criteria and is not driven by a single dimension. The effect corresponds to approximately 11.9% and 10.7% of high-exposure firms' average pre-shock scope 1 and scope 1+2 carbon intensities, respectively. These findings are consistent with H1, supporting the premise that the Task Force effectively disciplines firms exhibiting a salient material gap between their statutory risk disclosures and actual operational realities.

[Insert Table 2 here]

We then check the parallel trends of emission intensities between high-exposure firms and other firms by estimating the dynamic treatment effects. Figure 1 plots the triple interaction term in each year around the shock. We replace the Post dummy with dummies of years from 2017 to 2023 and re-estimate the baseline regressions. We set 2020, the year right before the shock, as the benchmark year. The pre-period coefficients are neither economically nor statistically significant, and the estimated treatment effect emerges only after the shock and grows over the post-period, suggesting no evidence of a pre-existing divergence in emission intensity trends between high-exposure firms and the rest of the sample prior to the Task Force's establishment.

[Insert Figure 1 here]

Furthermore, to alleviate the concern that our baseline results are driven by observable firm differences, we re-estimate our triple-difference model using an entropy-balanced sample constructed from the baseline year (2020). Specifically, based on characteristics of firms with environmental incidents, we construct another group of firms that exactly match the first group in terms of the first three moments (mean, variance, and skewness) of the baseline firm-level covariates alongside the Disclosure10K indicator by assigning different weights to firms. As shown in Panel A of Table 3, this procedure eliminates mean differences in covariates between the two groups. We then apply these cross-sectional weights to our baseline regressions. The results reported in Panel B, show that the weighted regressions remain qualitatively consistent with our baseline findings in Table 2.[3]

[Insert Table 3 here]

5.1.2 Is strategic silence an alternative response?

An alternative response, suggested in H2, is that firms may choose strategic silence rather than real decarbonization. High-exposure firms may curtail their environmental disclosure to lower their propensity of regulatory scrutiny. While strategic silence and real decarbonization are not necessarily mutually exclusive, the reduction in reported emission intensity might reflect what firms choose to disclose rather than a substantive change in overall business.

We examine the effect of the shock on the subsequent environmental disclosure of firms with high ex-ante exposure. Specifically, we re-estimate our baseline specification using two continuous measures of environmental disclosure, *GHG_Disclosure* and *Envr_Disclosure*, as the dependent variable, respectively. *GHG_Disclosure (Envr_Disclosure)* is defined as the proportion of the external cost of direct greenhouse gas emissions (environmental impacts) that is calculated based on actual data explicitly disclosed by the company, rather than estimated. These two variables capture the extent to which firms disclose their emission and environmental information.

If highly exposed firms respond to the Task Force primarily by withdrawing disclosure, we would expect the coefficient of *Post* × *Disclosure10K* × *E_incidents* in this specification to be significantly

[3] In untabulated analyses, we employ an alternative entropy balancing specification where we designate *Disclosure10K* as the treatment group and include *E_incidents* as a covariate. This reverse-matching procedure yields qualitatively identical results.

negative. Instead, Table 4 shows insignificant results, indicating that the effect is not due to high-exposure firms' strategic and selective disclosure following the Task Force's establishment. This finding, together with the baseline results in Table 2, are inconsistent with strategic silence and support that firms substantively lower their carbon emission intensities.

While curtailing subsequent environmental disclosures could be a natural alternative response to minimize future regulatory scrutiny, this strategy alone may be insufficient for high-exposure firms. Because enforcement agencies actively review historical 10-K filings to identify anti-fraud violations, firms cannot retroactively erase the statutory risk benchmarks established in their pre-shock disclosures simply by becoming less vocal. The salient divergence between their historical risk assessments and materialized operational incidents remains legally actionable under securities laws. Therefore, to effectively eliminate the regulatory exposure created by their past filings, making substantive improvements in underlying environmental performance remains a critical and indispensable margin of adjustment.

[Insert Table 4 about here]

5.2 Robustness tests

We also conduct a battery of robustness checks to address different concerns and rule out alternative explanations.

Time-varying industry and regional shocks. Our sample period might coincide with certain uneven, industry- and region-specific rebounds from significant events (e.g., COVID-19 pandemic and trade tensions between the U.S. and other countries). Besides, the policy might receive difference levels of pressure in different states subject to the ideology and political preference of each state. One concern is that our estimates capture differential patterns rather than a response to the Task Force. In Panel A of Table 5, we replace our baseline industry and year fixed effects with industry-by-year and state-by-year fixed effects, which wash out any common shocks that vary across industries or regions over time. Our results still hold with these additional fixed effects.

Alternative emissions data. Because the emission data can be sensitive to database choice, in Panel B and Panel C of Table 4, we respectively cross-validate our results using reduced and alternative emission data, to ensure that our findings are not specific to a single data source. In specific, in Panel

C we exclude observations with estimated (not disclosed) carbon emission data in Trucost. In Panel D we use alternative carbon emission data from LESG. Our results are still robust.

Alternative sample construction. In panels D-F, we show that our results are robust to various alternative sample restrictions, including excluding firms without RepRisk coverage, excluding financial and utility industries, and restricting the sample to firms with continuous coverage over the full sample period.

[Insert Table 5 here]

5.3 Falsification tests

Our identification could be challenged by the inherent self-motivation of high-disclosure firms to improve over time regardless of regulatory pressure, or the tendency of firms with environmental incidents to undertake legitimacy-repair efforts on their own timeline. In specific, should there be no such regulatory shock, the high-exposure firms might improve their performance following their disclosure and incidents. We rule out these alternative explanations with two sets of tests in Tbale 5 and Figure 2, respectively.

[Insert Table 6 here]

We start with a set of falsification tests with various pseudo shock years as well as disclosure and incidents records in various pre-shock years. First, we use our baseline identification but use 2020 and 2019 as pseudo shock years, respectively. Panels A and B of Tabel 5 report the results. We find no effect on high-exposure firms with these pseudo shock years. The results confirm that high-exposure firms only reduce their carbon emission intensities after the regulatory shock. If high-exposure firms were to lower their carbon emission intensities regardless of the shock, the effect should also be observed in 2020.

Second, to further rule out the results are not driven by firms' pressure from incidents record or inherent self-motivation to disclose and improve, we further move both the shock year and the identification window one and two years ahead, respectively. In specific, in Panel C, we identify high-exposure firms based on their presence of disclosure in 2019 and their incidents record during 2018-2019. In Panel D, we identify high-exposure firms based on their presence of disclosure in 2018 and

their incidents record during 2017-2018. If by any chance our results reflect firms' existing trend following disclosure or incidents record, these pseudo identifications and shock years will capture similar effects to our baseline regressions. They do not. By contrast, Panel C and Panel D find positive effects on carbon emission intensities, indicating that apart from the pseudo shock and identifications, we further conduct a component-wise spatial placebo test in which we keep one of the *Disclosure10K* or *E_incidents* indicators fixed and randomly assign the other. We re-estimate equation (1) using this placebo high-exposure measure in place of the real one. If our baseline estimate reflects the effect of the Task Force rather than a spurious correlation between exposure and unobserved firm characteristics, the placebo interaction term based on the random assignment of a single identification dimension should be statistically insignificant.

Figure 2 confirms the null predictions. In panels A and C, we use a firm's real disclosure but randomly assign a firm's incidents record and estimate the coefficients of the triple interaction. We repeat the procedure 1,000 times and plot the distribution coefficients with scope 1 and scopes 1&2 as the dependent variables respectively. In panels B and D, we use a firm's real incident record but randomly assign a firm's disclosure. We also repeat the same procedure 1,000 times and plot the coefficients. As is shown in Figure 2, almost all the coefficients are centered around zero rather than the real baseline estimate.

[Insert Figure 2 about here]

Together, the results in this section indicate that our baseline estimates are unlikely to be driven by unobserved random noise, the inherent self-motivation of firms with disclosure, or the legitimacy-repair needs of firms with a history of environmental incidents.[4]

[4] In untabulated analyses, we exploit the jurisdictional boundary of the SEC's mandate by conducting a placebo test on non-U.S. listed firms from Compustat Global. Because these firms fall outside the SEC's regulatory purview, we replace the 10-K disclosure indicator with two alternative 2020 disclosure proxies from LSEG (CSRreporting and ClimateChangeCommercialRisksOpportunities). The estimated coefficients on the interaction terms are statistically insignificant for this foreign sample, confirming that our baseline findings are driven specifically by U.S. regulatory deterrence rather than a concurrent global macroeconomic trend toward decarbonization.

6. Further analysis

6.1 The role of ex-ante executives' incentives

We then explore the role of executives' incentives. If the effect is induced by concerns of the large divergence between disclosure and environmental performance being detected, this should be pronounced among firms where the executive compensation contract explicitly ties pay to sustainability- or CSR-related performance targets (e.g., Haque, 2017; Haque and Ntim, 2020).

Table 7 reports the results. We re-estimate the baseline regressions in sub-samples of firms with and without sustainability-linked executive compensation, respectively. We find economically and statistically stronger coefficients on *Post* × *Disclosure10K* × *E_incidents* among firms with sustainability-linked executive compensation. In addition, the difference between the two subsamples is statistically significant at conventional levels. This pattern is consistent with ouir conjecture. Executives whose personal wealth is directly linked to firms' sustainability performance bear a higher cost of a detected gap between disclosure and performance once the Task Force, and they therefore have stronger incentives to narrow that gap through substantive improvement rather than simply adjusting disclosure.

These findings are consistent with our predictions and highlight a strong synergy between internal incentive structures and external regulatory scrutiny. Specifically, executives' sustainability-linked compensation serves as a vital transmission channel that plausibly determines how effectively a given level of regulatory deterrence translates into substantive internal managerial action.

[Insert Table 7 here]

6.2 The role of firm size

Larger firms are usually associated with more care about reputation (e.g., Hong et al., 2007; Sila et al., 2017). Besides, they are also more visible in many ways such as greater analyst coverage, media attention, and investor scrutiny. These raise the probability that any substantial gap between a firm's climate disclosures and its environmental is detected. We test this prediction by splitting our sample based on firm size, measured as total assets.

We re-estimate the baseline regressions in large and small firms in separate and report the results in

Table 8. The effect of *Post* × *Disclosure10K* × *E_incidents* is stronger among large firms than small firms, and the difference between the two subsamples is statistically significant at conventional levels. Our findings suggest that larger, more visible firms face a higher potential cost of being caught maintaining a gap between climate rhetoric and environmental performance, not only because they are more likely to draw the Task Force's attention in the first place but also because any detected gap can cause higher reputational cost and larger capital-market consequences for a highly visible firm.

[Insert Table 8 here]

6.3 The role of ex-ante SEC comments

We further examine whether the decarbonization response is concentrated among firms with a heightened ex-ante sensitivity to SEC oversight. Under the SEC's risk-based review process, historically flagged firms attract concentrated and continuous regulatory attention (Cassell et al., 2013; Heese et al., 2017). Furthermore, prior enforcement interactions equip regulators with firm-specific knowledge that significantly enhances the rigor of subsequent scrutiny (Kubic & Toynbee, 2023). Consequently, if our baseline findings are fundamentally driven by regulatory deterrence, high-exposure firms with a heavier historical volume of SEC comment letters should exhibit a more pronounced decarbonization response to the Task Force's mandate.

To test this conjecture, we partition the sample based on the median number of total SEC comment letters received during the 2017–2020 pre-shock window (the median is two letters). Table 9 presents the cross-sectional estimation results. Panel A demonstrates that among the subsample of firms with high prior SEC scrutiny, high-exposure firms reduce their carbon emission intensity significantly, by more than 0.6 kilograms per dollar. Conversely, as reported in Panel B, this negative effect is statistically insignificant among firms with fewer ex-ante SEC comment letters. Taken together, these findings provide compelling evidence that the substantive environmental improvements triggered by the SEC Climate and ESG Task Force are distinctly driven by the mechanism of regulatory deterrence.

[Insert Table 9 here]

6.4 The role of ex-ante ESG disclosure score

Finally, we examine how the breadth of a firm's voluntary public rhetoric, captured by the ex-ante

Bloomberg ESG disclosure score, shapes its decarbonization response. While standard 10-K filings establish a statutory risk-management baseline, broader voluntary ESG disclosures are the primary venues where firms make ambitious public commitments, extensive sustainability pledges, and, frequently, exaggerated environmental claims (i.e., greenwashing). Because the SEC Task Force cross-checks voluntary sustainability reports against statutory filings and real-world conduct, firms that aggressively overclaim their environmental credentials face magnified litigation and regulatory risks when actual incidents occur. Consequently, high-exposure firms with extensive ex-ante voluntary disclosures should experience the strongest imperative to substantively decarbonize to bridge the glaring gap between their lofty rhetoric and operational reality.

To test this conjecture, we partition our sample based on the median Bloomberg ESG disclosure score in the pre-shock year (2020) and re-estimate our baseline regressions. The cross-sectional results in Table 10 strongly align with our predictions. Panel A reveals a highly pronounced reduction in carbon emission intensity among firms with high ex-ante ESG disclosure scores. In stark contrast, Panel B demonstrates that this disciplinary effect is statistically insignificant for firms with below-median scores. These findings confirm that the SEC's anti-greenwashing enforcement most effectively disciplines the most vocal "over-claimers," forcing them to substantiate their extensive public commitments with real environmental improvements.

[Insert Table 10 here]

7. Conclusion

This paper examines how anti-greenwashing regulatory deterrence induces substantive corporate decarbonization. Using the SEC's establishment of the Climate and ESG Task Force in 2021 as a shock to the expected cost of maintaining a "material gap" between statutory disclosures and operational reality. We find that firms with high ex-ante exposure to greenwashing scrutiny, defined as those exhibiting both affirmative climate-related 10-K disclosures and a record of environmental incidents, significantly reduce their carbon emission intensity relative to other firms. These baseline estimates withstand a battery of robustness checks, as well as multiple spatial and intertemporal falsification tests designed to rule out pre-existing trends and alternative explanations. Crucially, by

demonstrating that highly exposed firms do not systematically curtail their subsequent environmental disclosures to evade scrutiny, we provide evidence that the corporate response concentrates on substantive carbon reduction rather than mere strategic silence. Cross-sectional analyses further reveal that this decarbonization response is concentrated in larger firms, firms with sustainability-linked executive compensation, firms with a history of receiving more SEC comment letters and firms with extensive voluntary ESG rhetoric. Together, these findings speak to a simple but powerful and underappreciated point: a securities enforcement agency with no direct authority over environmental mandates can nonetheless drive substantive real-world decarbonization by strictly regulating the integrity of what firms say about their environmental risk management.

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Figure 1 Dynamic Treatment Effects and Parallel Trends

This figure presents the dynamic triple-difference (DDD) estimates of the impact of the SEC Climate and ESG Task Force establishment on corporate carbon emission intensity. Panel (a) reports the dynamic treatment effects for Scope 1 emission intensity (*Intensity_Scope1*), and Panel (b) reports the results for combined Scope 1 and Scope 2 emission intensity (*Intensity_Scope12*). The horizontal axis denotes the calendar years, with the year 2020 serving as the baseline (omitted) reference period prior to the Task Force's establishment in 2021. The vertical dashed red line separates the pre-treatment and post-treatment periods. The shaded areas represent the 95% confidence intervals based on robust standard errors clustered at the firm level. All dynamic regressions control for the baseline set of firm characteristics, the underlying double-difference and main effect terms, and include both firm and year fixed effects.

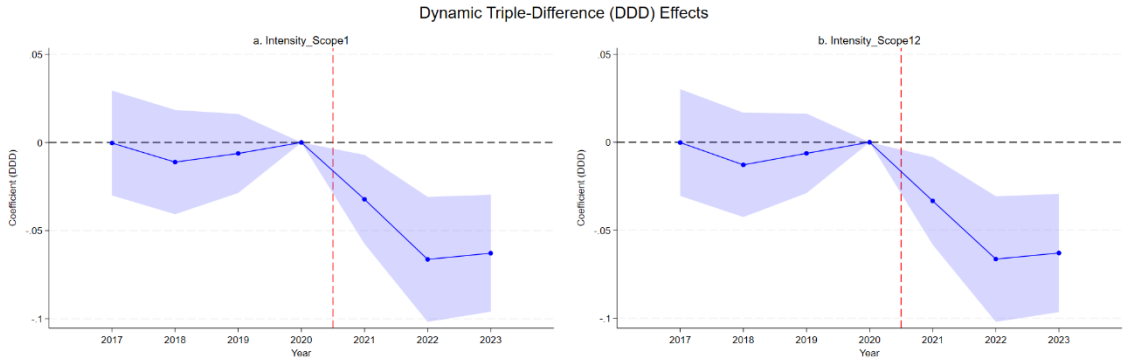
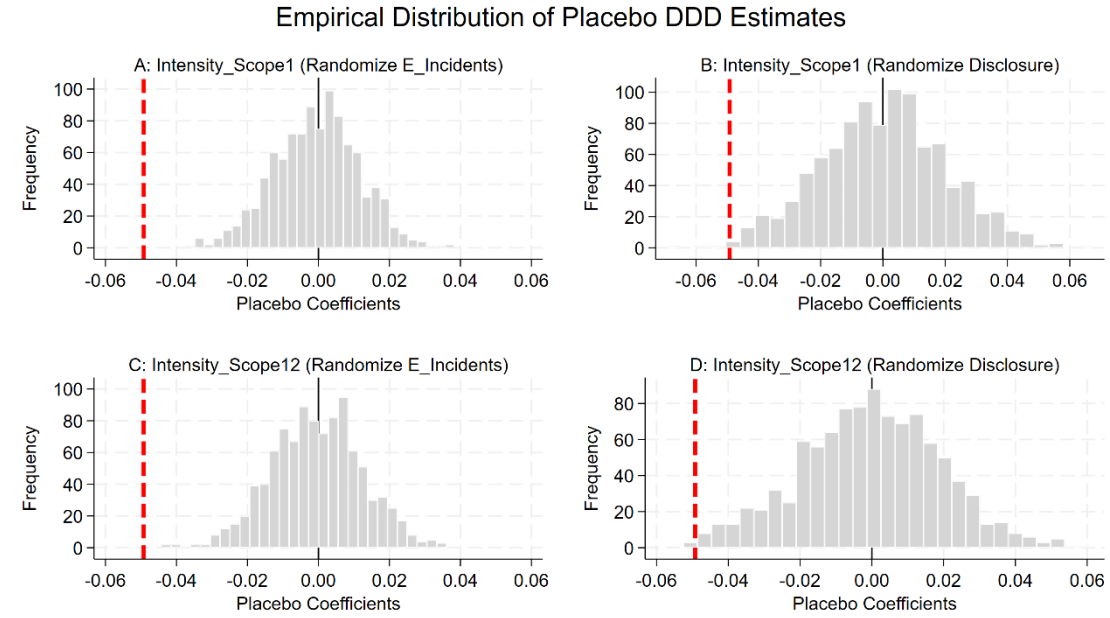


Figure 1 Dynamic Treatment Effects and Parallel Trends

Figure 2 Component-Wise Spatial Placebo Tests

This figure reports the empirical distributions of placebo triple-difference (DDD) estimates generated from component-wise spatial placebo tests by randomly reassigning firm characteristics across the sample 1,000 times. The dependent variable is *Intensity_Scope1* in Panels A and B, and *Intensity_Scope12* in Panels C and D. Panels A and C report the placebo distributions when firms' environmental incidents (*E_Incidents*) are randomly reassigned while holding their actual climate disclosure status constant. Panels B and D present the distributions when firms' climate disclosure status (*Disclosure*) is randomly reassigned while holding their actual environmental incidents constant. The grey histograms represent the empirical frequencies of the 1,000 placebo DDD coefficients. The solid black vertical line indicates zero, and the thick dashed red vertical line represents the true baseline DDD estimate.



Notes: The solid black line indicates zero. The dashed red line represents the true DDD estimate.

Figure 1 Component-Wise Spatial Placebo Tests

Table 1 Descriptive statistics

This table reports the sample selection process and descriptive statistics for the full sample. Panel A reports the step-by-step sample filtering procedure. Panel B reports the descriptive statistics. All variable definitions are provided in Appendix Table A1.

Panel A: Sample selection

	Obs.	Unique firms
Russell 3000 firms from CERES merged with Compustat NA[5]	**16,631**	**2,574**
Less observations:		
Firms outside RepRisk coverage in 2020	(1,481)	
Observations with missing Trucost emission data	(556)	
Observations with missing control variables	(2280)	
Final Sample	**12,314**	**1,971**

Panel B: Descriptive statistics

Variables	N	Mean	Sd.	P25	P50	P75
Intensity_Scope1[6]	12314	0.109	0.390	0.002	0.011	0.024
Intensity_Scope12	12314	0.135	0.397	0.009	0.031	0.062
E_incidents	12314	0.222	0.416	0.000	0.000	0.000
Disclosure10K	12314	0.622	0.485	0.000	1.000	1.000
Post	12314	0.415	0.493	0.000	0.000	1.000
Size	12314	8.053	1.763	6.837	7.939	9.194
Lev	12314	0.285	0.232	0.086	0.258	0.417
ROA	12314	0.017	0.140	0.006	0.030	0.074
TobinQ	12314	2.239	1.869	1.091	1.533	2.547
Cash	12314	0.163	0.194	0.033	0.089	0.211
PPE	12314	0.216	0.235	0.036	0.124	0.317
Capx	12314	0.031	0.037	0.006	0.020	0.042
RD	12314	0.419	0.493	0.000	0.000	1.000
CsrCommitte	12314	0.442	0.497	0.000	0.000	1.000
IndepBoardMem	12314	81.417	10.675	76.923	84.615	90.000
CeoChairmanSeparation	12314	0.567	0.495	0.000	1.000	1.000

[5] This baseline universe is constructed by merging the 2020 cross-sectional data of Russell 3000 firms from the CERES database with the Compustat North America database (Panel data). Firms with missing or negative total assets are subsequently excluded.

[6] Prior to the regulatory shock (*Post* = 0), the average emission intensities for the high-exposure treatment group (*E_incidents =1 and Disclosure10K =1)* are 0.411 (Scope 1) and 0.459 (Scope 1 & 2).

Table 2 SEC Task Force Establishment and Corporate Carbon Emission Intensity

This table reports the baseline triple-difference (DDD) estimates of the impact of the SEC Climate and ESG Task Force establishment on corporate carbon emission intensity. The dependent variables are the carbon emission intensities for Scope 1 emissions (*Intensity_Scope1*, Column 1) and combined Scope 1 and Scope 2 emissions (*Intensity_Scope12*, Column 2). The primary variable of interest is the triple interaction term, *E_incidents*Disclosure10K*Post*. *E_incidents* is an indicator variable equal to 1 if the firm experienced environmental (E) incidents during the 2019-2020 period, and 0 otherwise. *Disclosure10K* is an indicator variable capturing whether a firm provided climate-related disclosures in its pre-shock 10-K filings. *Post* is a dummy variable equal to 1 for the years 2021 and onwards (the post-establishment period), and 0 otherwise. Firm and Year fixed effects are controlled in both columns. Robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix Table A1.

	(1)	(2)
Variables	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents* Disclosure10K* Post	-0.049***	-0.049***
	(0.013)	(0.013)
Disclosure10K* Post	-0.003	-0.005
	(0.004)	(0.005)
E_incidents* Post	-0.011	-0.012
	(0.007)	(0.008)
Size	-0.011*	-0.012**
	(0.006)	(0.006)
Lev	0.015	0.017
	(0.017)	(0.017)
ROA	-0.034**	-0.033**
	(0.015)	(0.015)
TobinQ	-0.001	-0.001
	(0.001)	(0.001)
Cash	0.005	0.004
	(0.013)	(0.013)
PPE	0.042	0.032
	(0.049)	(0.049)
Capx	-0.164	-0.142
	(0.117)	(0.118)
RD	-0.020***	-0.018
	(0.007)	(0.011)
CsrCommitte	0.006	0.007
	(0.005)	(0.005)
IndepBoardMem	0.000	0.000
	(0.000)	(0.000)
CeoChairmanSeparation	-0.004	-0.003
	(0.005)	(0.006)
Firm FE	YES	YES
Year FE	YES	YES
Observations	12,314	12,314
Adj. R-squared	0.942	0.943

Table 3 Entropy-Balanced Matching

This table reports the results of the triple-difference (DDD) estimations using an entropy-balanced matching sample. To achieve covariate balance, entropy balancing is applied based on firm characteristics in the baseline year (2020). Specifically, defining firms with environmental incidents as the treatment group, the algorithm reweighs the control group by constraining the first, second, and third moments (mean, variance, and skewness) of the covariates, which include the climate disclosure indicator alongside the baseline firm-level controls, to be equal to those of the treatment group. Panel A presents the covariate balance statistics before and after reweighting, where U and M denote the unadjusted (pre-balance) and entropy-balanced (post-balance) samples, respectively. Panel B reports the weighted DDD regression results of the impact of the SEC Climate and ESG Task Force establishment on corporate carbon emission intensities using the balanced sample. The dependent variables are Scope 1 emissions (*Intensity_Scope1*, Column 1) and combined Scope 1 and Scope 2 emissions (*Intensity_Scope12*, Column 2). All specifications include the baseline set of firm-level control variables in Table 2, alongside firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix Table A1.

Panel A: Entropy-balanced matching sample

Variables		Mean of treatment group	Mean of control group	Diff
Disclosure10K	***U***	0.859	0.544	0.315
	M	0.859	0.859	0.000
Size	***U***	9.503	7.621	1.882
	M	9.503	9.499	0.004
Lev	***U***	0.382	0.274	0.109
	M	0.382	0.382	0.000
ROA	***U***	0.015	-0.005	0.020
	M	0.015	0.015	0.000
TobinQ	***U***	2.051	2.467	-0.416
	M	2.051	2.051	0.000
Cash	***U***	0.118	0.208	-0.090
	M	0.118	0.118	0.000
PPE	***U***	0.382	0.176	0.207
	M	0.382	0.382	0.000
Capx	***U***	0.039	0.021	0.018
	M	0.039	0.039	0.000
RD	***U***	0.350	0.442	-0.092
	M	0.350	0.351	-0.001
CsrCommitte	***U***	0.773	0.314	0.460
	M	0.773	0.773	0.001
IndepBoardMem	***U***	84.950	80.800	4.150
	M	84.950	84.920	0.030
CeoChairmanSeparation	***U***	0.632	0.536	0.096
	M	0.632	0.632	0.000

VARIABLES	(1) ***Intensity_Scope1***	(2) ***Intensity_Scope12***
E_incidents* Disclosure10K* Post	-0.068***	-0.071***
	(0.022)	(0.022)
Disclosure10K* Post	0.017	0.019
	(0.017)	(0.018)
E_incidents* Post	-0.007	-0.009
	(0.009)	(0.010)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	11,873	11,873
Adj. R-squared	0.932	0.932

Table 4 Alternative Response: Strategic Silence

This table reports the triple-difference (DDD) estimates of the impact of the SEC Climate and ESG Task Force establishment on corporate environmental disclosure levels. The dependent variables are the proportion of the external costs based on data explicitly disclosed by the company for greenhouse gas emissions (*GHG_Disclosure*, Column 1) and overall environmental impacts (*Envr_Disclosure*, Column 2). The primary variable of interest is the triple interaction term, *E_incidents*Disclosure10K*Post*. All specifications control for the baseline set of firm characteristics, as well as firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix Table A1.

	(1)	(2)
Variables	***GHG_Disclosure***	***Envr_Disclosure***
E_incidents* Disclosure10K* Post	-5.690	-0.243
	(4.649)	(3.764)
Disclosure10K* Post	9.320***	7.764***
	(1.751)	(1.191)
E_incidents* Post	-0.607	-4.796
	(4.092)	(3.273)
Size	2.342	0.780
	(1.512)	(1.078)
Lev	6.096	5.556*
	(3.834)	(2.834)
ROA	-4.439	-4.541**
	(3.111)	(2.058)
TobinQ	0.341	0.322
	(0.364)	(0.243)
Cash	7.633*	6.932**
	(4.040)	(2.752)
PPE	-3.398	-0.941
	(8.331)	(6.393)
Capx	-28.451	-7.368
	(20.795)	(15.017)
RD	-0.028	-2.327
	(5.371)	(3.522)
CsrCommitte	18.348***	11.777***
	(1.357)	(0.958)
IndepBoardMem	-0.029	-0.039
	(0.058)	(0.039)
CeoChairmanSeparation	-3.211**	-1.460
	(1.574)	(1.102)
Firm FE	YES	YES
Year FE	YES	YES
Observations	12,314	12,314
Adj. R-squared	0.735	0.768

Table 5 Robustness Tests

This table reports the results of various robustness checks for the baseline triple-difference (DDD) estimations regarding the impact of the SEC Climate and ESG Task Force establishment on corporate carbon emission intensity. The primary variable of interest is the triple interaction term, *E_incidents*Disclosure10K*Post*. The robustness tests are organized into six panels. Panel A reports the results when rigorously controlling unobserved time-varying macro and regional shocks by simultaneously incorporating year-by-industry and year-by-state fixed effects. Panel B reports the results excluding observations where carbon emissions are not explicitly disclosed by the firm but rather estimated by Trucost. Panel C reports the estimations that replace the baseline dependent variables with alternative carbon emission metrics sourced from the LSEG database. Panel D reports the findings when expanding the sample by including firms that were not covered by the RepRisk universe in 2020, assigning them a baseline controversy value of zero. Panel E reports the results excluding firms in the financial (SIC 6000-6999) and utility (SIC 4900-4999) sectors to account for their distinct regulatory environments. Panel F reports the estimations restricted to a strongly balanced panel of firms with continuous observations throughout the sample period. All specifications include the baseline set of firm-level control variables in Table 2, alongside firm and year (excluding Panel A) fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix Table A1.

Panel A: Including Year-industry FEs and Year-state FEs		
	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents* Disclosure10K* Post	-0.038***	-0.039***
	(0.013)	(0.013)
Disclosure10K* Post	0.002	0.002
	(0.005)	(0.006)
E_incidents* Post	-0.006	-0.007
	(0.008)	(0.008)
Controls	YES	YES
Firm FE	YES	YES
Year-industry FE	YES	YES
Year-state FE	YES	YES
Observations	12,244	12,244
Adj. R-squared	0.944	0.945

Panel B: Excluding estimated carbon emissions

	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents*Disclosure10K*Post	-0.072***	-0.056***
	(0.020)	(0.018)
Disclosure10K*Post	0.000	-0.007
	(0.011)	(0.006)
E_incidents*Post	-0.014	-0.014
	(0.013)	(0.015)
Controls	YES	YES
Firm FE	YES	YES
Year-industry FE	YES	YES
Observations	4,003	3,643
Adj. R-squared	0.961	0.970

Panel C: Carbon emissions from LSEG

	(1)	(2)
VARIABLES	***Intensity_Scope1_LSEG***	***Intensity_Scope12_LSEG***
E_incidents*Disclosure10K*Post	-0.077***	-0.077***
	(0.020)	(0.022)
Disclosure10K*Post	-0.009	-0.016***
	(0.006)	(0.006)
E_incidents*Post	-0.018	-0.025
	(0.015)	(0.016)
Controls	YES	YES
Firm FE	YES	YES
Year-industry FE	YES	YES
Observations	4,906	4,755
Adj. R-squared	0.947	0.956

Panel D: Including firms without RepRisk coverage

	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents*Disclosure10K*Post	-0.049***	-0.049***
	(0.013)	(0.013)
Disclosure10K*Post	-0.003	-0.005
	(0.004)	(0.004)
E_incidents*Post	-0.011	-0.012
	(0.007)	(0.008)
Controls	YES	YES
Firm FE	YES	YES
Year-industry FE	YES	YES
Observations	12,733	12,733
Adj. R-squared	0.941	0.942

Panel E: Excluding financial and utility industries		
	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents*Disclosure10K*Post	-0.030**	-0.032**
	(0.015)	(0.016)
Disclosure10K*Post	-0.004	-0.005
	(0.006)	(0.006)
E_incidents*Post	-0.015	-0.017
	(0.010)	(0.011)
Controls	YES	YES
Firm FE	YES	YES
Year-industry FE	YES	YES
Observations	9,075	9,075
Adj. R-squared	0.875	0.882
Panel F: Requiring a strongly balanced panel		
	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents*Disclosure10K*Post	-0.048***	-0.048***
	(0.014)	(0.014)
Disclosure10K*Post	-0.004	-0.005
	(0.004)	(0.005)
E_incidents*Post	-0.009	-0.010
	(0.008)	(0.009)
Controls	YES	YES
Firm FE	YES	YES
Year-industry FE	YES	YES
Observations	9,716	9,716
Adj. R-squared	0.947	0.948

Table 6 Falsification Tests: Inherent Motivation and Environmental Incidents vs. Regulatory Shock

This table reports falsification tests to ensure that the baseline triple-difference (DDD) estimates are driven by the SEC regulatory shock rather than the self-motivation of high-disclosure firms or the legitimacy repair needs of firms with environmental incidents. For all specifications, we restrict the estimation sample to the pre-treatment period (up to 2020), entirely excluding the actual post-shock years. Pseudo-DDD models are estimated by artificially shifting the regulatory shock backward in time. In Panels A and B, the baseline treatment indicators (*E_incidents* and *Disclosure10K* measured around 2020) are retained, and a pseudo-shock is assumed to have occurred in 2020 and 2019, respectively. In Panels C and D, both the pseudo-shock year and the treatment indicators measurement years are simultaneously shifted backward. Specifically, in Panel C, the treatment group is defined based on historical 2019 treatment indicators alongside a pseudo-shock in 2020, while in Panel D, 2018 treatment indicators are utilized with a pseudo-shock in 2019. The dependent variables are the carbon emission intensities for Scope 1 emissions (*Intensity_Scope1*, Column 1) and combined Scope 1 and Scope 2 emissions (*Intensity_Scope12*, Column 2). The baseline set of firm-level control variables in Table 2, alongside firm and year fixed effects, is included in all specifications. Robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix Table A1.

Panel A: Using baseline *E_incidents and Disclosure10K* (Pseudo shock year = 2020)		
	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents* Disclosure10K* Pseudo Post	0.005	0.005
	(0.012)	(0.012)
Disclosure10K* Pseudo Post	0.010**	0.010**
	(0.004)	(0.004)
E_incidents* Pseudo Post	-0.001	-0.002
	(0.005)	(0.005)
Controls	0.005	0.005
Firm FE	YES	YES
Year FE	YES	YES
Observations	7,151	7,151
Adjusted R-squared	0.954	0.955

Panel B: Using baseline *E_incidents and Disclosure10K* (Pseudo shock year = 2019)		
	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents* Disclosure10K* Pseudo Post	0.002	0.002
	(0.012)	(0.012)
Disclosure10K* Pseudo Post	0.006	0.007*
	(0.004)	(0.004)
E_incidents* Pseudo Post	-0.001	-0.002
	(0.004)	(0.004)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	7,151	7,151
Adjusted R-squared	0.954	0.955
Panel C: Using historical *E_incidents and Disclosure10K* (Pseudo shock year = 2020)		
	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents* Disclosure10K* Pseudo Post	0.029**	0.029**
	(0.015)	(0.015)
Disclosure10K* Pseudo Post	0.004	0.003
	(0.004)	(0.004)
E_incidents* Pseudo Post	0.001	0.002
	(0.006)	(0.006)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	6,916	6,916
Adjusted R-squared	0.952	0.953
Panel D: Using historical *E_incidents and Disclosure10K* (Pseudo shock year = 2019)		
	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents* Disclosure10K* Pseudo Post	0.038**	0.041**
	(0.018)	(0.018)
Disclosure10K* Pseudo Post	0.002	0.002
	(0.004)	(0.004)
E_incidents* Pseudo Post	-0.009	-0.012
	(0.009)	(0.010)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	7,080	7,080
Adjusted R-squared	0.955	0.955

Table 7 Cross-sectional Analysis: The Role of Ex-Ante Executives' Incentives

This table reports the results of how ex-ante executive compensation incentives tied to sustainability moderate the impact of the SEC Climate and ESG Task Force establishment on corporate carbon emission intensity. *SustainCmpn* is an indicator equal to 1 if the firm's senior executives' compensation was linked to CSR, Health & Safety, or sustainability targets in 2020, and 0 otherwise. Panel A reports the DDD estimations for the High *SustainCmpn* group (*SustainCmpn*=1), while Panel B reports the estimations for the Low *SustainCmpn* group (*SustainCmpn*=0). The primary variable of interest remains the triple interaction term, *E_incidents*Disclosure10K*Post*. The dependent variables are the carbon emission intensities for Scope 1 emissions (*Intensity_Scope1*, Column 1) and combined Scope 1 and Scope 2 emissions (*Intensity_Scope12*, Column 2). All specifications include the baseline set of firm-level control variables in Table 2, alongside firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix Table A1.

Panel A: High *SustainCmpn* group		
	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents*Disclosure10K*Post	-0.084**	-0.086**
	(0.038)	(0.039)
Disclosure10K*Post	0.004	0.004
	(0.009)	(0.009)
E_incidents*Post	-0.018	-0.020
	(0.031)	(0.032)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	2,824	2,824
Adjusted R-squared	0.948	0.950
Panel A: Low *SustainCmpn* group		
	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents*Disclosure10K*Post	-0.012	-0.012
	(0.009)	(0.010)
Disclosure10K*Post	-0.006	-0.008
	(0.005)	(0.005)
E_incidents*Post	-0.005	-0.007*
	(0.003)	(0.004)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	9,152	9,152
Adjusted R-squared	0.912	0.910

Table 8 Cross-sectional Analysis: The Role of Ex-Ante Firm Size

This table reports the results of how ex-ante firm size moderate the impact of the SEC Climate and ESG Task Force establishment on corporate carbon emission intensity. *High Size* is an indicator variable that equals one if the firm's total assets in 2020 are at or above the sample median for that year, and zero otherwise. Panel A reports the DDD estimations for the High Size group, while Panel B reports the estimations for the Low Size group. In both panels, the primary variable of interest remains the triple interaction term, *E_incidents*Disclosure10K*Post*. The dependent variables are the carbon emission intensities for Scope 1 emissions (*Intensity_Scope1*, Column 1) and combined Scope 1 and Scope 2 emissions (*Intensity_Scope12*, Column 2). All specifications include the baseline set of firm-level control variables in Table 2, alongside firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix Table A1.

Panel A: *High Size* Group		
	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents*Disclosure10K*Post	-0.056***	-0.056***
	(0.015)	(0.015)
Disclosure10K*Post	0.001	-0.002
	(0.006)	(0.007)
E_incidents*Post	-0.008	-0.009
	(0.009)	(0.009)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	6,489	6,489
Adjusted R-squared	0.955	0.956
Panel B: *Low Size* Group		
	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents*Disclosure10K*Post	-0.022	-0.016
	(0.036)	(0.036)
Disclosure10K*Post	-0.007	-0.007
	(0.006)	(0.006)
E_incidents*Post	-0.011	-0.016*
	(0.008)	(0.009)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	5,677	5,677
Adjusted R-squared	0.893	0.896

Table 9 Cross-sectional Analysis: The Role of Ex-Ante SEC Comments

This table reports the results of how ex-ante SEC comments moderate the impact of the SEC Climate and ESG Task Force establishment on corporate carbon emission intensity. *High PreSecCommentLetters* is an indicator variable that equals one if the total number of SEC comment letters a firm received during the 2017-2020 period is at or above the sample median of two, and zero otherwise. Panel A reports the DDD estimations for the *High PreSecCommentLetters* group, while Panel B reports the estimations for the *Low PreSecCommentLetters* group. In both panels, the primary variable of interest remains the triple interaction term, *E_incidents*Disclosure10K*Post*. The dependent variables are the carbon emission intensities for Scope 1 emissions (*Intensity_Scope1*, Column 1) and combined Scope 1 and Scope 2 emissions (*Intensity_Scope12*, Column 2). All specifications include the baseline set of firm-level control variables in Table 2, alongside firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix Table A1.

Panel A: *High PreSecCommentLetters* Group

	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents*Disclosure10K*Post	-0.062***	-0.061***
	(0.017)	(0.017)
Disclosure10K*Post	-0.000	-0.002
	(0.007)	(0.007)
E_incidents*Post	-0.014	-0.016
	(0.010)	(0.010)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	7,673	7,673
Adjusted R-squared	0.925	0.925

Panel B: *Low PreSecCommentLetters* Group

	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents*Disclosure10K*Post	-0.018	-0.019
	(0.018)	(0.019)
Disclosure10K*Post	-0.009**	-0.010**
	(0.005)	(0.005)
E_incidents*Post	-0.008	-0.010
	(0.006)	(0.007)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	4,641	4,641
Adjusted R-squared	0.971	0.972

Table 10 Cross-sectional Analysis: The Role of Ex-Ante ESG Disclosure Score

This table reports the results of how ex-ante ESG disclosure scores moderate the impact of the SEC Climate and ESG Task Force establishment on corporate carbon emission intensity. *High ESG_Disclosure* is an indicator variable equal to 1 if a firm's ESG disclosure score prior to the event (e.g., in 2020) is at or above the sample median, and 0 otherwise. Panel A reports the DDD estimations for the *High ESG_Disclosure* group, while Panel B reports the estimations for the *Low ESG_Disclosure* group. In both panels, the primary variable of interest remains the triple interaction term, *E_incidents*Disclosure10K*Post*. The dependent variables are the carbon emission intensities for Scope 1 emissions (*Intensity_Scope1*, Column 1) and combined Scope 1 and Scope 2 emissions (*Intensity_Scope12*, Column 2). All specifications include the baseline set of firm-level control variables in Table 2, alongside firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix Table A1.

Panel A: *High ESG_Disclosure* Group

	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents*Disclosure10K*Post	-0.056***	-0.058***
	(0.021)	(0.022)
Disclosure10K*Post	-0.004	-0.003
	(0.009)	(0.010)
E_incidents*Post	-0.013	-0.009
	(0.015)	(0.015)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	3,583	3,583
Adjusted R-squared	0.953	0.952

Panel B: *Low ESG_Disclosure* Group

	(1)	(2)
VARIABLES	***Intensity_Scope1***	***Intensity_Scope12***
E_incidents*Disclosure10K*Post	0.003	0.001
	(0.008)	(0.009)
Disclosure10K*Post	0.006	0.003
	(0.006)	(0.007)
E_incidents*Post	-0.005*	-0.010***
	(0.003)	(0.004)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	3,406	3,406
Adjusted R-squared	0.878	0.886

Table A1 Variables definition

Variables	Definition	Sources
Intensity_Scope1	Scope 1 carbon emission intensity, defined as direct greenhouse gas (GHG) emissions (scaled by revenue), measured in kilograms per U.S. dollar (kg/USD).	Trucost
Intensity_Scope12	Combined Scope 1 and Scope 2 carbon emission intensity, including both direct and indirect GHG emissions, measured in kilograms per U.S. dollar (kg/USD).	Trucost
E_incidents	An indicator variable equal to 1 if the firm experienced environmental (E) incidents during the 2019-2020 period, and 0 if the firm experienced no E incidents but was included in the 2020 RepRisk rating universe.	RepRisk
Disclosure10K	An indicator variable capturing whether a firm provided climate-related disclosures in its 10-K filings in 2020.	CERES[7]
Post	An indicator variable equal to 1 for the years 2021 and onwards, corresponding to the post-establishment period of the SEC Climate and ESG Task Force, and 0 otherwise.	-
Size	Firm size, measured as the natural logarithm of total assets.	Compustat
Lev	Leverage ratio, calculated as the sum of long-term debt and current liabilities, divided by total assets.	Compustat
ROA	Return on assets, measured as net income divided by total assets.	Compustat
TobinQ	Tobin's Q, calculated as the market value of equity plus the book value of assets minus the book value of equity, scaled by total assets.	Compustat
Cash	Cash holdings, measured as cash and short-term investments divided by total assets.	Compustat
PPE	Capital intensity (Property, Plant, and Equipment), calculated as net property, plant, and equipment divided by total assets.	Compustat
Capx	Capital expenditures, scaled by total assets.	Compustat

[7] https://tools.ceres.org/resources/tools/sec-sustainability-disclosure

RD	Research and Development dummy, equal to 1 if the firm reports non-zero R&D expenses, and 0 otherwise.	Compustat
CsrCommitte	An indicator variable equal to 1 if the firm has a CSR or Sustainability Committee, and 0 otherwise.	LSEG
IndepBoardMem	Board independence, measured as the percentage of independent board members on the board of directors.	LSEG
CeoChairmanSeparation	CEO duality indicator, equal to 1 if the roles of CEO and Chairman are separated, and 0 otherwise.	LSEG
GHG_Disclosure	The proportion (measured from 0 to 100) of the external cost of direct greenhouse gas (GHG) emissions that is calculated based on actual data explicitly disclosed by the company, rather than estimated.	Trucost
Envr_Disclosure	The proportion (measured from 0 to 100) of the external cost of direct environmental impacts that is calculated based on actual data explicitly disclosed by the company, rather than estimated.	Trucost
Intensity_Scope1_LSEG	Scope 1 emission intensity sourced from LSEG, scaled by total revenue measured in kilograms per U.S. dollar (kg/USD).	LSEG/ Compustat
Intensity_Scope12_LSEG	Combined Scope 1 and Scope 2 emission intensity sourced from LSEG, scaled by total revenue measured in kilograms per U.S. dollar (kg/USD).	LSEG/ Compustat
SustainCmpn	An indicator equal to 1 if the firm's senior executives' compensation was linked to CSR, Health & Safety, or sustainability targets in 2020, and 0 otherwise.	LSEG
High Size	An indicator variable equal to 1 if the firm's total assets in 2020 are at or above the sample median for that year, and 0 otherwise.	Compustat
High PreSecCommentLetters	An indicator variable equal to 1 if the total number of SEC comment letters (UPLOAD) a firm received during the 2017-2020 period is at or above the sample median, and 0 otherwise	SEC EDGAR
High ESG_Disclosure	An indicator variable equal to 1 if the firm's ESG disclosure score in 2020 is at or above	Bloomberg

	the sample median for that year, and 0 otherwise.