The Unseen Cost of Green Policies: The Impact of Environmental Regulation on Workplace Safety

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Abstract

Leveraging three regulatory changes as quasi-natural experiments and employing difference-in-differences models, we present consistent evidence that stricter environmental regulations lead to an increase in safety infractions. Further investigation reveals that this effect is largely attributable to operational adjustments required for compliance with environmental mandates and the associated resource reallocation, providing insights into the interaction between operational change and financial constraints. Specifically, financially constrained firms, which undergo operational changes following the implementation of environmental regulations, experience more safety violations. Conversely, firms with ample financial resources, such as large and publicly listed companies, manage to navigate these operational changes without compromising safety. Additionally, the relative attention that stakeholders place on environmental versus social concerns influences the impact of environmental regulation on workplace safety. Our findings highlight a critical, albeit unintended, consequence of climate policies and underscore the inherent tension between the environmental and social components of ESG.

Keywords: climate policy, workplace safety, financial constraints, operational change.
JEL code: G18; G32; Q52; Q54; Q58

1. Introduction

Climate change poses one of the most severe and pressing challenges to humanity. Governments worldwide are adopting various regulatory measures to mitigate the impacts of climate change. Yet, environmental issues are complex and intertwined with other societal challenges, making it difficult to assess the effectiveness of policies and their potential unintended consequences. Considerable research has investigated the economic implication of anti-pollution regulations on industry competition and labor allocation (e.g., Greenstone, 2002; Greenstone, List, and Syverson, 2012; Walker, 2011, 2013), with emerging literature in finance focusing predominantly on how climate regulations influence corporate carbon emissions, financing, and investment (e.g., Bartman, Hou, and Kim, 2022; Brown, Martinsson, and Thomann, 2022; Dang, Gao, and Yu, 2023). However, one critical yet often neglected aspect is the interaction between environmental regulations and employee social welfare. Our study aims to address this oversight.

This paper explores the consequences of rigorous environmental policies on social aspects, with a particular emphasis on occupational health and safety protocols. Workplace safety is a crucial element of employee welfare. The International Labor Organization (ILO, 2003) reports that work-related injuries and diseases claim approximately 2.3 million lives annually, incurring costs of about 4 percent of global GDP.[1] Furthermore, workplace safety is an integral part of the "social" dimension of corporate Environmental, Social, and Governance (ESG) performance. While much of the ESG debate encompasses the entirety of ESG issues, there is scant discussion on the interrelations among the individual ESG components. Our study is driven by this gap, endeavoring to illuminate the potential conflicts between the "Environmental" and "Social" aspects of ESG and hopefully contribute to the discourse on developing balanced climate change policies that consider both carbon emission reduction and the aspects of economic and social welfare.

The intrinsic tension between environmental initiatives and social equality, particularly workplace safety in this context, is rooted in the nature of multi-tasking framework, as described in the seminal work of Holmstrom and Milgrom (1991). Managers must balance competing tasks across various dimensions while facing limitations in attention and resources. Consequently, the relative incentives (or disincentives) for different objectives, as well as the ease of quantifying performance, influence managers' resource allocation decisions. Generally, environmental issues

[1] See http://www.ilo.org/global/about-the-ilo/mission-and-objectives/features/WCMS_075615/lang--en/index.htm

receive more public attention and carry steeper penalties than workplace safety infractions do.[2] Additionally, safety concerns are by nature probabilistic – reduced safety investments do not immediately translate into increased incidents. It is conceivable that adjustments in resources and operations to meet environmental regulations may come at the cost of workplace safety.[3]

To conduct a solid empirical analysis on this issue, we exploit three environmental regulation settings, including the 2013 California Cap-and-Trade Program (hereafter, California Law), the 1990 Clean Air Act Amendments (hereafter, CAAA), and the staggered nonattainment designations of counties for the National Ambient Air Quality Standards (NAAQS) thresholds from 1987 to 2021 (hereafter, NA Designation). Our dataset merges comprehensive establishment-level safety violations data from the Occupational Safety and Health Administration (OSHA) with firm-level characteristics from Capital IQ. We employ three separate Difference-in-Differences tests each keyed the above-mentioned regulatory changes. All three analyses consistently reveal that stricter environmental regulations are associated with a rise in safety violations among the regulated firms compared to their unregulated counterparts, with increases ranging from 31% to 91% above the mean, varying by regulatory contexts and model specifications. These findings hold steady under alternative econometric strategies, including OLS regressions with high-dimensional fixed effects and Poisson regressions for count data (Cohen, Liu, and Wardlaw, 2022).

We conduct additional tests to further solidify the evidence documented above. Prior research (e.g., Bartram et al., 2022; Walker, 2013) shows that firms with plants spread across regulated and unregulated regions may be able to shift production and reduce the overall effect of environmental regulation. We test this notion and find supportive evidence that firms with plants in only regulated areas experience a stronger environmental regulation effect on workplace safety than firms with plants dispersed across regulated and nonregulated regions.

After confirming the robustness of our baseline results, we investigate the economic mechanism driving the observed detrimental impact of environmental regulations on workplace safety.

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[2] We elaborate on the relative penalties for safety and environmental violations in Section 2.

[3] Despite a few high-profile accidents that attract media attention, most safety violations and job injuries are low profile in nature, such as failure to put a warning sign on a slippery site that caused a worker to fall and break an arm. They typically do not attract media attention (Caskey and Ozel 2017).

First, we explore the operation adjustment triggered by policy directives,[4] which urge firms to integrate new technologies or equipment in order to achieve compliance with environmental standards. To align with these regulations, firms may alter their production methods, which entail novel tasks for workers and introduce new safety risks. Given that safety fractures are more likely to occur when workers perform novel tasks relative to routine tasks (Grote 2012), we hypothesize that firms subject to environmental mandates are more likely to undertake significant operational adjustments, correlating with a higher incidence of safety violations.

Empirically, measuring the extent of operational adjustment poses challenges. We approximate this by examining the number of green patents filed by companies, which predominantly cover production processes[5] and are indicative of environmentally friendly operational changes. Our analysis finds that firms that are subject to environmental mandate filed more green patents, and these firms also have a higher rate of safety violations, aligning with our hypothesis.

Our investigation then turns to financial constraints. Abundant evidence in finance literature suggests that financial constraints are linked to increased pollution and safety incidents (e.g., Cohn and Wardlaw 2016; Cohn, Nestoriak, and Wardlaw 2021; Xu and Kim, 2022; Dang, Wang and Wang, 2022). Since operational adjustments require substantial capital, firms under financial strain are more likely to incur safety violations when adapting to stringent environmental regulations. We employ four financial constraint proxies: the SA index, firm size, dividend payment status, and public listing status. Across these metrics, we observe that financial constraints intensify the negative impact of environmental regulations on safety compliance.

We also examine the interplay between operational adjustments and financial constraints. While operational changes inherently raise the risk of safety infractions, firms can alleviate this by meticulously planning procedures and investing in workforce training. Conversely, if environmental regulations exacerbate safety violations due to resource limitations, this effect should be more acute in financially constrained firms than in those with greater financial flexibility.

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[4] In fact, the Environmental Protection Agency (EPA) offers guidance to encourage companies to embrace innovative technologies for environmental protection. For illustrative information, please refer to the Clean Air Technology Center Products page: https://www.epa.gov/catc/clean-air-technology-center-products#factsheets

[5] In our analysis, we compare green patents to the database of process patents provided by Bena and Simintzi (2023). We discover that a significant proportion of green patents are categorized as process patents.

Our data supports this notion: financially robust firms do not exhibit increased safety violations, regardless of their engagement in green patenting. In contrast, financially constrained firms undergoing operational adjustments report significantly more safety violations than those with minor operational changes.

These findings resonate with the theory of resource competition when addressing multiple objectives. To ascertain whether environmental regulations lead to a reduction in safety resources, we analyze workforce data to estimate the number of safety personnel within firms. Our empirical tests affirm the conjecture, showing that firms impacted by environmental mandates experience a marked decline in safety staff compared to unaffected firms, suggesting that the pursuit of environmental compliance diverts resources from safety initiatives.

Lastly, we consider stakeholder engagement, as firms' resource allocations are often influenced by stakeholder demands. Several studies (e.g., Engle et al., 2020; Choi, Gao, and Jiang, 2020) highlight the impact of media and public focus on climate change on stock valuation. Utilizing a survey-based index of environmental concern and Google search volume data on climate change as indicators of stakeholder attention (e.g., Ilhan et al., 2021; Krueger et al., 2024), we find a stronger correlation between safety violations and heightened environmental regulatory stringency when stakeholder interest in climate change is elevated. This supports our assertion that increased stakeholder focus on climate issues prompts firms to prioritize environmental compliance, possibly at the expense of workplace safety. Moreover, the relationship between environmental regulation and safety infractions is notably stronger in firms that are simultaneously navigating operational changes and facing intense stakeholder scrutiny on environmental matters.

We expand upon the research exploring the economic consequences of environmental regulations (Becker and Henderson, 2000; Greenstone, 2002; Greenstone et al., 2012; Walker, 2011, 2013; Bartram et al., 2022) by examining the *non-monetary aspects* of employee welfare. Our work sheds light on the intricate interplay between environmental considerations and labor protection in the corporate context. In contrast to prior studies that predominantly focus on the employment or wage impacts for workers (e.g., Walker, 2011, 2013), our research emphasizes the well-being of workers. Workplace safety concerns can inflict non-financial losses on employees and result in deadweight welfare loss (Calfee and Rubin, 1992). Our study extends beyond the conventional focus on wages and employment, probing into how environmental regulations influence workers' welfare in the realm of workplace safety.

Second, we engage with the ongoing debate surrounding ESG. While most research targets the link between ESG and financial outcomes (e.g., Albuquerque et al., 2019; Kruger, 2015; Edmans, 2022; Starks, 2023) and critiques the subjective nature of ESG performance assessments via ratings (Berg et al., 2022), we enrich the dialogue by uncovering the potential tensions between the 'Environmental' and 'Social' facets of ESG. Our analysis of environmental regulation's effects on workplace safety offers valuable insights into the policy discussion on climate change mitigation. Combating climate change should not overshadow other vital social and economic considerations. Our research informs the ongoing discussion on crafting policies that effectively balance carbon reduction goals with social fairness, contributing to the discourse on sustainable and responsible corporate conduct.

Third, our work adds to the burgeoning field of workplace safety literature (Bradley et al., 2022; Caskey and Ozel, 2017; Cohn et al., 2021; Cohn and Wardlaw, 2016). These studies, typically through a shareholder lens, establish that market forces influence workplace safety outcomes. We build on this foundation from a stakeholder perspective, demonstrating that striving to meet environmental mandates may lead to safety issues. A novel discovery in our study is the identification of operational adjustments—often required by environmental regulations—as a potential driver of increased safety risks. This finding intersects with the well-acknowledged influence of financial constraints on safety. We contribute to this body of knowledge by illustrating the interaction between operational adjustments and financial constraints and their combined effect on workplace safety.

The remainder of the paper is structured as follows: Section 2 discusses the institutional background and empirical design. Section 3 describes the data and methodology for constructing the sample. Section 4 presents the baseline results, while Section 5 delves into the underlying economic mechanisms. Section 6 concludes the paper.

2. Conceptual Framework and Hypothesis Development

The potential conflict between environmental push and workplace safety is grounded in the multi-tasking nature of ESG when managers need to balance competing tasks on the various dimensions of ESG subject to limited attention and resource constraints (Holmstrom and Milgrom, 1991). As a result, the relative rewards (or penalties) of ESG activities affect managers' allocation of resources (Holmstrom and Milgrom, 1991). As elaborated in this session, environmental issues generally attract more public attention and carry larger penalties than workplace safety violations. Therefore, it is plausible that resource and operation adjustments to comply with environmental regulations come at the expense of workplace safety.

Environmental regulations either mandate or put pressure on firms to adjust production processes (Greenstone et al., 2012; Walker, 2013). The adjustment poses challenges for workplace safety. Change in production methods both entails deviations from previous routines and introduces potential new job hazards. For example, one technology mandated by the Clean Air Act when a county falls into "nonattainment status" is to use elevated and steam-assisted flares to improve the destruction efficiency of volatile organic compounds (VOC).[6] Its implementation not only puts a strain on company resources but also necessitates the redesign of workflows to integrate an elevated flare system into the production process. As such, a new set of coordination is needed to ensure that airflow, temperature, pollutant loading, and pretreatment of the emission stream are properly in place to ensure a smooth combustion process. New job hazards, such as burning chemicals generated by flaring liquids reaching the ground, could emerge. Given that safety fractures are more likely to happen when workers perform novel tasks relative to routine tasks (Grote 2012), it is likely that environmental regulations will jeopardize workplace safety. We state our null hypothesis in its alternative form.

H1: Environmental regulation decreases workplace safety performance.

Closely related to the changes in production methods is the issue of compliance costs. Change in production methods both requires extra safety buffers and consumes financial resources; thus, firms' financial flexibility is vital. Financially constrained firms tend to have higher toxic emissions as they weigh abatement costs against potential legal liabilities (Bartram et al., 2022; Xu and Kim, 2022). Like environmental policy compliance, workplace safety requires significant financial resources—financial frictions negatively impact firms' investments in workplace safety (Cohn et al., 2021; Cohn and Wardlaw, 2016). With both environmental and safety compliances

[6] https://www.epa.gov/sites/default/files/2020-08/documents/fflare.pdf

requiring financial resources, the enactment of stringent climate policies could make firms divert resources from employee safety toward pollution reduction, especially if firms are financially constrained.

This conjecture is motivated by the relative penalties and saliency of environmental and safety issues. First, environmental penalties are much larger on average than penalties for safety violations. The maximum penalty for a serious safety violation is $16,131 in 2024. The minuscule nature of penalties for safety violations is well-recognized in the literature (Pagell et al., 2020). By contrast, the average environment-related penalty between 2000 and 2021 is over $1.6 million in the violation tracker database. The issue is exacerbated by the probabilistic nature of safety fractures —accidents, such as workers bending and twisting their waist while moving inventory, may still occur even with diligent efforts. Moreover, wage premiums cannot fully reflect job hazards due to information asymmetry and incomplete bargaining power, as firms only internalize around 20% of total safety costs (Leigh and Marcin 2012.

Second, safety issues are less salient than environmental issues. Despite a few high-profile accidents, most safety issues are low-profile in nature, such as the failure to put a warning sign on a slippery floor that led to a fracture of an arm. They typically do not carry media attention (Caskey and Ozel, 2017). Further, environmental issues attract more attention from stakeholders and shareholders than safety matters. [7] For financial constraint firms, firms may divert limited resources to meet more pressing needs of more stringent environmental compliance, distracting safety efforts.

Overall, we argue that climate policies could limit firms' investment in workplace safety, jeopardizing safety performance. We state our second hypothesis in its alternative form.

H2: The effect of environmental regulation on workplace safety is more pronounced for financially constrained firms.

Firms' allocation of resources towards ESG tasks is also heavily influenced by stakeholders such as shareholders, analysts, and the media (Bradley et al., 2022; Johnson, 2020; Liang et al., 2022). For example, Johnson (2020) and Liang et al. (2022) demonstrate that public scrutiny, including the media, helps reduce injury rates. Bradley et al. (2022) find that firms with higher

[7] In the Online Appendix, we tabulate the media attention and shareholder activism of environmental and safety issues.

levels of analyst coverage exhibit lower work-related injury rates. Additionally, Krueger et al. (2024) find that environmental awareness in a country affects compliance with ESG disclosure mandates. Thus, the extent of stakeholders' attention to environmental matters could drive the relationship between climate policies and workplace safety. With the recent rise in climate risk awareness and the idea that political events related to climate change increase public attention on climate change (Ilhan et al., 2021), the enactment of climate policies could raise stakeholder attention to climate matters at the expense of safety-related issues. Consequently, the pressure from these stakeholders may further drive firms' focus away from labor rights, increasing safety violations. Like the financial constraint channel, this channel suggests that stakeholder attention toward environmental matters moderates the effect of environmental regulation on workplace safety. We state our next hypothesis in its alternative form.

H3: The effect of environmental regulation on workplace safety is more pronounced for firms with more stakeholder attention on environmental matters.

3. Institutional Background and Empirical Design

In this section, we discuss the environmental regulations that underpin the three difference-in-differences approaches utilized in our study. Our first analysis hinges on the 2013 California Cap-and-Trade Program. The second analysis draws upon the substantial revisions to the Clean Air Act in 1990, and the third examines the evolution of pollution NAAQS thresholds from 1987 to 2021. We also review prior research that utilizes these regulations as identification strategies and introduce our empirical framework.

3.1. The California Cap-and-Trade Program

The 2013 California Cap-and-Trade Program (California Law) is North America's inaugural extensive cap-and-trade system covering multiple sectors. California's climate policy is framed by three greenhouse gas (GHG) emission reduction targets: to 1990 levels by 2020, to 40 percent below 1990 levels by 2030, and to 80 percent below 1990 levels by 2050. To achieve these greenhouse gas emission reduction targets, the California Air Resources Board (CARB) introduced the cap-and-trade program in 2012, with compliance obligations starting in January 2013.[8]

[8] Cap-and-trade is a market-based emissions trading system that establishes a declining cap on emissions over time and distributes tradeable credits under the cap.

California's cap-and-trade program covers plants economy-wide, setting a limit on approximately 85 percent of California's GHG emissions. Specifically, the program targets all facilities from the power sector and industrial plants that emit 25,000 or more metric tons of carbon dioxide equivalent (MT CO_2e) per year. As a cap-and-trade, the program trades compliance instruments through auctions and allocations. Entities are then expected to pay off their emissions using these allowances and additional compliance credits they may acquire through market transactions, according to a vintage-specific schedule laid out by the program.

The program presents regulated plants with two main compliance options.[9] First, GHG emitters that cannot meet emissions allotment by reducing their emissions must purchase allowances at the quarterly auction or acquire offsets through trade with other covered entities that have extra credits.[10] Second, polluters can reduce emissions and avoid the purchase of emission credits. While the program does not directly specify the modifications that polluters should make to their production processes, it highly encourages these firms to adopt more environment-friendly production technologies. For example, a portion of the cap-and-trade revenues are given back to firms as subsidies to upgrade production equipment to energy-efficient technologies.[11][12]

Existing evidence suggests that compliance is costly for firms. As reported by the CARB, allowances are completely sold out in every quarterly allowance auction starting in November 2012, bids outnumber available allowances, and the settlement prices always exceed the initial reserve price despite the reserve price being increased every year. In analyzing the role of financial constraints in firms compliance with *California Law*, Bartram et al. (2022) find that the cost of allowances for constrained firms with high-emission establishments amounts to $20 million, which represents 9 percent of the tax expense or 4 percent of the interest expense of the average firm.

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[9] The program hardly faces compliance problems. According to the CARB, all regulated firms have fully met their compliance obligations for their greenhouse gas emissions from 2018-2020 – achieving a 100% compliance rate.

[10] Offsets are tradable credits that represent verified GHG emissions reductions or removal enhancements from sources not subject to a compliance obligation in the cap-and-trade program. Under the Cap-and-Trade Program, covered entities may use compliance offset credits to satisfy up to eight percent of their compliance obligation.

[11] E&J Gallo Winery (the largest exporter of California wines), for instance, has received over $5.4 million for a series of projects, including efficiency improvements to its refrigeration equipment at its Livingston and Modesto wineries, air compressor improvements at the Modesto wineries, and other upgrades (Mulkern, 2022).

[12] This is consistent with the evidence that the European cap-and-trade program has encouraged greater low-carbon patenting and R&D spending among regulated firms (Calel, 2020).

In this study, we argue that the increase in costs of emitting greenhouse gases due to the introduction of the California Cap-and-Trade Program could force firms to divert financial resources away from workplace safety, especially given that workplace accidents are probabilistic in nature and workers generally have less bargaining power.

3.1.1. The 2013 California Cap-and-Trade Program as a Research Design

As discussed in the preceding section, *California Law* increased environmental regulatory stringency for California plants compared to other plants. We exploit variation in the treatment of *California Law* in the cross-section (i.e., California plants compared to other plants) and time series (i.e., before compared to after the enforcement of the rule in 2013) to implement DiD regressions. Following Bartram et al. (2022), we examine the impact of *California Law* on workplace safety from 2010 to 2015 by estimating the following DiD regression.

$$Safety_{it} = \alpha + \beta_1 Cal_i \times Post\_2013_t + \beta_2 X_{it} + \beta_3 \theta_i + \beta_4 \delta_t + \varepsilon_{it} \qquad (1)$$

where *i* indexes plant, and *t* indexes year. *Safety* is the number of violations (*Violation*). *Cal* is an indicator variable equal to one if a plant is in California and zero otherwise. *Post_2013* is an indicator variable equal to one if the year is 2013 or after and zero otherwise. *X* represents a set of plant and firm-level characteristics. Particularly, the plant-level control variables include the natural logarithm of the number of employees (*Log Emp*) and workers' union status (*Union*). We also include plant-fixed effects, θ, and year-fixed effects, δ, to control for unobserved plant and time-invariant characteristics that may influence our findings, respectively. Following existing studies (e.g., Bradley et al., 2022; Cohn et al., 2021; Cohn and Wardlaw, 2016; Liang et al., 2022), we control for firm-level characteristics including *Firm Size* (natural logarithm of total assets), *Leverage* (total debt/total assets), *Tangible Assets* (net property, plant, and equipment/total assets), *Cash Holding* (cash and short-term investments/total assets), and *Profitability* (earnings before extraordinary items/total assets). Because of our conflicting predictions, we expect the coefficient of interest, β_1, to be either positive or negative.

3.2. The Clean Air Act Amendments

The Clean Air Act (CAA) is a comprehensive federal law that regulates air emissions from stationary and mobile sources. The act was passed in 1963 and significantly amended in 1970, 1977, and 1990. The 1970 amendments authorized the EPA to establish National Ambient Air

Quality Standards (NAAQS) to safeguard public health. NAAQS specify the minimum acceptable quality for six criteria air pollutants by setting the maximum allowable pollution in each area.

The CAA amendments of 1977 set more rigorous requirements by requiring an annual designation of every U.S. county as being in attainment or out of attainment (nonattainment) of NAAQS. When a county is out of attainment for one of the regulated pollutants, the EPA requires states to adopt regulatory plans, known as state implementation plans (SIPs), to bring the county into compliance. Failure to comply triggers significant sanctions from the EPA.[13] SIPs contain plant-specific regulations in the form of emissions limits and mandatory redesigns in production processes (Becker and Henderson, 2000; Walker, 2013). The rules demand the installation of state-of-the-art pollution abatement equipment. For instance, New Hampshire's SIPs for the 2010 SO_2 NAAQS require Eversource Merrimack Station located in Bow to install a flue gas desulfurization system. We argue that the new installations could increase safety hazards for workers, especially those who must adapt.[14] Conversely, the new equipment could smoothen out the production process and decrease the likelihood of injuries or safety violations.

The 1990 CAA amendments labeled a set of counties as nonattainment for a new particulate matter standard (PM10). Additionally, the EPA also formally evaluated existing nonattainment designations so that 137 counties found themselves in nonattainment for at least one new pollutant.[15] In nonattainment counties, new polluters or existing sources undertaking significant expansions must adopt "lowest achievable emission rates" (LAER) technologies without regard to costs. Moreover, any new emissions from plant entry or investment/expansion must be offset from an existing source within the same county. Existing pollution sources in nonattainment counties are required to meet "reasonably available control technology" (RACT) standards, which are emission limits based on technological and economic feasibility. On the contrary, polluters in attainment counties use "best available control technology" (BACT), which considers the economic burden on the plant in arriving at a final solution.

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[13] Sanctions could be in the form of withholding federal grant monies (e.g., highway construction funds), direct EPA enforcement and control, penalty fees, and bans on the construction of new establishments with the potential to pollute.
[14] These hazards could be very concerning given that plants in nonattainment areas usually make equipment installations in bigger lumps or all at once as opposed to a phased-in approach (Becker and Henderson, 2000).
[15] This represents a 34% increase, by far the largest documented increase in nonattainment designations since 1978.

Becker (2005) shows that BACT is considerably less costly than LAER technology. Becker and Henderson (2001) estimate that total operating costs were 17% higher in polluting plants from nonattainment areas relative to similar plants in attainment areas. In addition to intense regulatory scrutiny, plants in attainment areas are also subjected to persistent inspections and oversight. With the idea that safety is a probabilistic event and labor has lower bargaining power, we argue that the compliance costs and stringent scrutiny from *CAAA* could incentivize firms to shift resources and attention toward climate policy compliance at the expense of workers' safety.

3.2.1. The 1990 Clean Air Act Amendments as a Research Design

A potential issue with time series variation with respect to nonattainment designation is that pollution may be due to the level of economic activity in the designated area (Walker, 2013). Therefore, counties that switch to nonattainment may also be more economically vibrant. To address this issue, our second setting relies on the 1990 *CAAA*, which established new standards and strengthened existing ones such that 137 counties suddenly found themselves in nonattainment relative to the year prior. Nonattainment status generates intensified federal and state regulations.[16] Hence, we follow Walker (2013) and investigate safety violations three years before and after the implementation of *CAAA* using the following DiD regression model.

$$Safety_{it} = \alpha + \beta_1 CAAA_i \times Post\_1990_t + \beta_2 X_{it} + \beta_3 \theta_i + \beta_4 \delta_t + \varepsilon_{it} \quad (2)$$

where *CAAA* is an indicator variable equal to one if a plant is located in a county that gained nonattainment status due to *CAAA* and zero for plants located in counties that maintained attainment status throughout the study window. *Post_1990* is an indicator variable equal to one if the year is after 1990 and zero otherwise. The other variables are the same as previously defined.

3.3. Revisions of the NAAQS Thresholds

Following its introduction in 1970, the NAAQS thresholds have undergone discrete revisions by the EPA.[17] These threshold revisions are based on new scientific findings showing air pollution's health implications. For example, there have been four discrete changes to the NAAQS thresholds for Ozone: the 1-Hour Ozone (1979) standard effective on January 6, 1992, 8-Hour

[16] As Walker (2013) argues, nonattainment designations are effective at reducing pollution levels, and much of this reduction comes from increased firm compliance. Hence, nonattainment regulations are binding for polluting plants.
[17] The NAAQS cover six criteria air pollutants, including ozone, nitrogen dioxide, particulate matter, sulfur dioxide, carbon monoxide, and lead.

Ozone (1997) standard effective on June 15, 2004, 8-Hour Ozone (2008) standard effective on July 20, 2012, and 8-Hour Ozone (2015) standard effective on August 3, 2018. On February 7, 2024, the EPA strengthened the NAAQS for Particulate Matter to protect millions of Americans from harmful and costly health impacts, such as heart attacks and premature death.

Aside from them being based on scientific research, the NAAQS revisions have other notable features. First, many counties fall into nonattainment following an exogenous change in the NAAQS thresholds. Second, all counties are classified based on the same NAAQS thresholds. This reduces concerns that designations are driven by county-specific characteristics. Third, they are usually not influenced by other county- or state-level regulations, especially given that SIPs are approved by the EPA, and hence, the federal enforcement of NAAQS reduces the tendency for states to overlook plants that surpass the thresholds. As discussed earlier, nonattainment status triggers considerable production changes and costs.

3.3.1. Revisions of the NAAQS Thresholds as a Research Design

Our final setting relies on the nonattainment designation of counties mainly induced by the EPA's discrete revisions to the NAAQS thresholds. After a change in the NAAQS thresholds, many counties suddenly find themselves in nonattainment relative to the year prior.[18] Plants in nonattainment counties face stringent regulations compared to those in attainment counties. Thus, we examine safety violations for plants in counties that entered nonattainment during the sample period (the treated group) relative to plants in counties that were never labeled as nonattainment (the control group) by estimating the following DiD model for the sample period 1987 – 2021.[19]

$$Safety_{it} = \alpha + \beta_1 NA_i \times Post\_NA_t + \beta_2 X_{it} + \beta_3 \theta_i + \beta_4 \delta_t + \varepsilon_{it} \quad (3)$$

where *NA* is an indicator variable that equals one if a county entered nonattainment status during the sample period and zero otherwise. *Post_NA* is one after a county is classified as nonattainment and zero otherwise. The other variables in the regression model are the same as previously defined.

4. Data and Methodology

[18] In between revisions, significantly more counties are redesignated as attainment rather than nonattainment. This suggests that the revisions are the main driving force of nonattainment designations and not changes in county-level conditions. Also, nonattainment designations are persistent as the average nonattainment duration is around 22 years.
[19] We begin from 1987 because the EPA's database on toxic release inventories starts from 1987. Also, the Capital IQ database begins from 1994. Hence, we supplement our firm variables with Compustat data for the years before 1994.

4.1. Sample Construction

We use comprehensive plant-level data on health and safety violations obtained from the U.S. Occupational Safety and Health Administration (OSHA). OSHA violations data suits our study's purpose mostly because we focus on firms' investment in workplace safety. Violations uncovered at a plant during OSHA inspections represent a 'snapshot' of safety conditions in the plant at a given moment. It, therefore, provides a more accurate representation of the firms' underlying safety investment decisions than, for instance, accidents, which can be random. Furthermore, the granular structure of the data allows us to conduct an in-depth investigation of the relation between environmental regulations and workplace safety.[20] Another notable advantage is that the data starts from the 1980s, allowing us to explore multiple environmental regulations spanning an extended period. Additionally, OSHA does not target a firm for inspections based on the firm's financial condition. Thus, selection is unlikely to be a problem in the estimations we report. A growing literature also uses safety violations to measure safety performance (e.g., Cohn et al., 2021; Johnson, 2020). A section of this literature employs Violation Tracker, which comprises predominantly of workplace safety and health violations, to measure corporate misconduct (e.g., Heese et al., 2022; Heese and Pérez-Cavazos, 2020; Li and Raghunandan, 2021).[21] Firm-level variables are obtained from the Capital IQ database. Plant pollution data is collected from EPA's Toxic Release Inventories (TRI) and Air Facility Subsystem (AFS) databases. Our cross-sectional tests utilize patent data from Bena and Simintzi (2023) and proxies of climate change attention from the World Values Survey (WVS) and Google Trends. Finally, data on safety employees are sourced from EMSI.

Appendix B presents an overview of the steps we take to arrive at the final samples for the three settings. We begin with the universe of plants in the OSHA violations database that are also covered in EPA's TRI (for *California Law* and *NA Designation*) and AFS (for *CAAA*) databases. Specifically, we start with 85,594 and 79,515 plant-year observations after separately merging the violation data with TRI and AFS, respectively. Next, we eliminate all observations that are outside the sample periods of the respective regulations. Only polluting plants are regulated under the

[20] For instance, OSHA provides additional information indicating each violation's severity, whether it is health or safety-related, firms' willingness to commit such violation, and the specific standards violated.

[21] More than 70% of violations in Violation Tracker are workplace safety and health violations (Heese and Perez-Cavazos, 2020). Violation Tracker collects safety violations that carries a penalty above 5,000 USD from OSHA. We collect all safety violations directly from OSHA.

environmental policies we study. Therefore, for *California Law*, we drop establishments that do not emit greenhouse gases. For *CAAA* and *NA Designation*, we delete establishments that do not emit the toxic chemicals regulated under the Clean Air Act. We then drop observations with apparently abnormal values, such as negative assets and missing observations. To ensure that we have a cleaner control sample for the *NA Designation* sample, we eliminate counties that were classified as nonattainment before 1987. Our final samples include 1,303, 3,670, and 12,199 plant-year observations for *California Law*, *CAAA*, and *NA Designation*, respectively.

4.2. Measure of Workplace Safety

Since our focus is on firms' investment in workers' safety, our primary measure of workplace safety for a plant is the total number of safety violations recorded by OSHA for the plant during inspections in a year.[22] OSHA's detailed violation data allows us to compute the number of safety- and health-related violations committed by privately and publicly controlled plants in the U.S. from 1987 to 2021.[23] Given that the dependent variable is a count variable, we estimate fixed effects Poisson models throughout our analysis.

5. Empirical Results

5.1. Summary Statistics

Table 1 presents the summary statistics of the plants and firms we employ in our study. In Panel A, we report the descriptive statistics for *California Law*. On average, plants within the *California Law* sample committed about four safety violations annually. The mean natural logarithm of the number of employees is 5.884, which corresponds to about 350 employees. Workers at about 46 percent of the sample plants are under some sort of labor union representation. Panel B shows that the average number of violations for the *CAAA* sample is relatively higher than those of the *California Law* sample. Specifically, the average plant in this sample commits about 8 safety violations. This is consistent with Bartram et al.'s (2022) observation that there have been improvements in workplace safety over the past few decades, even though the current level is still concerning. The improvements are significant, especially considering that the mean number of employees for the *CAAA* sample is over 200 less than the more recent *California Law*. Workers

[22] OSHA could conduct multiple inspections at a single plant in a year.

[23] In untabulated results, we confirm that our baseline finding is robust to using the natural logarithm of the total number of safety violations committed by plants in a year as an alternative measure of workplace safety.

have labor union representation in about 47.4 percent of the sample plants. Since the Capital IQ data began in 1994, the *CAAA* sample is without firm level characteristics.

Panel C presents the corresponding descriptive statistics for the *NA Designation* sample.[24] The mean value of safety violations is 6.137. The mean value of *Log Emp.*, 5.209, is higher than that of *CAAA* but less than that of *California Law*. Workers at about 44 percent of the sample plants are under some sort of labor union representation, which is the lowest among the three samples. With the mean *Log Plant* value of 0.810, the sample firms have an average of 2 plants during the sample period. The mean value of the natural logarithm of total assets is 5.748, which suggests that, in terms of dollar value, firms in the *NA Designation* sample have over 313 million in total assets. Firms hold 5.2 percent of total assets in cash. The mean and median values of profitability are 9 and 8.5 percent, respectively. Approximately 23 percent of total assets are tangible. Finally, book leverage makes up approximately one-quarter of total assets. Overall, these statistics are consistent with those of existing studies (e.g., Bartram et al., 2022).

[Insert Table 1 here]

5.2. Baseline Results

5.2.1. The 2013 California Cap-and-Trade Program

We begin our analysis by graphically comparing California and non-California plants' safety violations over the sample window. The time trends show that safety violations in California and non-California plants are closely aligned before 2013. Following the introduction of *California Law,* however, the aligned trends diverge. More especially, safety violations among California plants begin to increase after the implementation of the cap-and-trade rule relative to non-California plants. These trends give initial evidence of how the environmental regulatory stringency from *California Law* affected workplace safety.

[Insert Figure 1 here]

Motivated by these trends, we formally test the effect of *California Law* on safety violations by estimating Equation (1). The first four columns of Table 2 present the baseline results.

[24] We use the *NA Designation* sample in our channel and further tests. This is because majority of the variables used in the subsequent analyses are at the firm level and there is a significantly limited number of firm-level observations for the *California Law* and *CAAA* samples.

The coefficient of interest is on the interaction term *Cal* × *Post_2013* because it captures the DiD effect of *California Law* on workplace safety. Across all columns, we include plant-level control variables. In addition, Columns (3) to (4) control for firm-level characteristics, including firm size, cash holding, profitability, tangibility, book leverage, and the natural logarithm of the number of plants owned by firms. Columns (1) and (3) include year-fixed effects, while Columns (2) and (4) include industry-year-fixed effects. The sign on the interaction term's coefficient is consistently positive in all the columns, and the magnitudes remain qualitatively similar. Depending on the model specification, the coefficient on the interaction term is up to 0.913 and significant at the 1% level. In terms of economic magnitude, the result indicates that California plants increased the number of safety violations by 91.3 percent compared to non-California plants.

In the last four columns of Table 2, we explore the trend in the relation between *California Law* and safety violations. In particular, we regress safety violations on the interaction terms between *Cal* and $Post\_2013_n$, where $Post\_2013_n$ is one if the year is *n* number of years relative to the event year and zero otherwise. Columns (5) to (6) include plant-level control variables, while Columns (7) and (8) control for both plant and firm-level characteristics. The interaction terms' coefficient is insignificant in all columns before the event year. From 2013, however, the estimates become statistically and economically significant.[25] The results suggest that there is no significant difference in safety violations between the treated and control groups before the event year. This is consistent with the parallel trend assumption and Figure 1.

[Insert Table 2 here]

5.2.2. The 1990 Clean Air Act Amendments

Next, we analyze the impact of *CAAA* on workplace safety. In Figure 2, the time trends around the implementation of the 1990 Clear Air Act Amendments reveal that safety violations in plants located in nonattainment counties and those located in attainment counties are closely aligned before 1990. However, the aligned trends diverge following the implementation of *CAAA*. Safety violations in the treated plants begin to increase after the implementation of *CAAA* relative to the control plants. More importantly, Figure 2 is comparable to Figure 1 and in line with the parallel trend assumption.

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[25] $Post\_2013_{-1}$ is omitted so that the effects are estimated relative to this year.

[Insert Figure 2 here]

In Table 3, we test the effect of *CAAA* on safety violations by regressing safety violations on *CAAA* × *Post_1990* and other control variables. The first two columns report the baseline effect of *CAAA* on safety violations, whereas the last two columns report the trend in the relation. We include plant-level control variables and plant-fixed effects in all columns. The first and third columns include year-fixed effects. The second and fourth columns include industry-year-fixed effects. Like *California Law,* Columns (1) and (2) show that the coefficient on the variable of interest, *CAAA* × *Post_1990*, is positive and significant. Following the implementation of the 1990 Clean Air Act Amendments, treated plants increased the number of violations by up to 0.688 (which is significant at the 5% level) relative to control plants. Economically, the introduction of *CAAA* increased safety violations of plants in counties that were designated as nonattainment by 68.8 percent compared to plants in counties that maintained attainment status throughout the study window. To investigate the trend in the relation between *CAAA* and safety violations, we interact *CAAA* and $Post\_1990_n$, defined as one if the year is *n* number of years relative to the 1990 and zero otherwise. Then, we regress safety violations on the interaction terms and the same control variables included in Columns (1) and (2). We observe that our coefficients of interest are insignificant until after 1990.[26] These findings align with the parallel trend graph in Figure 2.

[Insert Table 3 here]

5.2.3. Staggered Nonattainment Designations

In our final setting, we test whether the increase in environmental regulatory stringency that comes with the designation of counties as nonattainment regarding the NAAQS thresholds affects workplace safety. In the parallel trend graph shown in Figure 3, safety violations for the treated and control groups remain aligned until after nonattainment designations, when those of the treated group rise sharply above those of the control group. Next, we estimate Equation (3) and present the results in Table 4. The baseline estimates and the dynamic DiD results are reported in the first two and last two columns, respectively. All columns include plant-level control variables

[26] Specifically, the relation becomes significant starting two years after the amendments. The delayed effect can be attributed to firms needing some time to fully incorporate the new standards into their operations.

as well as plant- and industry-year-fixed effects. Additionally, Columns (2) and (4) include firm-level control variables.

In the first two columns, the results suggest that firms' violations of safety standards increase in the presence of strict environmental regulations. The estimates for the coefficient of interest in Columns (1) and (2) are 0.305 and 0.380, respectively. Also, all estimates are statistically significant. The results suggest that plants in counties that were classified as nonattainment during the sample period (i.e., those exposed to strict environmental policies) violate safety standards by up to about 38 percent more than plants that operate in counties that were never designated as nonattainment (i.e., those exposed to less strict climate policies), depending on the specification. For our dynamic DiD tests, the coefficient of the interaction terms between NA and $Post\_NA_n$ becomes significant only after the nonattainment designations, substantiating the evidence that nonattainment designation causes an increase in safety violations.

[Insert Table 4 here]

5.3. Robustness Checks

The exploitation of multiple quasi-natural experiments substantially reduces endogeneity concerns in this study. Nevertheless, we also conduct a number of robustness checks to substantiate our baseline results. One primary concern of staggered DiD designs is that comparisons of treatment effects between earlier and later treated samples are inappropriate when treatment effects are dynamic (Baker et al., 2022). This can bias the average treatment effect of an unknown sign. Even though the use of clean treated and control groups in our regressions mitigates this problem, we show in Panel A of Table 5 that our baseline results still hold if we use stacked instead of staggered regressions. Specifically, our stacked DiD analysis utilizes the four Ozone NAAQS revisions in 1992, 2004, 2012, and 2018.

Extant research suggests that the effect of environmental regulation on firms that have plants in only highly regulated areas is significantly greater than on firms that operate plants in regulated and unregulated areas (Bartram et al., 2022; Walker, 2013). For instance, using a DiD design and *California Law*, Bartram et al. (2022) find that financially constrained firms shift emissions and output from California to other states where they have underutilized similar plants. Therefore, we test whether firms with plants in only regulated areas (*Concentrated Firms*) experience a stronger environmental regulation effect on workplace safety than firms with plants dispersed across regulated and nonregulated regions (*Dispersed Firms*). As shown in Panel B of Table 5, we find that the magnitude and significance of the effect of climate policies on safety violations is more pronounced for *Concentrated Firms* than for *Dispersed Firms*. For instance, in Column (3), the coefficient on $NA \times Post\_NA$ is 0.892 and statistically significant at the 1% level. The corresponding estimate for *Dispersed Firms* is 0.241, which is about four times less and only significant at the 10% level.

In untabulated results, we also confirm that, first, using the natural logarithm of *Violation* as an alternative measure of workplace safety does not significantly impact our findings. Second, our results are robust to using OLS instead of Poisson models. Third, our baseline results are not driven by the level at which we cluster standard errors in the regressions. The fact that we continue to find a statistically and economically significant positive effect of environmental regulation on safety violations against all these sensitivity tests suggests that the evidence documented in this study is not driven by our methodology choices.

[Insert Table 5 here]

6. Economic Mechanisms

6.1.1. Operational Changes

After strengthening the baseline findings, we explore the economic reasons underlying the positive relation between environmental policies and safety violations. This section particularly supports our hypothesis that operational changes that come with environmental policies increase violations of safety standards. Our measure of operational change is the number of green patent applications (*Green Patents*). In Panel A of Table 6, Columns (1) and (2) show that environmental regulation increases *Green Patents*, suggesting that firms adjust their operations following the introduction of climate policies. In the subsequent columns, we partition the *NA Designation* sample into two subsamples based on the number of green patents applied by the parent firm after nonattainment designation. Particularly, firms with *Green Patents* above the sample median are classified as high and otherwise as low. In Column (3), nonattainment designation significantly increases the *Violation* of the treated plants by 105 percent compared to the control plants. The corresponding estimate for the low *Green Patents* group is not statistically and economically significant. It is worth highlighting that the inclusion of firm characteristics significantly reduces the number of observations to a level that makes it impossible to conduct a similar analysis when firm-level control variables are included. That notwithstanding, the evidence collectively suggests that the effect of environmental regulation on workplace safety is more pronounced for firms that make substantial changes to their operations following the nonattainment designation of the counties in which they operate.

In Panel B of Table 6, we investigate whether environmental regulation impacts safety jobs within firms. To the extent that environmental policies make firms reallocate resources and attention away from workplace safety investments toward environmental endeavors, one would expect the significance of safety-related jobs within firms to decrease. Hence, we expect the number of safety-related jobs to decline following an increase in environmental regulatory stringency. We proxy safety jobs with the number of safety-related employees (*Safety Employees*) and the number of safety-related positions available (*Safety Positions*). We find a significant negative estimate on our coefficient of interest in all the specifications. Designation of counties as nonattainment reduces the number of *Safety Employees* and *Safety Positions* within regulated firms by up to 44.6 and 45.4, respectively, compared to the control firms. The results support our prediction that environmental regulation reduces safety-related jobs.

[Insert Table 6 here]

6.1.2. Financial Constraints

In this section, we test our conjecture that financial constraints explain why environmental regulation impacts workplace safety. Our measures of financial constraints include SA index (Hadlock and Pierce, 2010), firm size, payout ratio, and stock market listing status. Firms are categorized as financially constrained if they are above the median for SA index, if they are below the median for firm size and payout ratio, and if they are private firms. Table 7 reports the results of the analysis. In Panels A, B, C, and D, we compare the effect of climate policies on safety violations between subsamples partitioned based on SA index, firm size, payout, and stock market listing status, respectively.

The first two columns of Panel A show that nonattainment designation significantly increases the treated plants' *Violation* by 65.2 percent compared to the control plants, whereas the relation is insignificant for the low SA index subsample. The p-values of the differences across the subgroups' estimates are also significant at the 1% level. Furthermore, the results from using firm size (Panel B), payout ratio (Panel C), and stock market listing status (Panel D) corroborate those from using SA index. Overall, the findings align with our prediction that the effect of environmental regulation on safety violations is concentrated in financially constrained firms.

[Insert Table 7 here]

6.1.3. Operational Changes for Financially Constrained and Unconstrained Firms

Firms' financial resources are vital in making operational changes following the introduction of strict environmental policies. That is, how operational changes influence the relation between environmental regulation and workplace safety could rely on the role of financial constraint. More specifically, we expect the limited financial resources for financially constrained firms to aggravate the role of operational changes in increasing safety violations following the enactment of environmental regulation compared to financially sound firms. We test this hypothesis by first partitioning the *NA Designation* sample into financially constrained and unconstrained subsamples. Within the financially constrained firms, we perform cross-sectional tests based on operational changes like those in Section 4.4.1. We repeat the tests for the financially unconstrained subsample. The results are presented in Table 8.[27] We demonstrate that the role of operational changes in the environmental regulation–workplace safety relation is concentrated among financially constrained firms.

[Insert Table 8 here]

6.1.4. Stakeholder Attention

In our final channel test, we investigate whether the attention of relevant stakeholders on climate change explains why environmental policies increase firms' safety violations. We use two measures of stakeholder attention on climate change. The first proxy, *Social Attention*, is an index based on the responses to World Values Survey questions on the environmental priorities of respondents in the United States (Krueger et al., 2024). The index, which ranges from 0 to 1, captures the extent to which people in the U.S. are concerned about the environment. For our second proxy, we follow Ilhan et al. (2021) and measure stakeholder attention on climate change

[27] For brevity of presentation, we only report results for when stock market listing status, and *Green Patents* are proxies of financial constraints and operational changes, respectively. Using the alternative measures does not significantly impact our conclusion.

by the Google search volume index on climate change, *CC SVI*. We partition the measures into high and low based on the median. In Panel A of Table 9, we show that although the relation between environmental regulation and safety violations is statistically significant for both high and low *Social Attention* groups, the effect is stronger when *Social Attention* is high. In Panel B, Columns (1) and (3) show that nonattainment designation significantly increases safety violations, whereas the corresponding estimates for the low *CC SVI* group are not significant. Overall, the results suggest that corporate stakeholder attention to climate change plays a key role in the effect of environmental regulation on workplace safety.

[Insert Table 9 here]

6.1.5. Stakeholder Attention for Financially Constrained and Unconstrained Firms

The extent to which firms react to environmental pressures from stakeholders in response to strict environmental regulations could heavily rely on firms' financial resources. That is, how stakeholder attention affects the relation between environmental regulation and workplace safety could depend on the level of financial constraints. Particularly, we conjecture that, compared to financially constrained firms, financially sound firms could react to stakeholder pressure but still have enough financial resources to ensure workers' safety following the enactment of environmental regulation. We partition the *NA Designation* sample into financially constrained and unconstrained subsamples. Within the financially constrained firms, we perform cross-sectional tests based on operational changes like those in Sections 4.4.2. We repeat the tests for the financially unconstrained subsample. As presented in Table 10, we find that the role of stakeholder attention in the effect of environmental regulation on workplace safety is more concentrated among financially constrained firms.[28]

[Insert Table 10 here]

7. Conclusion

The urgency of climate change has prompted governments to implement regulations aimed at reducing harmful emissions. However, the implications of these policies for labor rights and employee welfare have received less attention. Our research addresses this gap by analyzing the

[28] For presentation purposes, we only present results for when stock market listing status, and *Social Attention* are proxies of financial constraints and stakeholder attention, respectively. Using the alternative measures does not significantly impact our conclusion.

impact of environmental policies on workplace safety. Using comprehensive data and multiple identification strategies, we find that stricter environmental policies are associated with an increase in safety infractions, especially for establishments that are financially constrained, make significant production and technological shifts, and have heightened stakeholder attention on climate change. We document an interplay between these three economic mechanisms underlying the relation between environmental regulation and workplace safety. Strict environmental regulation is also associated with decreases in the number of safety-related jobs available within firms. Further, the relation between environmental regulations and workplace safety is more pronounced for firms that have plants in only regulated areas. Our research illuminates the unintended consequences of environmental regulations and provides valuable insights for policymakers, businesses, and labor advocates. It highlights the necessity for balanced regulations that protect both the environment and worker welfare. Additionally, it contributes a critical perspective to the dialogue on sustainable corporate practices.

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Appendix A: Variable definitions

This table provides definitions and data sources of the study's variables.

Variable	Definition	Data Source
Dependent Variables		
Violation	Number of violations reported by OSHA	OSHA
Climate Policies		
Cal	Dummy variable that equals one for plants in California and zero otherwise	Constructed
Post_2013	Dummy variable that equals one if the year is 2013 or after and zero otherwise	Constructed
CAAA	Dummy variable that equals one if a county is classified as nonattainment due to CAAA, 1990, and zero otherwise	Constructed
Post_1990	Dummy variable that equals one after 1990 and zero otherwise	Constructed
NA	Dummy variable that equals one if a county achieved nonattainment status during the sample period and zero otherwise	Constructed
Post_NA	Dummy variable that equals one after a county is classified as nonattainment and zero otherwise	Constructed
Plant Characteristics		
Log Emp.	Natural logarithm of the number of employees	OSHA
Union	Dummy variable that equals one if employees have a union representation and zero otherwise	OSHA
Firm Characteristics		
Firm Size	Natural logarithm of total assets	Capital IQ
Leverage	Total debt divided by total assets	Capital IQ
Cash Holding	Cash and cash equivalents scaled by total assets	Capital IQ
Profitability	Operating income before depreciation divided by total assets	Capital IQ
Tangible Assets	Net property, plant, and equipment divided by total assets	Capital IQ
R&D	R&D expenditure scaled by total assets	Capital IQ
Log Plant	Natural logarithm of the number of plants owned by a firm	Capital IQ
Other Variables		
SA Index	Hadlock and Pierce's (2010) financial constraint index: $-0.737 \times \text{Firm Size} + 0.043 \times \text{Firm Size}^2 - 0.040 \times \text{Age}$	Capital IQ
Dividend	Amount of dividend paid	Capital IQ

Private Firm	Dummy variable that equals one for private firms and zero otherwise	Capital IQ
Green Patents	Number of green patent applications	Bena and Simintzi (2023)
Social Attention	The ratio of World Values Survey respondents in the United States that (1) would do voluntary work for unpaid environment, conservation, and animal rights; (2) are active members of an environmental organization; (3) believe that it is important for a person to look after the environment; (4) would give part of their income for the environment; or (5) think that protecting the environment has priority in contrast to economic growth.	World Values Survey
CC SVI	Google search volume index on climate change	Google Trends

Appendix B: Determination of Final Samples

This table presents an overview of the steps used in obtaining the final samples.

Step	No. of Obs.
Panel A: California Law, 2013	
OSHA and TRI (1970 – 2021)	85,594
Restrict to sample period (2010 – 2015)	10,633
Drop non-emitters of greenhouse gas	2,271
Drop abnormal observations	**1,303**
Panel B: CAAA, 1990	
OSHA and AFS (1970 – 2021)	79,515
Restrict to sample period (1987 – 1993)	11,920
Drop non-polluters	8,336
Drop abnormal observations	**3,670**
Panel C: NA Staggered DiD, 1987 – 2021	
OSHA and TRI (1970 – 2021)	85,594
Restrict to sample period (1987 – 2021)	65,219
Drop non-polluters	45,753
Drop counties designated as NA before 1987	21,558
Drop abnormal observations	**12,199**

Table 1: Summary Statistics

This table presents the summary statistics of the variables used in the study. Panels A, B, and C focus on the 2013 California Cap-and-Trade Program, the 1990 Clean Air Act Amendments, and the designation of counties as nonattainment from 1987 to 2021, respectively.

Variable	N	Mean	St. Dev	P25	Median	P75
Panel A: California Law (2010 – 2015)						
Violation	1,303	4.300	6.829	0.000	2.000	5.000
Log Emp.	1,303	5.884	1.568	4.868	5.886	6.960
Union	1,303	0.462	0.499	0.000	0.000	1.000
Panel B: CAAA (1987 – 1993)						
Violation	3,670	7.551	9.661	1.000	4.000	10.000
Log Emp.	3,670	5.015	1.486	3.932	4.905	5.991
Union	3,670	0.474	0.499	0.000	0.000	1.000
Panel C: NA Staggered DiD (1987 – 2021)						
Violation	12,199	6.137	7.997	1.000	3.000	8.000
Log Emp.	12,199	5.209	1.297	4.331	5.198	6.054
Union	12,199	0.297	0.457	0.000	0.000	1.000
Log Plant	3,875	0.810	0.245	0.693	0.693	0.693
Firm Size	3,875	5.748	3.738	0.535	6.741	8.537
Cash Holding	3,875	0.052	0.068	0.000	0.026	0.080
Profitability	3,875	0.090	0.081	0.000	0.085	0.144
Tangible Assets	3,875	0.231	0.188	0.000	0.230	0.354
Leverage	3,875	0.191	0.175	0.000	0.179	0.303

Figure 1: Effect of California Law on Workplace Safety

This figure shows the trend of safety violations around the 2013 California cap-and-trade program.

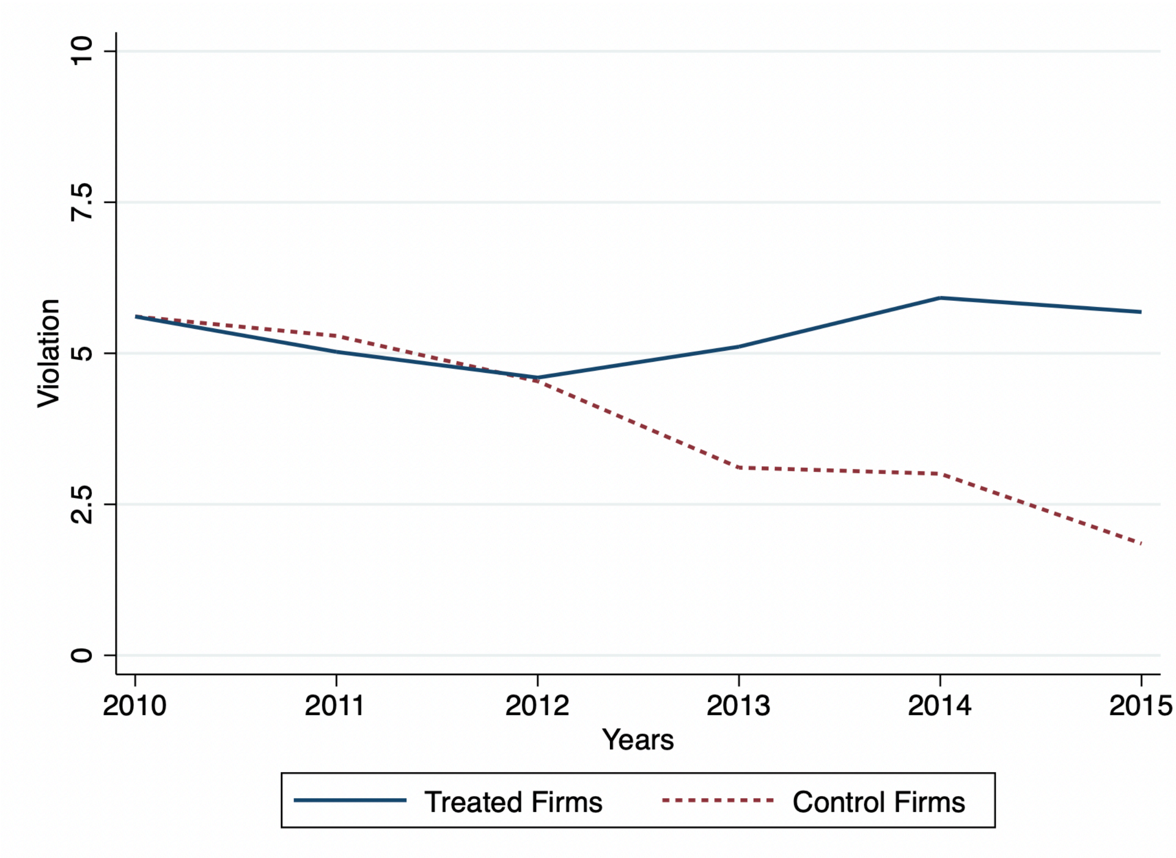

Table 2: California Cap-and-Trade Program, 2013

This table presents the effect of *California Law* on workplace safety. The first four columns and the last four columns show the baseline and dynamic DiD results, respectively. The dependent variable is *Violation*, which is defined as the number of safety violations committed at a plant. *Cal* is a dummy variable equal to one for plants in California and zero otherwise. *Post_2013* is a dummy variable equal to one if the year is 2013 or after and zero otherwise. $Post\_2013_n$ is a dummy variable equal to one if the year is *n* years relative to 2013 and zero otherwise. Detailed variable definitions are provided in Appendix A. The first four columns include plant-level control variables, while the last four columns include both plant- and firm-level control variables. All regressions include plant-fixed effects. Columns (1), (3), (5), and (7) include year-fixed effects. Columns (2), (4), (6), and (8) include industry-year-fixed effects. Continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors are clustered at the state level, and t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Violation	Violation	Violation	Violation	Violation	Violation	Violation	Violation
Cal × Post_2013	0.816***	0.846***	0.759***	0.913***				
	(7.486)	(5.815)	(6.299)	(6.522)				
Cal × $Post\_2013_{-3}$					0.187	-0.106	0.242	0.182
					(0.955)	(-0.395)	(1.356)	(0.678)
Cal × $Post\_2013_{-2}$					-0.256	-0.344	-0.360	-0.157
					(-1.045)	(-1.191)	(-1.264)	(-0.457)
Cal × $Post\_2013_{0}$					0.475**	0.188	0.470**	0.424*
					(2.087)	(0.801)	(2.139)	(1.651)
Cal × $Post\_2013_{+1}$					0.867***	0.841**	1.123***	1.514**
					(3.761)	(2.001)	(4.175)	(2.270)
Cal × $Post\_2013_{+2}$					1.185***	0.577***	0.970***	0.715**
					(5.398)	(2.716)	(3.740)	(2.216)
Log Emp.	0.555***	0.695***	0.572***	0.701***	0.559***	0.737***	0.569***	0.769***
	(4.470)	(3.535)	(4.202)	(2.717)	(4.414)	(3.341)	(4.112)	(3.267)
Union	-0.182	0.0443	0.0593	0.185	-0.181	-0.0371	0.0517	-0.172
	(-0.936)	(0.112)	(0.245)	(0.408)	(-0.928)	(-0.120)	(0.218)	(-0.503)

Log Plant			0.374	0.611			0.375	0.0641
			(0.882)	(0.891)			(0.877)	(0.0960)
Firm Size			-0.0209	-0.595***			-0.0198	-0.227***
			(-0.277)	(-3.789)			(-0.264)	(-3.044)
Cash Holding			0.281	-4.626			0.524	0.642
			(0.110)	(-1.280)			(0.210)	(0.158)
Profitability			-1.653	-1.295			-1.709	-1.401
			(-0.661)	(-0.334)			(-0.682)	(-0.384)
Tangible Assets			0.193	-2.544*			0.151	-0.453
			(0.104)	(-1.687)			(0.0810)	(-0.301)
Leverage			1.161	1.440			1.089	1.384
			(0.813)	(0.711)			(0.759)	(0.837)
Observations	1,303	559	1,181	495	1,303	620	1,181	552
Plant FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No	Yes	No	Yes	No
Industry-Year FE	No	Yes	No	Yes	No	Yes	No	Yes
R-Squared	0.408	0.520	0.409	0.532	0.409	0.485	0.410	0.490

Figure 2: Effect of CAAA 1990 on Workplace Safety

This figure shows the trend of safety violations around the 1990 Clean Air Act Amendments.

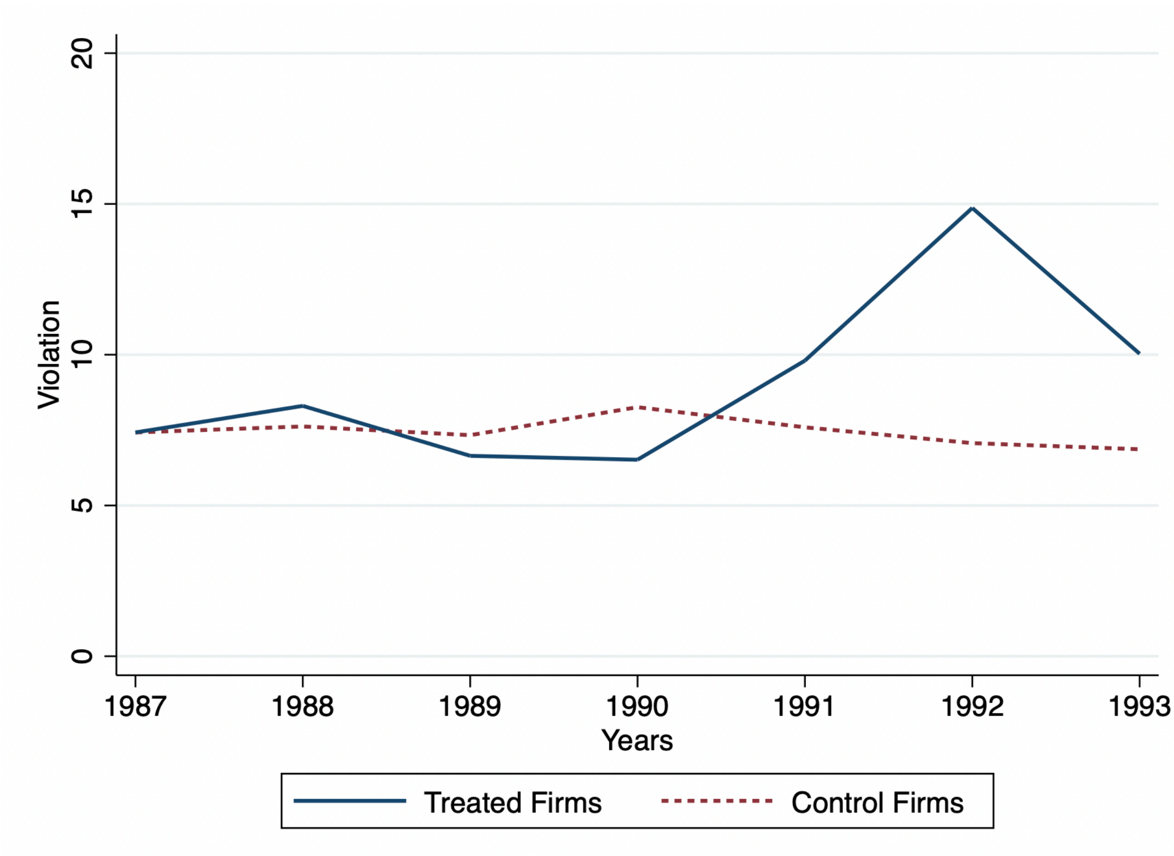

Table 3: Clean Air Act Amendments, 1990

This table presents the effect of the 1990 Clean Air Act Amendments (CAAA) on workplace safety. The first two columns and the last two columns show the baseline and dynamic DiD results, respectively. The dependent variable is *Violation*, defined as the number of safety violations committed at a plant. *CAAA* is a dummy variable equal to one for plants in counties that achieved nonattainment status due to the 1990 CAAA and zero otherwise. *Post_1990* is a dummy variable that equals one after 1990 and zero otherwise. $Post\_1990_n$ is a dummy variable equal to one if the year is *n* years relative to 1990 and zero otherwise. Detailed variable definitions are provided in Appendix A. All regressions include plant-level control variables and plant-fixed effects. The first and third columns include year-fixed effects. The second and fourth columns include industry-year-fixed effects. Continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors are clustered at the county level, and t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

	(1) Violation	(2) Violation	(3) Violation	(4) Violation
CAAA × Post_1990	0.688**	0.605**		
	(2.440)	(2.070)		
CAAA × $Post\_1990_{-3}$			0.273	0.193
			(0.730)	(0.422)
CAAA × $Post\_1990_{-2}$			0.397	0.337
			(1.084)	(0.792)
CAAA × $Post\_1990_{-1}$			0.195	0.109
			(0.372)	(0.187)
CAAA × $Post\_1990_{+1}$			0.683	0.514
			(1.271)	(0.949)
CAAA × $Post\_1990_{+2}$			1.295***	1.286***
			(3.201)	(2.838)
CAAA × $Post\_1990_{+3}$			0.667	0.466
			(1.599)	(1.088)
Observations	3,670	3,531	3,670	3,531
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	No	No	No
Plant FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Industry-Year FE	No	Yes	No	Yes
R-Squared	0.323	0.376	0.324	0.377

Figure 3: Effect of Nonattainment Designation on Workplace Safety
This figure shows the trend of safety violations around nonattainment designations.

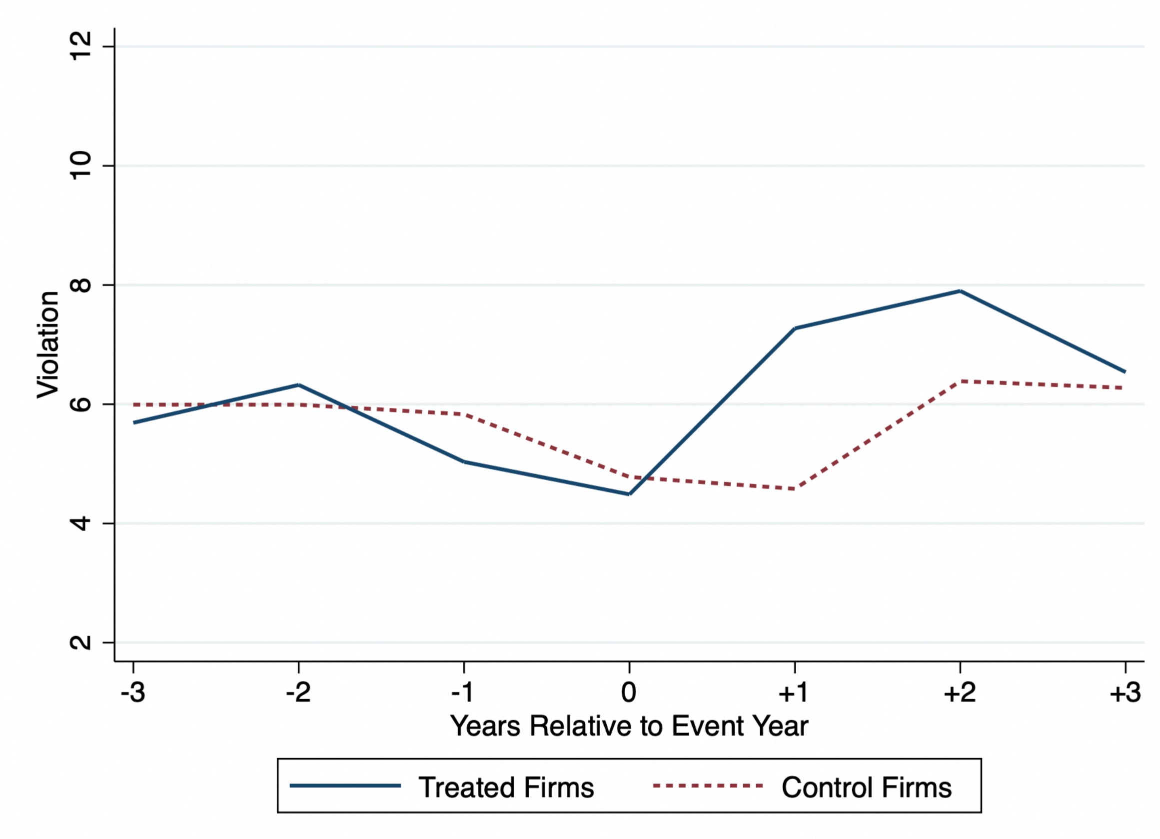

Table 4: NA Staggered DiD

This table presents the effect of climate policies on workplace safety using nonattainment designations of counties by the EPA from 1987 to 2021. The dependent variable is *Violation*, defined as the number of safety violations committed at a plant. *NA* is one for plants in counties that achieved nonattainment during the sample period and zero otherwise. *Post_NA* is a dummy variable that equals one after nonattainment designation and zero otherwise. $Post\_NA_n$ is a dummy variable equal to one if the year is *n* years relative to the year of nonattainment designation and zero otherwise. Detailed variable definitions are provided in Appendix A. Columns (1) and (3) include plant-level control variables, while Columns (2) and (4) include both plant and firm-level control variables. All regressions include plant-fixed effects and industry-year-fixed effects. Continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors are clustered at the county level, and t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

	(1) Violation	(2) Violation	(3) Violation	(4) Violation
NA × Post_NA	0.305***	0.380***		
	(4.015)	(2.747)		
NA × $Post\_NA_{\leq -4}$			0.217	0.324
			(1.092)	(0.985)
NA × $Post\_NA_{-3}$			0.0537	0.105
			(0.238)	(0.308)
NA × $Post\_NA_{-2}$			0.266	0.348
			(1.177)	(0.848)
NA × $Post\_NA_{-1}$			0.110	0.302
			(0.544)	(0.854)
NA × $Post\_NA_{+1}$			0.603***	0.672
			(2.810)	(1.413)
NA × $Post\_NA_{+2}$			0.556***	0.567
			(2.670)	(1.552)
NA × $Post\_NA_{+3}$			0.659***	1.018**
			(2.825)	(2.495)
NA × $Post\_NA_{\geq +4}$			0.436**	0.568*
			(2.237)	(1.773)
Observations	11,570	3,875	12,199	3,875
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	Yes	No	Yes
Plant FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.338	0.387	0.332	0.388

Table 5: Robustness Checks

This table presents the robustness checks of the baseline results. Panel A shows the effect of climate policies on workplace safety using a stacked DiD design. The dependent variable is *Violation*, defined as the number of safety violations committed at a plant. NA_{Ozone} is one for plants in counties that achieved nonattainment for Ozone and zero otherwise. $Post\_NA_{Ozone}$ is a dummy variable that equals one after nonattainment designation for Ozone and zero otherwise. Columns (1) – (2) include plant-level control variables, while Columns (3) – (4) include both plant and firm-level control variables. Panel A regressions include plant-fixed effects and either year-fixed effects or industry-year-fixed effects. Panel B presents the effect of climate policies on workplace safety for firms with all plants in a single county (Concentrated firms) against those with plants spread across multiple counties (Dispersed firms). The dependent variable is *Violation*. *NA* is one for plants in counties that achieved nonattainment during the sample period and zero otherwise. *Post_NA* is one after nonattainment designation and zero otherwise. Detailed variable definitions are provided in Appendix A. All regressions include plant-level control variables, plant-fixed effects, and industry-year-fixed effects. Additionally, Columns (3) and (4) include firm-level control variables. Continuous variables are winsorized at the 1^{st} and 99^{th} percentiles. Robust standard errors are clustered at the county level, and t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

Panel A: Stacked DiD

	(1) Violation	(2) Violation	(3) Violation	(4) Violation
NA_{Ozone} × $Post\_NA_{Ozone}$	0.476*	0.582**	2.145***	2.125***
	(1.696)	(1.980)	(6.254)	(5.641)
Observations	6,078	6,078	2,188	2,023
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	No	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Industry-Year FE	No	Yes	No	Yes
Pseudo R-Squared	0.377	0.427	0.390	0.499

Panel B: Concentrated vs. Dispersed Firms

	(1) Concentrated	(2) Dispersed	(3) Concentrated	(4) Dispersed
NA × Post_NA	0.267**	0.254**	0.892***	0.241*
	(2.231)	(2.562)	(4.150)	(1.711)
P-value of Difference	0.080		0.000	
Observations	4,040	7,084	485	3,138
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	No	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes

Industry-Year FE	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.356	0.353	0.554	0.392

Table 6: The Role of Operational Changes

This table presents the effect of climate policies on workplace safety conditional on operational changes. In Panel A, the proxy for operational changes is the number of green patent applications (*Green Patents*). High and Low groups are created based on whether *Green Patents* after NA designation is above or below the median. The dependent variable in Columns (1) and (2) is *Green Patents*. The dependent variable in Columns (3) and (4) is *Violation*, defined as the number of safety violations committed at a plant. *NA* is a dummy variable that equals one for plants in counties that achieved nonattainment during the sample period and zero otherwise. *Post_NA* is one after nonattainment designation and zero otherwise. All Panel A regressions include plant-level control variables and plant-fixed effects. In addition, Columns (1) – (2) include year-fixed effects, Column (2) includes firm-level control variables, and Columns (3) – (4) include industry-year-fixed effects. Panel B presents the effect of climate policies on safety jobs. The dependent variable in Columns (1) – (2) is *Safety Employees*, defined as the number of safety workers employed at a firm. The dependent variable in Columns (3) – (4) is *Safety Positions*, defined as the number of safety positions at a firm. All Panel B regressions include plant-level control variables, plant-fixed effects, and industry-year-fixed effects. Additionally, Columns (2) and (4) include firm-level control variables. Detailed variable definitions are provided in Appendix A. Continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors are clustered at the county level, and t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

Panel A: Green Patents				
	Green Patents		Violation	
	(1)	(2)	(3)	(4)
			High Green Patents	Low Green Patents
NA × Post_NA	0.400*	0.327**	1.050***	0.883
	(1.787)	(2.289)	(2.666)	(1.588)
P-value of Difference			0.000	
Observations	1,693	533	367	354
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	Yes	No	No
Plant FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	No	No
Industry-Year FE	No	No	Yes	Yes
Pseudo R-Squared	0.724	0.896	0.498	0.543

Panel B: Safety Personnel				
	(1)	(2)	(3)	(4)
	Safety Employees	Safety Employees	Safety Positions	Safety Positions
NA × Post_NA	-0.373***	-0.446***	-0.394***	-0.454***

	(-2.727)	(-4.756)	(-3.020)	(-5.291)
Observations	127	72	127	72
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	Yes	No	Yes
Plant FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.858	0.866	0.760	0.781

Table 7: The Role of Financial Constraints

This table presents the effect of environmental regulation on workplace safety for subsamples partitioned based on financial constraints. *SA Index* (Hadlock and Pierce's (2010) index), *Firm Size* (natural logarithm of total assets), *Dividend* (amount of dividend paid), and stock market listing status are the measures of financial constraints in Panels A, B, C, and D respectively. For the first three measures, firms are grouped into high and low subsamples based on whether the financial constraints measure is above and below the sample median, respectively. For the fourth measure, private firms are classified as financially constrained. The dependent variable is *Violation*, which is defined as the number of safety violations committed at a plant. *NA* is one for plants in counties that were designated as nonattainment during the sample period and zero otherwise. *Post_NA* is one after nonattainment designation and zero otherwise. Detailed variable definitions are provided in Appendix A. All regressions include plant-level control variables, plant-fixed effects, and industry-year-fixed effects. Additionally, Columns (3) and (4) include firm-level control variables. Continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors are clustered at the county level, and t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

Panel A: SA Index

	(1) High SA	(2) Low SA	(3) High SA	(4) Low SA
NA × Post_NA	0.652***	-0.103	0.662***	-0.181
	(4.103)	(-0.460)	(3.839)	(-0.877)
P-value of Difference	0.000		0.000	
Observations	1,720	1,834	1,590	1,834
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	No	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.449	0.434	0.463	0.438

Panel B: Firm Size

	(1) Small Firms	(2) Large Firms	(3) Small Firms	(4) Large Firms
NA × Post_NA	0.642***	-0.112	0.678***	-0.157
	(3.831)	(-0.485)	(3.769)	(-0.681)
P-value of Difference	0.000		0.000	
Observations	1,759	1,807	1,623	1,807
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	No	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.452	0.452	0.462	0.453

Panel C: Dividend				
	(1)	(2)	(3)	(4)
	Low Dividend	High Dividend	Low Dividend	High Dividend
NA × Post_NA	0.398**	-0.119	0.416*	-0.124
	(1.989)	(-0.494)	(1.851)	(-0.519)
P-value of Difference	0.000		0.000	
Observations	1,804	1,695	1,650	1,695
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	No	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.450	0.438	0.456	0.439

Panel D: Stock Market Listing Status				
	(1)	(2)	(3)	(4)
	Private	Public	Private	Public
NA × Post_NA	0.428***	0.0187	1.291***	0.0216
	(4.985)	(0.134)	(5.322)	(0.161)
P-value of Difference	0.000		0.000	
Observations	8,189	2,971	666	2,971
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	No	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.349	0.394	0.556	0.395

Table 8: The Role of Operational Changes Given Financial Constraints

This table presents the effect of climate policies on workplace safety conditional on operational changes for financially constrained and unconstrained firms. *Green Patents* (i.e., the number of green patent applications) and stock market listing status are the proxies for operational changes and financial constraints, respectively. High and low groups are created based on whether the respective measure is above or below the sample median. The dependent variable is *Violation*, which is defined as the number of safety violations committed at a plant. *NA* is one for plants in counties that achieved nonattainment during the sample period and zero otherwise. *Post_NA* is a dummy variable that equals one after nonattainment designation and zero otherwise. Detailed variable definitions are provided in Appendix A. All regressions include plant-level control variables, plant-fixed effects, and industry-year-fixed effects. Continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors are clustered at the county level, and t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

	Private Firms		Public Firms	
	(1)	(2)	(3)	(4)
	High Green Patents	Low Green Patents	High Green Patents	Low Green Patents
NA × Post_NA	1.486***	-0.841	-0.502	-0.923
	(5.118)	(-1.054)	(-0.395)	(-1.102)
P-value of Difference	0.000		0.136	
Observations	472	222	115	177
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	No	No	No
Plant FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.486	0.614	0.582	0.595

Table 9: The Role of Stakeholder Attention

This table presents the effect of climate policies on workplace safety for subsamples partitioned based on stakeholders' attention to climate change. *Social Attention* (i.e., an index computed based on World Values Survey questions on environmental awareness) and *CC SVI* (i.e., Google SVI on climate change) are the measures of stakeholders' attention to climate change in Panels A and B, respectively. High and low groups are created based on whether the measure is above or below the sample median. The dependent variable is *Violation*, which is defined as the number of safety violations committed at a plant. *NA* is one for plants in counties that achieved nonattainment during the sample period and zero otherwise. *Post_NA* is a dummy variable that equals one after nonattainment designation and zero otherwise. Detailed variable definitions are provided in Appendix A. All regressions include plant-level control variables, plant-fixed effects, and industry-year-fixed effects. Additionally, Columns (3) and (4) include firm-level control variables. Continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors are clustered at the county level, and t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

Panel A: Social Attention on Climate Change

	(1) High Social Attention	(2) Low Social Attention	(3) High Social Attention	(4) Low Social Attention
NA × Post_NA	0.691***	0.323***	1.005***	0.363*
	(3.659)	(2.870)	(2.742)	(1.707)
P-value of Difference	0.000		0.000	
Observations	4,439	5,159	1,489	1,732
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	No	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.388	0.389	0.453	0.444

Panel B: Google SVI on Climate Change

	(1) High SVI	(2) Low SVI	(3) High SVI	(4) Low SVI
NA × Post_NA	0.759***	0.411	1.500***	-0.369
	(3.060)	(1.296)	(2.902)	(-1.228)
P-value of Difference	0.000		0.000	
Observations	1,116	869	132	730
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	No	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.452	0.442	0.631	0.482

Table 10: The Role of Stakeholder Attention Given Financial Constraints

This table presents the effect of climate policies on workplace safety conditional on stakeholder attention for financially constrained and unconstrained firms. *Social Attention* (i.e., an index based on World Values Survey questions on environmental awareness) and stock market listing status are the proxies for stakeholder attention and financial constraints, respectively. High and low groups are created based on whether the respective measure is above or below the median. The dependent variable is *Violation*, which is defined as the number of safety violations committed at a plant. *NA* is one for plants in counties that achieved nonattainment during the sample period and zero otherwise. *Post_NA* is a dummy variable that equals one after nonattainment designation and zero otherwise. Detailed variable definitions are provided in Appendix A. All regressions include plant-level control variables, plant-fixed effects, and industry-year-fixed effects. Continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors are clustered at the county level, and t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

	Private Firms		Public Firms	
	(1)	(2)	(3)	(4)
	High Social Attention	Low Social Attention	High Social Attention	Low Social Attention
NA × Post_NA	0.873***	0.390***	-0.0762	0.113
	(4.200)	(3.045)	(-0.292)	(0.457)
P-value of Difference	0.000		0.209	
Observations	3,125	3,624	1,164	1,300
Plant Level Controls	Yes	Yes	Yes	Yes
Firm Level Controls	No	No	No	No
Plant FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.397	0.403	0.461	0.459