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Climate Boards: Do Natural Disaster Experiences Make Directors More Prosocial?

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Abstract:

We document that corporate directors' past experience with abnormally severe climatic natural disasters shape their prosocial preferences and influence firm climate policies. Using detailed data on director career histories and county-level natural disasters, we identify Directors with Abnormal Disaster Experiences (DADEs). DADEs are significantly more likely to be affiliated with nonprofit organizations, consistent with heightened prosocial preferences. Importantly, firms with more DADEs on their boards exhibit lower scope 1 and 2 greenhouse gas emission intensities and are more likely to implement climate-related policies, including board climate oversight, emission targets, and management incentives to reduce emissions. These effects are driven by influential DADEs serving on governance, audit, or ESG committees, but absent among DADEs on finance, compensation, or risk committees, supporting a preference-based rather than risk-based mechanism. Independent directors, rather than the influence of CEOs, play a central role. The effects are stronger when disaster experiences are accumulated over longer histories and in large or high-emission firms. The results are muted in smaller disasters and not driven by recent trends in attention to climate change. Despite the role of preferences, firms with more DADEs do not exhibit worse financial or operational performance. Using director deaths as plausibly exogenous shocks, we provide causal evidence. Our findings show that directors' experiences heighten their prosocial preferences that lead them to influence corporate climate policy.

Keywords: Board of Directors, Climate, Corporate Climate Policy, Experience, Greenhouse Gas Emissions, Preferences, Prosocial Behavior

JEL Classification: D64, G34, G41, Q54

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1. Introduction

What are the drivers of prosocial preferences among individuals, and how do they influence corporate outcomes (see Navarro, 1988; Bénabou and Tirole, 2006; 2010)? Do managers implement sustainable corporate policies in pursuit of firm *value* or their personal *values* (see Starks, 2023)? Past experiences are powerful, long-lasting determinants of individual beliefs and preferences, which often affect leadership decisions, corporate culture, and asset prices (see Malmendier and Wachter, 2024). For example, early-life macroeconomic experiences heavily influence the financial decisions of households and CEOs (see Malmendier and Nagel, 2011; 2016; Malmendier, Tate, and Yan, 2011). Similarly, the accumulation of past experiences can shape corporate directors' altruistic desires and sense of social responsibility, motivating them to steer the firms they govern to conduct their operations responsibly. Understanding these drivers not only helps explain individual prosocial behavior but also sheds light on how firms navigate trade-offs between profit maximization and broader societal impact.

In this paper, we study whether past experiences of abnormally devastating natural disasters by corporate directors shape their influence on corporate climate policies. This specific context suits our research objective for two operational reasons. First, natural disasters that cause immense property damage and/or casualties are salient events that are recorded accurately. Because these events cause much suffering within communities, they are likely to leave psychological marks on individuals who observe them up close or experience them firsthand as members of the affected community (see Dessaint and Matray, 2017; Alok, Kumar, and Wermers, 2020). Second, corporate climate policies, such as the intensity of the firm's greenhouse gas (GHG) emissions or explicit board oversight and managerial incentives related to corporate climate initiatives, are readily measured and of first-order importance to stakeholders (see Krüger, Sautner, and Starks, 2020; Bolton and Kacperczyk, 2021; 2023; Pastor, Stambaugh, and Taylor, 2021; 2022).

Theoretically, experiences of natural disasters by corporate directors and corporate climate policies can be linked for several reasons. We start from the general notion that salient and adverse experiences in the past may incentivize current efforts to avoid similar occurrences that may extrapolate into the future. With this in mind, we consider two broad hypotheses. The first hypothesis is that past disaster experiences alter the prosocial preferences of directors.

For instance, by remembering the damage and suffering within their community, individuals may develop a desire to contribute to mitigating the likelihood of potential disasters in the future. To the extent that these individuals expect climate change to cause more extreme disasters, they may exert their influence as directors to push firms to emit less greenhouse gases, primarily for societally beneficial reasons. The second, alternative hypothesis is that directors may derive information from disasters and learn about the likelihood and extent of climate risk that is relevant for the financial performance of the firm. It should be caveated that this second hypothesis is based on two assumptions: that directors who experience disasters attribute them to climate change, and that more disaster experiences unidirectionally lead to updated beliefs of greater climate risk exposure.

We measure director experiences using data on natural disasters identified at the county-month-hazard level, obtained from the Spatial Hazard Events and Loss Database for the United States (SHELDUS). For our baseline specifications, we retain climate-related disasters that caused damages exceeding $1 billion in 2022 dollars, which are mapped onto locational information of directors' past employment histories excluding boards they currently serve on, extracted from the BoardEx database. This allows us to identify **D**irectors who have had **A**bnormal **D**isaster **E**xperiences in the past (i.e., DADEs).

Using information on directors' extracurricular activities, also obtained from BoardEx, we first show that DADEs are more likely to be affiliated with nonprofit charitable organizations than other directors. This initial evidence supports our conjecture that DADEs are more likely to exhibit prosocial preferences, further motivating our main firm-level analysis.

In our main results, we show that publicly listed U.S. firms whose boards consist of more DADEs emit less GHG emissions and are more likely to have formal climate policies in place. These analyses rely on emissions data from S&P Trucost and information on other explicit climate policies disclosed in the Climate Disclosure Project (CDP). In our main regressions with granular fixed effects and controls, we find that firms with one more DADE per ten directors exhibit 3% lower scope 1 and 2 emission intensities (metric tons per dollar of sales) and are 6% more likely to have boards with ultimate authority over the firms' climate policies. These are both economically large and statistically significant associations. Combined with the

director-level evidence above, our main results indicate that directors' prosocial preferences shaped by their past disaster experiences may influence corporate climate policies.

Board members can influence firm decisions through several channels. In particular, board committees play a central role due to their focused discussions regarding specific aspects of governance and firm policies. Consistent with directors exerting influence on firms' climate policies, we find that these effects are primarily observed if DADEs sit on certain board committees or are males, but not otherwise. Specifically, we find that firms with more DADEs on their boards have lower emissions if the DADEs serve on governance, audit, or ESG/sustainability committees, but not if they sit on compensation, finance, or risk committees. These differences likely reflect the distinct mandates of board committees. Compensation, finance, and risk committees tend to prioritize financial performance and prudent risk oversight, aligning their actions with shareholder value. In contrast, governance, audit, and ESG committees are more stakeholder-oriented, emphasizing transparency and the disclosure of climate-related performance to investors and broader stakeholders. These results contradict the hypothesis that past disaster experiences heighten directors' perceptions of climate risk as an important source of immediate risk for the firm, but more consistent with the hypothesis that directors weigh their past experiences and preferences against their roles in the boardroom.

To address concerns about endogenous board selection and the possibility that our results may reflect managerial influence rather than independent director preferences, we examine the role of director independence and CEO involvement. Specifically, we show that DADEs who are outside directors are the ones primarily associated with lower corporate emissions, while non-independent DADEs are not. We also find no evidence that CEO influence, indicated by board chair duality or the CEO him/herself being a DADE, plays any meaningful role in moderating the impact of DADEs on reducing firms' emissions.

Highlighting the importance of the accumulation of past experiences over time, we also show that directors affect corporate climate policies much more strongly when they have accumulated abnormal disaster experiences over a long period throughout their careers, than when they have experienced disaster shocks only in recent years. For instance, having a director who has experienced abnormal disasters over the last 20 years has as much as twice the effect on reducing the firm's emissions than having a director who has experienced

abnormal disasters only within the past 5 years. This result underscores the long-lasting impact of early experiences in shaping the prosocial preferences of individuals (see Malmendier and Wachter, 2024).

We conduct several additional tests to corroborate these interpretations. We show that the results hold only with salient, abnormally devastating disasters that caused property and crop damages exceeding $1 billion in a county where a DADE's employer was headquartered, but not with smaller, less visible disasters based on alternative thresholds (e.g., $500 million, $100 million). We also document meaningful heterogeneities across firms that highlight the societally beneficial impact DADEs are aiming to achieve: Our results are chiefly observed among the heavier GHG emitters, with respect to either the median industry or firm, but not among lighter emitters; and also, among larger firms rather than smaller firms. In addition, to alleviate remaining concerns that our findings might be attributed to recent shifts in attention to climate change or our understanding of its risks rather than to the effects of past experiences on prosocial preferences, we use the 2015 Paris Agreement and the ensuing formation of the Task Force on Climate-Related Financial Disclosures (TCFD) as a shock to attention to climate change. We find no evidence that the effects of DADEs on corporate emissions became stronger only after the Paris Agreement/TCFD.

Overall, our findings are most consistent with the long-lasting role of past experiences on the formation of prosocial preferences among corporate directors, and these preferences affecting decisions in the corporate boardroom. This interpretation is further supported by additional evidence showing that having more DADEs on the board does not improve financial performance, which is inconsistent with DADEs having updated their beliefs about financially material climate risks. However, given the fiduciary duty of directors to shareholders, it is also important to note that we find no evidence that DADEs hurt performance either. A reasonable conclusion is that DADEs with past disaster experiences tend to pareto optimize the "double bottom line" of shareholder value and prosocial values.

Finally, to further alleviate concerns about endogenous links between the presence of DADEs on boards and corporate climate policies, we provide additional evidence supporting the causal impact of DADEs on firms' emissions. Specifically, we identify exogenous shocks to DADE board representation using directors' deaths in a stacked difference-in-differences (DID)

framework estimated for a matched sample. In this analysis, we find that firms significantly increase their scope 1 emissions after losing a DADE due to a director's death. Albeit for a limited sample, this corroborates our causal interpretation regarding the role of DADEs and their past experiences in influencing a firm's environmental performance.

Our study contributes to a strand of literature that investigates the impact of early-life experiences on economic decisions (see Malmendier and Nagel, 2011; 2016; Malmendier and Wachter, 2024). We complement studies on how these traits can affect managerial behavior and corporate outcomes. Malmendier et al. (2011) show that CEOs who grew up during the Great Depression are risk averse in their financing decisions. Benmelech and Frydman (2015) document that CEOs with military backgrounds are associated with more conservative and ethical corporate policies. Bernile, Bhagwat, and Rau (2017) show that the severity of early-life disaster experiences mediates the risk-taking behavior of CEOs. Duchin, Simutin, and Sosyura (2021) study how CEOs' formative socioeconomic backgrounds affect their investment decisions. By broadening this line of inquiry to corporate directors, our findings provide new evidence that past experiences shape not only individual managerial behavior but also collective decision-making dynamics in the boardroom, offering a deeper understanding of how early-life experiences influence corporate governance and outcomes.

Our focus on corporate climate policies also brings new insights to the climate finance literature that struggles to understand the underlying motivations for ESG or sustainability oriented corporate policies. As stressed by Starks (2023), there is a lack of delineation between such corporate policies that are driven by considerations of *value* or *values*. A branch of research in this area emphasizes risk and value as important considerations for corporate responsibility (see Krüger, 2015; Lins, Servaes, and Tamayo, 2017; Albuquerque, Koskinen, and Zhang, 2019). Much of this rationale also has carried over to climate concerns and corporate greenness (see Krüger et al., 2020; Bolton and Kacperczyk, 2021; 2023; Ilhan, Sautner, and Vilkov, 2021; Hoepner, Oikonomou, Sautner, Starks, and Zhou, 2024). However, recent studies scrutinize this line of argument (see Zhang, 2024). Alternatively, several notable studies highlight the role of preferences and values in explaining the demand for responsible businesses (see Riedl and Smeets, 2017; Pastor et al., 2021; 2022; Bauer, Ruof, and Smeets, 2021; Heeb, Kölbel, Paetzold, and Zeisberger, 2023; Döttling and Kim, 2024). Our work joins this

conversation and provides support for the notion that personal preferences, built on the long-lasting impact of past experiences, can affect the board's influence on the firm's climate policies.

In this context, our findings are related to a recent study by Huang, Jiang, Xuan, and Zhou (2022), who document that natural disaster "shocks" to firms affect third-party ESG scores of other firms at which their directors hold interlocking board positions by updating directors' beliefs about climate change. There are at least three distinguishing features that differentiates our study. First and foremost, our findings highlight the long-lasting role of accumulated past experiences in the formation of individual prosocial preferences, and their importance relative to recent and immediate shocks that incrementally update beliefs. Second, our study focuses on precisely defined corporate climate policies as outcome variables, such as scope 1 and 2 emissions, emission targets, the board's climate policy authority, or managerial climate incentives, rather than relying on third party ESG scores. Third, our findings indicate that male directors are more effective at influencing the firm's policy according to their preferences, whereas Huang et al. (2022) document that females directors are quicker to update their beliefs about climate change. In short, our study makes clear and distinct contributions to the literature and complements the findings by Huang et al. (2022).

Finally, our work contributes to the literature on the importance of board experience and expertise. Several studies highlight that industry-related board expertise can be valuable, for instance, in banks or in industries with important information frictions (see Minton, Taillard, and Williamson, 2014; Dass, Kini, Nanda, Onal, and Wang, 2014). Board experience also has been shown to help firms make better acquisitions or navigate structural changes in global trade (see Field and Mkrtchyan, 2017; Chen, Chen, Kang, and Peng, 2020). Other studies consider the impact of more deep-rooted traits of directors, such as gender, race, age, and cognitive ability, to show that board diversity is valuable (see Adams and Ferreira, 2009; Bernile, Bhagwat, and Yonker, 2018). Our study departs from these studies by focusing on the role of board experience in forming directors' preferences that impact the sustainability outcomes of firms.

Understanding the drivers and interactions of individual and corporate prosocial behavior has long been an important goal for economists (see Navarro, 1988; Bénabou and Tirole, 2006; 2010). While our study provides novel insights into how directors' preferences are formed through experiences and imbued into corporate climate policies, it also underscores the

importance of aligning *value* and *values* and accounting for the costs of potential conflicts between them (see Masulis and Reza, 2015, Starks 2023).

2. Data and sample overview

2.1. Data

2.1.1. Directors with Abnormal Disaster Experiences

The first step to identifying Directors with Abnormal Disaster Experiences (DADEs) is to identify abnormally devastating natural disasters. To do this, we utilize the Spatial Hazard Events and Loss Database for the United States (SHELDUS) database, which is a county-month-level hazard dataset for the U.S. that covers natural hazards such as thunderstorms, hurricanes, floods, wildfires, and tornados, covering the period from January 1960 to December 2022. The database contains information on the date of an event, affected location (county and state), and the dollar losses caused by the event (i.e., property and crop losses, injuries, and fatalities). From this database, we define and retain abnormal disasters as all climatic disasters (i.e., excluding disasters such as earthquakes or volcanic eruptions) that caused a total property and crop damage of $1 billion or more in 2022 dollars.

Our data on boards of directors come from the BoardEx North America database. We obtain data on directors' current board positions as well as past employment history. For directors' current board positions, we also utilize detailed descriptions of their board committee assignments available in the BoardEx Committee Details file and classify whether they serve on one of the following committees: governance, audit, ESG/sustainability, compensation, finance, or risk. We also collect additional information on directors' profiles, such as gender, age, educational background, and extracurricular activities outside corporate positions (e.g., affiliations with nonprofit charitable organizations). We then manually clean and geocode the headquarter addresses of all firms that directors' have ever been affiliated with in the past or present and match current and past board positions with the county-month level natural disaster data compiled from SHELDUS.

We then construct our variable of interest, DADE, at the firm-year level by counting the number of directors currently serving on the firm's board who had experienced abnormally

devastating natural disasters in previous years while they were employed by different firms. In our analysis, we use the logarithm of this number, or its scaled version divided by board size, as the key explanatory variable.

2.1.2. Corporate climate policies

As our outcome variables, we focus on measures of corporate climate policies. As our main variable, we focus on the intensity of the firm's scope 1 and 2 GHG emissions (i.e., CO_2 equivalents), obtained from S&P Trucost Environmental. We use a measure of emission intensity that divides emissions by the firm's sales as a proxy for its output, to account for differences or changes in emissions that could be attributed to the size of the firm's economic activities. We use scope 1 and 2 emissions because scope 1 emissions are produced directly from sources that are controlled or owned by the firm (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles, etc.), and because scope 2 emissions are associated with the purchase of electricity, steam, heat, or cooling. Although scope 2 emissions physically occur elsewhere, they are accounted for in a firm's emissions because they are a result of its energy use. We do not consider scope 3 emissions, which encompass emissions that are not produced by the company itself and are not the result of activities from assets owned or controlled by the firm, but by other entities up and down the firm's value chain (e.g., suppliers and customers). These emissions are difficult to view as being under the firm's direct control. In addition, scope 3 emissions are generally estimated with significant noise.

To complement the analysis of emissions and to provide more direct evidence on the firm's managerial intent to implement climate policies, we leverage data from the Carbon Disclosure Project (CDP). CDP is a nonprofit organization that solicits companies to disclose their climate impact by responding to an extensive suite of survey questionnaires. CDP has been expanding their coverage rapidly since their beginning in 2003, covering over 23,000 private and publicly listed companies worldwide as of 2023. We focus on publicly listed firms in the U.S. with valid ISINs reported in the CDP database and use survey responses up to 2020.

These surveys include specific questions explicitly asking firms whether they have formal climate policies in place and whether they have a chain of responsibility to implement these policies. We focus on questionnaires related to three aspects relevant for our study: (i) whether the board has the highest responsibility on the firm's climate policy, such as "*Where*

is the highest level of direct responsibility for climate change within your company?" or "*Is there board-level oversight of climate-related issues within your organization?*"; (ii) whether the firm has formal emission targets or reduction initiatives in place, such as "*Did you have an emissions reduction target that was active (ongoing or reached completion) in the reporting year?*" or "*Did you have an emissions target that was active in the reporting year?*"; and (iii) whether the firm provides managerial incentives related to climate performance, such as "*Do you provide incentives for the management of climate change issues, including the attainment of targets?*". Firms respond to these questions in varying textual forms, such as "*Yes*", "*No*", "*Individual/Sub-set of the Board or other committee appointed by the Board*", "*No individual or committee with overall responsibility for climate change*", "*Both absolute and intensity targets*", or "*No target*". We parse these responses into dummy variables taking values of 1 or 0.

In addition, to control for observable firm characteristics that might be correlated with DADE and affect corporate climate policies, we compute variables such as total assets, leverage, return on assets (ROA), and Tobin's Q based on financial data from Compustat.

2.2. Sample overview

To be included in our sample, we first retain all U.S. firm-year observations with positive assets and sales larger than $10 million. We also require firms to be covered in the Trucost Environmental emissions database. Finally, we drop firms that have less than three directors on their boards, and firms that have no directors with abnormal disaster experience. After the sample is constructed, we winsorize all unbounded continuous variables at the 1% extremes.

In Table 1, we chronologically list the top 25 abnormal natural disasters in terms of the magnitude of the dollar damages they have caused at the county-month level, experienced throughout the careers of directors included in our sample. These devastating disasters are overwhelmingly related to hurricanes and tropical storms, as well as damages from flooding corresponding to these storms. Wildfires have recently started to cause significant damages as well. The list of major events corroborates the notion that such experiences may instill in directors a desire to help prevent future abnormal disasters by mitigating the climate impact of firms they govern. It is important to note that this reasoning does not require an assumption or stance on whether these past events were attributable to climate change, but only that the reduction of emissions can help prevent extraordinary disasters in the future.

[Table 1 about here]

Table 2 characterizes our sample of firms, which consists of an unbalanced panel of 2,636 firms and 16,354 firm-years in total. As reported later, the inclusion of granular controls including industry-by-year fixed effects results in further sample shrinkage in our regressions. To start with our explanatory variable, the average firm in our sample has approximately two DADEs on its board, which makes up roughly one fifth of all its directors. Figure 1 highlights that there has been a time-trend in this statistic, namely a gradual increase in the board representation of DADEs within the average firm (i.e., 35% increase in the number of DADEs, or a 10% greater share of the average board, over the past 20 years). This within-firm increase underscores our baseline empirical strategy that controls for firm fixed effects.

[Figure 1 about here]

We also summarize our sample firm's climate policies. The average firm emits 20 metric tons of scope 1 emissions per every dollar of its sales, or 49 metric tons of scope 1 and 2 emissions combined. Many firms that report to CDP have formal climate policies in place: 66% of firms have given boards ultimate authority over their climate policies, 75% have explicit emission targets in place, and 72% provide management incentives to achieve climate goals. On average, these are large firms with ten board members and $20 billion in assets.

Panel B of Table 2 also reports the correlations between our variables. DADE and emissions are positively correlated, a pattern that likely reflects cross-sectional differences across firms. DADE is also positively correlated with the existence of other explicit climate policies. These correlations indicate that there is room for DADEs to contribute to the carbon transition of heavy-emission firms by implementing formal climate policies. Emission intensities are modestly correlated with various firm financial attributes, underscoring the importance of controlling for these variables.

[Table 2 about here]

3. Main results

3.1. Directors' prosocial preferences

We hypothesize that directors' past experiences with abnormal natural disasters can shape the prosocial preferences, which may, in turn, influence corporate climate policies due to these preferences. As the first step, we test whether such experiences prosocial tendencies by conducting a director-year level analysis. We proxy prosocial preferences using data on directors' affiliations with nonprofit charitable organizations from the BoardEx Other Activities file – approach supported by prior research (see Masulis and Reza, 2015; Cai, Xu, and Yang, 2021; Ahn, Houston, and Kim, 2025). Specifically, we estimate the following regression:

$$\boldsymbol{I}(Charitable)_{d,t} = \beta \cdot \boldsymbol{I}(DADE)_{d,t-1} + \lambda \cdot Controls_{d,t-1} + \alpha_d + \alpha_t + \epsilon_{i,t} \quad (1)$$

where d and t each denote director and year. The dependent variable, $\boldsymbol{I(Charitable)}_{d,t}$, is an indicator variable indicating whether director d is affiliated with a nonprofit in year t. The explanatory variable of interest, $\boldsymbol{I(DADE)}_{d,t-1}$, is an indicator variable for whether director d has had abnormal disaster experiences in the past as of $t-1$. As potential confounders that may be correlated with these key variables, we include time-varying director attributes in the regressions, including the logarithm of director age and board experience. Director board experience is measured as the number of company boards a director had served on in the past. Furthermore, we also control for director fixed effects, which control for all time-invariant director attributes, as well as time fixed effects.

[Table 3 about here]

The results are reported in Table 3. Columns 1 and 2 show the results with and without director controls. In both specifications, the ***I(DADE)*** coefficient is positive and significant at the 5% level, implying that DADEs are two percentage points more likely to be associated with a nonprofit than other directors. This is an economically meaningful effect, corresponding to a 15% increase relative to the unconditional likelihood of nonprofit affiliation of approximately 14%. In the next three columns, we replace ***I(DADE)*** with ***I(DADE_20Y)***, ***I(DADE_10Y)***, or ***I(DADE_5Y)***, each indicating whether the director had experienced an abnormal disaster within the past 20, 10, or 5 years, respectively. Signifying the importance of accumulated past experiences, the results weaken as we focus on more recent disaster experiences.

This initial evidence is consistent with a prosocial *values* channel, whereby past experiences mold the preferences of individual directors. Against this backdrop, we next

conduct our main analyses to examine how directors' past disaster experiences affect their influence on corporate climate policies.

3.2. DADEs and corporate climate policies: Baseline analysis

We begin our main analysis with firm-year level OLS regressions of corporate climate policies on DADEs, following the regression equation:

$$ClimatePolicy_{i,t} = \beta \cdot DADE_{i,t-1} + \lambda \cdot Controls_{i,t-1} + \alpha_i + \alpha_{j,t} + \epsilon_{i,t} \quad (2)$$

where *i*, *j*, and *t* each denote firm, industry, and year. The outcome variable, $ClimatePolicy_{i,t}$, is either the logarithm of the firm's scope 1 and 2 GHG emissions scaled by the firm's sales (metric tons per one dollar of sales), or one of three indicator variables for whether the firm's board has the highest responsibility on its climate policies, whether the firm has emission targets or reduction initiatives, and whether the firm gives management climate-related incentives. The key explanatory variable, $DADE_{i,t-1}$, is the number of directors with abnormal disaster experience on the company's board as of year *t-1*. We either log-transform *DADE* or divide it by the total number of directors on the firm's board. As time-varying firm controls, we include firm size computed as the logarithm of total assets, leverage as total debt divided by total assets, return-on-assets (ROA), Tobin's Q, the logarithm of board size, the logarithm of average director age, and the logarithm of average director experience measured as the number of a director's past board affiliations, all measured at *t-1*. To inoculate our results from the influence of time-invariant firm unobservables or time-varying industry factors, we also control for firm and industry-by-year fixed effects, where the firm's industry is defined by its historical 4-digit SIC code. The coefficient of interest is on *DADE*, which estimates the incremental effect of having more directors with past disaster experiences on the board on the firm's emissions or explicit climate policies.

Table 4 reports our baseline results based on scope 1 and 2 emission intensities as our outcome variables. The first two columns use the logarithm of DADEs as the explanatory variable, while the last two use DADEs scaled by board size. Based on either scope 1 or the sum of scope 1 and 2 emissions, the coefficient estimates indicate a negative, economically large and statistically significant effect of DADEs on the firm's emissions. To provide an economic interpretation of the first two columns, a 50% increase in the number of DADEs with respect to

the mean, roughly corresponding to an increase from 2 to 3 DADEs, results in a 4% reduction in scope 1 emission intensity and a 6% reduction in scope 1 and 2 emission intensity. Alternatively, the last two columns indicate that a firm with one more DADE per ten directors on its board exhibits approximately 3% lower emission intensity. These are economically important effects, and all of the estimates are statistically significant at the 1% or 5% levels.

[Table 4 about here]

Table 5 reports the results based on indicator variables for whether the firm has one of three types of climate policies in place. The first two columns show that having more DADEs on the board is associated with a significantly higher probability of the board having explicit and ultimate authority over the firm's climate policy. The average firm increasing the number of DADEs by 50% from 2 to 3, or adding an additional DADE per ten directors, is associated with a 9% or 6% higher likelihood of board climate authority, respectively. Similarly, a greater number of DADEs on the board is associated with a higher probability of the firm having explicit emission targets, or the firm providing management with incentives to achieve climate goals. Overall, the baseline results indicate that directors' past disaster experiences positively impact the firm's climate policies.

[Table 5 about here]

3.3. Director influence

It is important to consider whether these results are driven by the influence of directors or the CEOs and management who endogenously select directors. In this section, we provide further evidence consistent with the impact of directors' influence on corporate climate policies. Board members can influence firm decisions through several channels. In particular, board committees play a key role due to their focused, in depth discussions regarding specific aspects of governance and firm policies.. Using committee membership data from BoardEx, we examine whether DADEs exert greater influence on corporate climate policies—specifically, scope 1 and 2 emission intensities—when they serve on board committees. We also test whether their influence varies by committee type.

Board committees are entrusted with specific responsibilities for different aspects of the firm's governance to ensure that there is informed decision making and enhanced oversight. For instance, all publicly traded firms are required to have audit, governance and compensation committees. In addition, risk and finance committees, though not required, are also widespread in certain industries (see Stulz, Tompkins, Williamson, and Ye, 2022). There also has been a growing number of firms that have included an ESG or sustainability committee to increase the focus on climate, diversity, governance, and other ESG-related issues at the board level. Even when firms do not have separate ESG/sustainability committees, they are often folded into governance committees. Given that committee members often wield greater influence on the firm's decisions under their committee charter than other directors, we examine whether more influential directors are better positioned to translate their experiences and preferences into climate-related policies. By leveraging variation in committee types and their relative influence, we also explore whether directors' impact stems from firm value-related considerations or from personal values shaped by past experiences.

We report our results in Table 6. In Panel A, we begin with whether DADEs sit on any of the aforementioned committees or not. We denote the number of DADEs who also currently serve on any of the firm's board committees as *DADE_Comm*, and those who do not as *DADE_Noncomm*. We then test whether each of these variables have varying incremental impact on the firm's emissions. The results show that having more DADEs who serve as committee members is distinctly associated with significantly lower emission intensity. While a higher number of non-committee DADEs is also associated lower emissions, this association is economically smaller, roughly half of that of committee DADEs, and statistically insignificant. These results highlight the role of director influence in impacting the firm's climate policies.

[Table 6 about here]

In Panel B of Table 6, we further break down *DADE_Comm* according to the specific committees these directors serve: governance, audit, ESG or sustainability, compensation, finance, and risk. The results show that having more DADEs on the board who are also members of the governance, audit and ESG committees is significantly associated with lower scope 1 and 2 emission intensity. DADEs with ESG committee memberships have an especially outsized impact on emissions, where an additional director per ten directors lowers emission intensity

by 8%. In contrast, having more DADEs who serve on compensation, finance, and risk committees has only modestly negative and statistically insignificant effects on emissions.

These differences reflect the distinct mandates of board committees. Compensation, finance, and risk committees tend to prioritize financial performance and prudent risk oversight, aligning their actions with shareholder value. In contrast, governance, audit, and ESG committees are more stakeholder-oriented, emphasizing transparency and the disclosure of climate-related performance to investors and broader stakeholders. This difference has implications for how we interpret our main findings. The fact that past disaster experiences have less impact on emissions when directors' role on the board is focused on risk and financial performance supports the notion that such impacts are driven by experiences shaping personal prosocial preferences rather than informing beliefs about financially material climate risks. It should be noted that directors may be assigned to a particular committee by the Chairman of the board or may request an assignment themselves. Regardless of the committee assignment channel, these results do not necessarily mean that directors would sacrifice their fiduciary duties, but simply that they will align their committee responsibilities with their prosocial preferences when possible.

In Panel C of Table 6, we also report differences in the influence of DADEs whose gender are male from those who are female. The results show that the effects of DADEs on firm emissions are entirely driven by the past disaster experiences of male directors and not by female directors. Recent studies highlight the role of gender-diverse boards in improving the efficiency of monitoring and risk-taking (see Adams and Ferreira, 2009; Bernile, Bhagwat, and Yonker, 2018). Given these previous studies, our result that primarily male directors channel their disaster experiences to the firm's climate policies again points to a preference channel and is inconsistent with these experiences informing more prudent monitoring.

This finding stands in contrast with Huang et al. (2022), who show that recent disaster shocks at interlocking firms have a disproportionate impact on female directors rather than on male directors. This difference can be attributed to the fact that our study focuses on accumulated past disaster experiences that likely shape preferences, whereas Huang et al. (2022) study the effects of recent disaster shocks in a narrow window period that likely affect

beliefs. Overall, these results help contextualize how directors leverage their influence to imbue their personal values shaped by their experiences in the corporate decision-making process.

3.4. Director independence and the role of CEOs

The influence of directors on firm decisions critically depends on the composition of the board. In CEO-dominated boards—where CEOs may influence director appointments—board actions may reflect the CEO's agenda rather than individual director preferences.

To isolate whether DADEs' influence on the firm's climate policy stems from their own experiential values or simply reflects CEO-driven decisions, we test whether DADEs who are independent directors—less subject to CEO influence—have a stronger effect on reducing firm emissions than those who are not independent. This test is important, as prior research shows that CEOs can endogenously shape board composition (Hermalin and Weisbach, 1998), while board independence has been shown to enhance governance and limit managerial influence (Weisbach, 1988; Duchin, Matsusaka, and Ozbas, 2010; Knyazeva, Knyazeva, and Masulis, 2013). By focusing on independent DADEs, we aim to rule out the CEO influence channel and provide cleaner evidence of director-driven climate action.

Alternatively, we directly explore whether certain CEO characteristics moderate the effect that DADEs have on corporate emissions. For instance, CEOs who also serve as board chairs may be more entrenched and have disproportionate influence on the board (see Graham, Kim, and Leary, 2020). If our results were driven by DADEs that are under the CEO's influence, the effect of DADEs on emissions may be driven by firms with such "dual" CEOs. Finally, the results may also be driven by a CEO who him/herself is a DADE, who is really the one taking charge of the firm's climate policies and endogenously choosing like-minded DADEs onto the board. We test this possibility as well.

The results are presented in Table 7. In Panel A, we start by examining the role of independent DADEs (i.e., DADEs who are outside directors). We denote the number of DADEs who are outside directors as DADE_Indep, and those who are not as DADE_NonIndep. We test the explanatory power of each of these variables with respect to the firm's emissions. The results show that having more independent DADEs on the board is significantly associated with

lower emission intensity of the firm. On the other hand, the association is economically smaller and statistically weaker for non-independent (i.e., insider) DADEs.

[Table 7 about here]

In Panel B, we further entertain the CEO influence channel by interacting our DADE variable with a firm-level dummy variable denoted "CEO Influence", which indicates whether the CEO is also the board chair (i.e., CEO duality), or whether the CEO is a DADE him/herself. We do not find any evidence that the effect of DADEs on emissions is driven by CEOs. The CEO Influence term itself is never significant, the interaction term is only marginally significant for CEO duality, and most importantly, the economic and statistical significance of the DADE variable itself is never weakened or subsumed.

Overall, these results indicate that our main findings are unlikely to be driven by CEOs who endogenously appoint and influence DADEs to reduce the carbon footprint of the firm.

3.5. Accumulated experience vs. recent experience

To strengthen our interpretation that directors' prosocial preferences influence firm decisions, it is important to delineate the role of past experiences that may shape directors' preferences from the role of recent events that may update directors' information and beliefs. In this section, we provide more evidence highlighting the importance of the accumulation of past disaster experiences by directors over time, as opposed to recent, incremental disaster shocks. Specifically, we create three past climatic disaster experience windows (past 20 years, past 10 years, and past 5 years) and corresponding DADE variables that count the number of directors on a company's board that have experienced disasters over these window periods, denoted *DADE_Window*. We then use these measures as alternative explanatory variables in our regressions to test whether DADEs with earlier disaster experiences have outsized effects on the firm's emission intensity compared to directors with more recent disaster experiences.

Reported in Table 8, the results confirm that having more DADEs on the company's board who have greater accumulation of past disaster experience over longer window periods is associated with stronger and more significant reductions in scope 1 and 2 emissions, compared to having DADEs who have only experienced disasters recently. While the

coefficients on *DADE_Window* are statistically significant for all three windows (i.e., past 20 years, past 10 years, or past 5 years), the negative point estimates are substantially larger in magnitude under longer experience windows. The results hold whether *DADE_Window* is log-transformed or computed as a fraction of board size. For instance, the coefficient on *log(DADE_Window)* is twice as large based on the 20 year window compared to that based on the 5 year window (i.e., –0.130 vs. –0.052).

[Table 8 about here]

These results support the hypothesis that directors affect corporate climate policies more strongly due to their prosocial preferences formed through their accumulated disaster experiences over long periods throughout their careers, than due to updated climate beliefs from disaster shocks in recent years. Our findings underscore the long-lasting impact of early experiences in shaping the preferences of individuals (see Malmendier and Wachter, 2024).

4. Additional analyses

4.1. Disaster magnitude and firm heterogeneity

Thus far, we have documented the importance of directors' past disaster experiences in shaping their prosocial preferences, and how this influences firms' corporate climate policies. In this section, we perform additional tests to corroborate our interpretations of the main results. In Table 9, we provide supporting evidence that our results are explained by the *salience* of directors' past experiences. Arguments related to the formative nature of early experiences are often made based on the salience of such events (see Malmendier and Nagel, 2011; Malmendier et al. 2011; Bernile et al. 2017). To test whether our results are in line with these arguments, we examine how our results vary with the magnitude of climatic disasters experienced by directors as an indication of their salience, exploring whether larger or even modest disaster experiences lead to similar results.

Our baseline definition of abnormal climatic disasters are all climatic disasters (i.e., excluding disasters such as earthquakes or volcanic eruptions) that caused a total property and crop damage of $1 billion or more in 2022 dollars. Using the SHELDUS database, we construct three additional climatic damage magnitude groups in 2022 dollars: $1–5 billion, $0.5–1 billion,

and $0.1–0.5 billion. We then compute alternate versions of DADE that count the number of directors on the company's board that had experienced past disasters belonging to these alternative damage groups, denoted as *DADE_Damage*. We then use these variables to test whether DADEs that had experienced larger, more devastating climatic disasters in the past have larger effects on the firm's emissions compared to directors with smaller, less devastating disaster experiences.

The results in Table 9 indicate that the association between DADEs and firms' emission intensities are negative and significant only when DADEs are defined as having experienced climatic disasters in the largest damage group (i.e., $1–5 billion, columns 1 and 2), but not for directors who had experienced smaller, less visible disasters based on alternative thresholds (e.g., $500 million, $100 million). These "placebo" results not only support the hypothesis that directors' influence on corporate climate policies are driven by preferences shaped by salient past experiences, but also help mitigate concerns that disaster experiences may be correlated with confounding director attributes.

[Table 9 about here]

In Table 10, we provide additional evidence supporting our interpretation of DADEs' *prosocial preferences*. Specifically, we test whether DADEs affect their firms' emissions especially when those firms are heavy GHG emitters. Intuitively, directors with prosocial objectives would have stronger incentives to influence their firms' climate policies if these firms had heavier carbon footprints to eliminate, much like how socially responsible investors would engage brown firms (see Hoepner et al. 2024). To implement this test, we divide our sample into high- and low-emission industries (firms) each year based on the median industry (firm) in terms of its lagged scope 1 emission intensity.[1] We then estimate our baseline regressions on the high- and low-emission subsamples. In both industry and firm subsamples, the coefficients on the DADE variables are negative and statistically significant only in high-emission industries (columns 1 and 2) or firms (columns 5 and 6), but not among lighter emitters (columns 3, 4, 7, and 8). These results are consistent with DADEs influencing corporate climate policies primarily if their firms are brown and have large emissions to reduce.

[1] An industry's scope 1 emission intensity is defined as the emission intensity of its median firm.

[Table 10 about here]

In a similar vein, in Table 11, we examine whether the impact of DADEs on corporate climate policies varies based on firm size. If DADEs had prosocial dispositions, they would want to influence policies at larger firms to achieve greater climate impact. To test this, we divide our sample annually into large and small firms with respect to the median firm. Running our baseline specification on these subsamples, the results show that the associations between our DADE variables and emission intensity are negative and significant only for larger firms (columns 1 and 2), but not for smaller firms (columns 3 and 4). Together, the results in Tables 10 and 11 document meaningful heterogeneities across firms that highlight the societally beneficial impact DADEs are aiming to achieve.

[Table 11 about here]

4.2. Not driven by recent trends in attention to climate change

Over the past several decades, there has been an increasing awareness of climate change around the world. As individuals, DADEs may have been influenced by this societal trend. Therefore, one concern about our analysis is that our results might be driven by recent shifts in attention to climate change or our understanding of climate change risks, rather than the effects of past climatic disaster experiences on prosocial preferences. To alleviate this concern, we use the 2015 Paris Agreement and the subsequent formation of the Task Force on Climate-Related Financial Disclosures (TCFD) as a shock to attention to climate change. We test whether the effect of DADEs on corporate emission intensity is different before and after this shock. Specifically, we create an indicator variable, *AfterParis*, that is equal to one for years 2017 or later, and zero for years 2014 or before. We exclude the years 2015 and 2016 from this analysis, as these years were when the Paris Agreement was introduced and signed. We interact *AfterParis* with our DADE measures and include the interaction term in our regressions.

Table 12 reports the results. Based on either the logarithm of DADE (column 1) or DADE scaled by board size (column 2), the interaction term is not significant. In contrast, the coefficient estimates on the DADE variables themselves remain negative, economically large, and statistically highly significant. Taken together, there is no evidence that the effects of DADEs

on corporate emissions became stronger only after events that raised attention to climate change and its associated risks, such as the Paris Agreement or the formation of TCFD.

[Table 12 about here]

4.3. Do DADEs improve or hurt firm performance?

Our key finding that the prosocial tendencies of DADEs drive climate-friendly corporate policies raises an important question for shareholders who prioritize firm value: do DADEs' climate-focused actions enhance firm value, or do they impose costs on shareholders? In this section, we examine whether DADE-driven climate policies benefit or harm firm performance. This test helps distinguish between two interpretations of our findings—DADEs are updating beliefs about climate-related material risks (suggesting improved performance), or DADEs' experiences shape preferences that may lead them to prioritize climate action, possibly even at the expense of shareholders (at the extreme, potentially worse performance). The latter possibility raises important governance concerns, as directors have a fiduciary duty to act in shareholders' best interests.

To test whether having more DADEs on the board improves or hurts shareholder value, we use our baseline regression framework, replacing the emissions variables with metrics of financial and operational performance. As measures of performance, we consider firm value measured by Tobin's Q, profitability measured by return on assets, asset growth, sales growth, and corporate investment defined as capital expenditures scaled by lagged assets.

[Table 13 about here]

The results are presented in Table 13. In all regressions and for all performance measures, the coefficient on the DADE variable is economically and statistically insignificant. This indicates that DADEs do not necessarily rely on past experiences to inform themselves on financially material climate risks. However, the results also suggest that boards with DADEs remain mindful of their duties to shareholders, and do not reduce emissions blindly at the expense of shareholders. Overall, our findings are consistent with past disaster experiences inducing directors to pareto optimize the "double bottom line" of shareholder value and prosocial values.

4.4. Exogenous director turnovers

Our results thus far include a rich array of evidence on the role of DADEs and the economic channel of their influence on firms. In this section, we conduct an additional test that serves as a robustness check for a limited sample where we can identify an exogenous source of variation to the representation of DADEs on company boards. This source of variation comes from the death of directors, which has been used throughout the literature to study the impact of directors on the performance of firms (see Nguyen and Nielsen, 2010; Falato, Kadyrzhanova, and Lel, 2014; Masulis and Zhang, 2019). Presumably, changes in board composition due to director deaths are unlikely to be driven by endogenous selection by management or director characteristics that may be correlated with the firm's climate policies.

To implement our identification strategy, we first construct a matched sample consisting of "treated" firms that experience a loss of DADEs due to director deaths during our sample period and "matched" control firms that do not (i.e., "never-treated" firms). For each treated firm, we identify a matched firm in the same industry with the closest propensity score as of the year prior to the death-induced DADE turnover year (i.e., the event year). Propensity scores are estimated from a logistic regression of treatment status on observable firm characteristics including firm size, debt, Tobin's Q, ROA, and board size. We then stack treated and matched firms within each matching cohort over the years –5 to +5 with respect to the exogenous turnover event year (or pseudo-event year for the matched firm). For this sample, we then estimate the following difference-in-differences (DID) regression specification:

$$Emission\ Int_{i,t} = \beta \cdot DADE\ Death_i \times Post_{t,c} + \lambda \cdot Controls_{i,t-1} + \alpha_{i,c} + \alpha_{t,c} + \epsilon_{i,t} \qquad (3)$$

where i, t, and c each denote firm, year, and matching cohort. The dependent variable is *Emission Intensity*$_{i,t}$, which is the logarithm of the firm's scope 1 and 2 GHG emissions scaled by the firm's sales. *DADE Death*$_i$ is a cross-sectional indicator variable that equals one if the firm is treated by an exogenous DADE turnover due to director death during our sample period and zero otherwise. $Post_{t,c}$ is an indicator variable indicating years after the exogenous turnover event (or pseudo-event for matched firms). Treated and matched firms in the same matching cohort share *Post* as a common variable. We include the same set of firm characteristics as controls. Additionally, we control for firm and year fixed effects, both interacted with matching

cohort fixed effects. Effectively, this configuration facilitates comparisons between each treated and matched firm in the same matching pair over the years –5 to +5 around a turnover event.

This stacked DID strategy helps account for several econometric issues, such as observable differences in firm characteristics between treated and control firms and biases arising from time-varying treatment effects in staggered DID settings (see Goodman-Bacon, 2021; Baker, Larcker, and Wang, 2022). The key coefficient is on the interaction term, $DADE\ Death_i \times Post_{t,c}$, which tests whether treated firms exhibit differential changes in their emissions after losing a DADE due to their death, compared to matched firms.

[Table 14 about here]

The results are shown in Table 14. Understandably, this analysis limits our sample to firms that experience the death of a DADE and an equivalent number of matched firms (i.e., 204 treated and matched firms combined). Despite the smaller sample size, the DID estimates indicate a sizeable and statistically significant increase in emission intensity for firms that lose DADEs. For scope 1 emissions, the effect amounts to a 16% greater increase in emission intensity for treated firms compared to matched firms (see column 1). The effect is highly significant at the 1% level. This result indicates that firms become substantially less likely to take climate-action in the absence of DADEs with prosocial preferences.

For scope 1 and 2 emissions combined, the effect is smaller and insignificant (see column 2). Upon closer inspection, this is primarily due to firms with larger scope 2 emissions relative to their scope 1 emissions. After capping the combined value of scope 1 and 2 emissions at twice the value of scope 1 emissions, we find that exogenous DADE turnovers are indeed followed by increases in emission intensity. These results indicate that a DADE death may have a stronger impact on the firm's scope 1 emissions but not on its scope 2 emissions, which are determined by energy supply contracts that were likely put in place before the DADE's death.

These results support a causal interpretation of the role of DADEs on the firm's climate policy. Moreover, the effect of DADE departures also helps rule out a pure information channel where DADEs may help update the firm's understanding of material climate risks. If a DADE had brought such information into the firm in the first place, it is unlikely that this information would be lost after their departure as it would have been diffused across the firm. Therefore, this

setting further supports our interpretation that DADEs influence firms' climate policies primarily via their prosocial preferences.

5. Conclusion

In this paper, we examine whether corporate directors' formative experiences with abnormally severe natural disasters shape their prosocial preferences and, in turn, influence corporate climate policies. We hypothesize that such salient, past experiences imprint durable values on directors—specifically, a heightened sense of prosocial responsibility—that manifest in boardroom decisions regarding climate policy.

We document that corporate Directors with Abnormal Disaster Experiences (DADEs) significantly influence corporate climate policies. DADEs are significantly more likely to be affiliated with nonprofit organizations, consistent with stronger prosocial preferences. Firms with boards consisting of more DADEs exhibit reduced scope 1 and 2 GHG emission intensities and are more likely to implement comprehensive climate policies, such as board oversight of climate issues, explicit emission targets, and management climate incentives.

Importantly, we provide robust evidence that these effects are driven by the accumulation of past experiences, not recent climate shocks, and persist even when controlling for managerial influence or shifts in public attention to climate change. The results are stronger for DADEs who serve on governance, audit, or ESG committees than for those who serve on compensation, finance, or risk committees. At the same time, the results are driven more by independent directors and are unlikely to be driven by managerial influences on the board.

Furthermore, the effects of DADEs are driven by the salience of their past experiences and are more pronounced among high-emission and large firms, underlining the potential for these directors to target impactful changes in corporate emissions. However, DADEs do not cause boards to sacrifice firm performance, consistent with a pareto optimization of shareholder value and prosocial values. Finally, using director deaths as plausibly exogenous shocks to board composition, we show that the departure of a DADE results in higher firm emissions, offering causal support for the influence of personal values on corporate policy.

Our findings contribute to better understanding the economic consequences of early-life experiences (see, e.g., Malmendier and Nagel, 2011; 2016), by showing that formative experiences shape not only managerial behavior but also collective governance outcomes through board composition. We also add to the climate finance literature by differentiating between value-driven and values-driven motivations for corporate environmental action (see Starks, 2023), offering new evidence that personal preferences can shape firm-level sustainability policies. Moreover, we advance the corporate governance literature by identifying a novel form of director expertise—life experiences with natural disasters—that has material implications for firm behavior, particularly in large and high-emission firms where such influence is most impactful.

Taken together, our results suggest that directors' personal histories can complement traditional notions of board independence and expertise in shaping firm strategy. These insights have implications for investors, policymakers, and nominating committees aiming to align governance structures with sustainability objectives. More broadly, our findings call for a reevaluation of how non-financial traits and lived experiences of directors can contribute to long-term firm outcomes, particularly in the context of ESG strategy and climate risk management.

Appendix

Table A1. Variable Descriptions

This table provides definitions for key variables used throughout our analysis and their data sources.

Variable	Definition	Data Source
I(DADE)	Dummy variable indicating whether a director is a DADE	BoardEx + SHELDUS
DADE	Number of directors currently serving on the firm's board who had experienced abnormally devastating natural disasters (defined as causing damages >$1 billion) in previous years while they were employed by different firms	BoardEx + SHELDUS
DADE_Comm	Number of DADEs who also currently serve on any or one of the following board committees: governance, audit, ESG/sustainability, compensation, finance, or risk	BoardEx + SHELDUS
DADE_NonComm	Number of DADEs who do not serve on the corresponding board committee	BoardEx + SHELDUS
DADE_Gender	Number of DADEs whose gender are male or female	BoardEx + SHELDUS
DADE_Indep	Number of DADEs who are independent directors	BoardEx + SHELDUS
DADE_NonIndep	Number of DADEs who are not independent directors	BoardEx + SHELDUS
CEO Influence	Dummy variable indicating the characteristic of the CEO (i.e., whether the CEO is Board Chair, or whether the CEO is a DADE)	BoardEx
DADE_Window	Number of directors on a company's board that have experienced disasters over one of the three past experience windows: past 20 years, past 10 years, or past 5 years	BoardEx + SHELDUS
DADE_Damage	Number of directors on the company's board that had experienced past disasters belonging to one of three damage groups: $1–5 billion, $0.5–1 billion, and $0.1–0.5 billion.	BoardEx + SHELDUS
I(Charitable)	Dummy variable indicating whether a director is associated with a nonprofit charitable organization	BoardEx
DADE Death × Post	Interaction term between a cross-sectional dummy variable, *DADE Death,* indicating whether a firm exogenously loses a DADE during our sample period without replacement due to the death of the director, and *Post*, an indicator variable equal to one for years after the exogenous turnover event (or pseudo-event for matched firms)	BoardEx + SHELDUS and Compustat

Scope 1 Emission Intensity	CO_2 emissions produced directly from sources that are controlled or owned by the firm (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles, etc.), divided by firm sales	Trucost
Scope 1+2 Emission Intensity	Scope 1 emissions, plus scope 2 emissions associated with the purchase of electricity, steam, heat, or cooling, divided by firm sales	Trucost
Board Climate Authority	Dummy variable indicating whether the board has the highest responsibility on the firm's climate policy	CDP
Emission Targets	Dummy variable indicating whether the firm has formal emission targets or reduction initiatives in place	CDP
Managerial Climate Incentives	Dummy variable indicating whether the firm provides managerial incentives related to climate performance	CDP
AfterParis	Dummy variable equal to one for years 2017 or after, and zero for years 2014 or before	
Board Size	Number of directors on the company's board	BoardEx
(Director) Age	Age of director	BoardEx
Average (Director) Age	Average age of directors on the company's board	BoardEx
(Dir. Past Board) Experience	Number of a director's past board affiliations	BoardEx
Average (Board) Experience	Average past board experience of directors on the company's board	BoardEx
Assets	Total assets (at)	Compustat
Debt/Assets	Short-term (dlc) and long-term debt (dltt), divided by total assets (at)	Compustat
Long-Term Debt/Assets	Long term debt (dltt), divided by total assets (at)	Compustat
Return on Assets (ROA)	Earnings before extraordinary items (ib), divided by lagged assets (at)	Compustat
Tobin's Q	Market value of assets (at + csho × prccf – ceq – txdb) divided by book value of assets (at)	Compustat
Asset Growth	Year-on-year growth rate of firm assets (at)	Compustat
Sales Growth	Year-on-year growth rate of firm sales (sale)	Compustat
Investment	Capital expenditures (capx) divided by lagged book value of assets (at)	Compustat

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Figure 1. Directors with Abnormal Disaster Experience Over Time

These figures illustrate the average within-firm growth trend of Directors with Abnormal Disaster Experience (DADE) on corporate boards. The figures plot the coefficients on year dummy variables from regressing the logarithm of DADE (left) or the share of DADEs on the board (right) on yearly time dummies and firm fixed effects. 90% confidence bands are plotted based on standard errors adjusted for clustering at the firm-level as gray areas surrounding the point estimates. Denoted under the year axis are the variables' cross-sectional mean values as of 2003, the omitted year category.

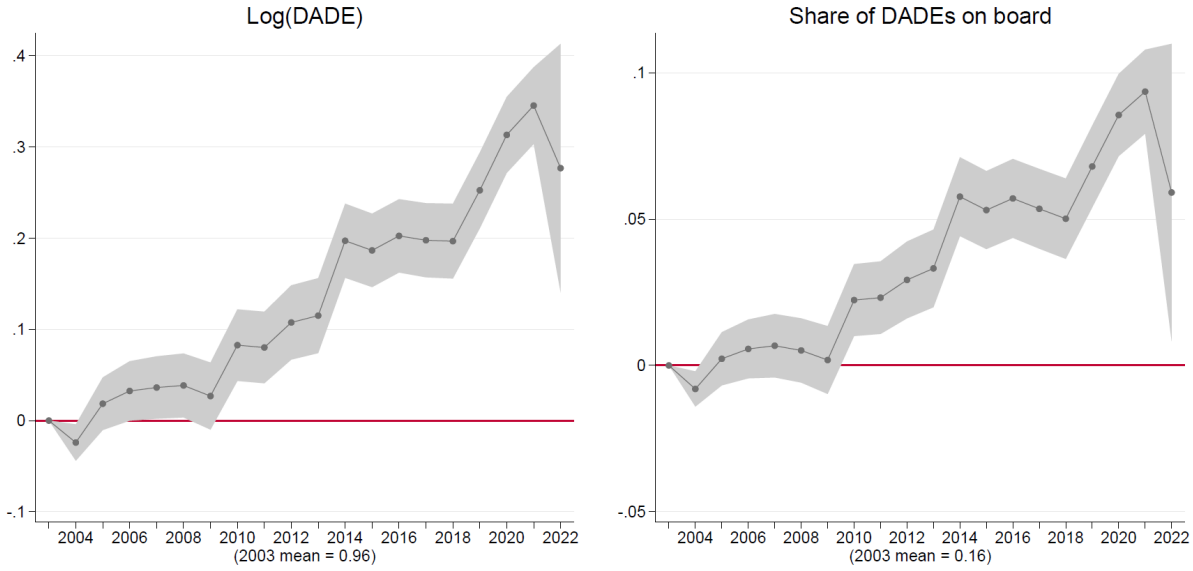


Table 1. Top 25 Abnormal Natural Disasters

This table lists the top 25 abnormal natural disasters experienced by our sample of corporate directors, in terms of their property and crop damage in 2022 U.S. dollars. The table lists the disasters chronologically, and reports the type of natural hazard, the year and month of occurrence, the U.S. state and county that was impacted, total property and crop damages in 2022 dollars ($ billion), number of fatalities during the event, and the duration of the disaster in days.

Hazard	Year /Month	State	County	Damages ($ billion)	Fatalities	Duration
Hurricane/Tropical Storm	1992/8	Florida	Broward	13.1	3.75	1
Hurricane/Tropical Storm	1992/8	Florida	Collier	13.1	3.75	1
Flooding	1997/4	N. Dakota	Grand Forks	5.3	0	6
Hurricane/Tropical Storm	2001/6	Texas	Harris	8.0	22	5
Hurricane/Tropical Storm	2004/9	Alabama	Mobile	3.8	0	4
Hurricane/Tropical Storm	2004/9	Florida	St. Lucie	3.8	0	2
Hurricane/Tropical Storm	2005/8	Mississippi	Harrison	4.3	97	2
Flooding	2005/8	Mississippi	Harrison	8.2	0	1
Hurricane/Tropical Storm	2005/8	Louisiana	Orleans	5.2	638	2
Flooding	2005/8	Louisiana	Orleans	25.9	0	1
Hurricane/Tropical Storm	2005/8	Louisiana	St.Tammany	3.7	2	2
Flooding	2005/8	Louisiana	St.Tammany	4.4	0	1
Hurricane/Tropical Storm	2005/10	Florida	Palm Beach	14.5	1	1
Flooding	2008/9	Texas	Galveston	5.3	12	3
Flooding	2008/9	Texas	Harris	3.9	0	3
Hail	2010/10	Arizona	Maricopa	3.6	0	1
Flooding	2012/10	New Jersey	Monmouth	12.3	0	2
Flooding	2017/8	Texas	Fort Bend	9.1	3	4
Flooding	2017/8	Texas	Galveston	11.3	3	5
Flooding	2017/8	Texas	Harris	11.3	36	4
Flooding	2017/8	Texas	Montgomery	7.9	3	4
Wildfire	2018/11	California	Butte	6.4	86	18
Wildfire	2018/11	California	Shasta	6.4	0	18
Hurricane/Tropical Storm	2020/8	Louisiana	Calcasieu	6.5	1	2
Hurricane/Tropical Storm	2022/9	Florida	Lee	7.0	60	1

Table 2. Summary Statistics of Firms

This table provides select descriptive statistics for the key variables in our analysis. The sample consists of an unbalanced panel of 2,636 firms and 16,354 firm-years in total over the period from 2003 to 2022. Panel A reports the number of firm-years, mean, standard deviation, and select percentile data for the key variables used in the analysis. Panel B reports the correlation matrix for these key variables. All variables are defined in Appendix Table A1.

Panel A. Key Variable Statistics

Variable	N	Mean	St. Dev.	25%	50%	75%
DADE	16,354	1.80	0.48	1.00	2.00	3.00
DADE/Board Size	16,354	0.21	0.14	0.10	0.15	0.25
Scope 1 Intensity (metric ton per dollar)	16,354	20.42	6.13	4.56	14.65	45.80
Scope 1+2 Intensity (metric ton per dollar)	16,354	49.15	4.24	16.17	40.78	102.49
Board Climate Authority	1,848	0.66	0.47	0.00	1.00	1.00
Emission Targets	1,848	0.75	0.43	1.00	1.00	1.00
Managerial Climate Incentives	1,848	0.72	0.45	0.00	1.00	1.00
Board Size	16,354	10.02	1.30	9.00	10.00	12.00
Average Director Age	16,354	63.12	0.09	60.20	63.67	66.86
Average Director Past Board Experience	16,267	7.17	0.59	5.13	7.25	10.00
Assets ($ billion)	16,354	19.73	52.71	1.37	4.26	13.78
Debt/Assets	16,354	0.29	0.22	0.11	0.26	0.42
Long-Term Debt/Assets	16,294	0.26	0.21	0.09	0.23	0.38
Return on Assets (ROA)	16,208	0.02	0.12	0.01	0.03	0.08
Tobin's Q	16,354	1.99	1.45	1.10	1.47	2.24

(continued)

Table 2. Summary Statistics of Firms (continued)

Panel B. Correlations

	DADE	DADE/ BrdSize	Scope 1	Scope 1+2	Board Climate	Emission Targets	Climate Incent.	Board Size	Avg. Age	Avg. Exp.	Assets	Debt	LTDebt	ROA	Tobin's Q
DADE	1.00														
DADE/Board Size	0.92	1.00													
Scope 1 Intensity	0.18	0.21	1.00												
Scope 1+2 Intensity	0.19	0.21	0.96	1.00											
Board Climate Auth.	0.14	0.09	0.10	0.11	1.00										
Emission Targets	0.09	0.04	0.02	0.03	0.63	1.00									
Manag. Climate Inc.	0.10	0.02	0.02	0.04	0.57	0.66	1.00								
Board Size	0.17	-0.11	0.01	-0.01	0.18	0.18	0.24	1.00							
Average Dir. Age	0.02	0.00	0.05	0.03	0.10	0.05	0.05	0.09	1.00						
Average Board Exp.	0.05	0.02	-0.14	-0.11	0.00	0.05	0.02	0.09	0.21	1.00					
Assets	0.09	-0.02	-0.24	-0.22	0.11	0.14	0.17	0.33	0.08	0.19	1.00				
Debt/AT	-0.01	0.00	0.28	0.30	0.11	0.06	0.00	-0.08	0.01	-0.09	-0.23	1.00			
Long-Term Debt/AT	-0.01	0.01	0.30	0.32	0.09	0.04	-0.01	-0.10	0.01	-0.08	-0.30	0.96	1.00		
ROA	-0.08	-0.09	-0.15	-0.16	0.05	0.10	0.12	0.03	0.02	-0.08	-0.15	-0.09	-0.08	1.00	
Tobin's Q	-0.06	-0.05	-0.22	-0.22	-0.04	0.03	0.04	-0.08	-0.07	-0.04	-0.23	0.02	0.02	0.56	1.00

Table 3. Director's Abnormal Disaster Experience and Charitable Affiliation

This table reports the results from OLS regressions of an indicator variable indicating whether a director is associated with a nonprofit charitable organization in a given year (i.e., ***I***(Charitable)), on an indicator variable indicating whether the director had experienced an abnormal natural disaster in the past (i.e., ***I***(DADE)), controlling for other director characteristics. Alternatively, we regress on ***I***(DADE_20Y), ***I***(DADE_10Y), and ***I***(DADE_5Y), each indicating whether the director experienced an abnormal disaster within the past 20 years, 10 years, and 5 years, respectively. The sample period is from 1999 to 2024. DADE is defined as a director who had previously experienced a climatic natural disaster that caused damages exceeding $1 billion in 2022 dollars. All other variables are defined in Appendix Table A1. We include director and year fixed effects. *T*-statistics are reported in parentheses. Standard errors are clustered at the director level. *** (**) {*} denote significance at the 1% (5%) {10%} level.

	Dependent Variable: ***I***(Charitable)				
	(1)	(2)	(3)	(4)	(5)
I(DADE)	0.022**	0.021**			
	(0.009)	(0.009)			
I(DADE_20Y)			0.015*		
			(0.008)		
I(DADE_10Y)				0.007	
				(0.006)	
I(DADE_5Y)					0.002
					(0.005)
Log(Age)		0.512**	0.513**	0.514**	0.517**
		(0.207)	(0.207)	(0.207)	(0.207)
Log(Experience)		0.001	0.001	0.002	0.002
		(0.007)	(0.007)	(0.007)	(0.007)
Observations	124,924	124,797	124,797	124,797	124,797
Director FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.564	0.565	0.565	0.565	0.565

Table 4. Directors with Abnormal Disaster Experience and Corporate Emission Intensity

This table reports the results from OLS regressions of Scope 1 or Scope 1 and 2 emission intensities on the number of Directors with Abnormal Disaster Experience (DADE) serving on the company's board, controlling for other firm characteristics. The sample period is from 2003 to 2022. Emission intensities are CO_2 equivalents in metric tons divided by the company's dollar sales. DADE is defined as a director who had previously experienced a climatic natural disaster that caused damages exceeding $1 billion in 2022 dollars while working for a different firm. Log(DADE) is the logarithm of the number of DADEs on a firm's board. DADE/Board Size is the number of DADEs scaled by board size. All other variables are defined in Appendix Table A1. We include firm and industry-by-year fixed effects, where industry is defined at the historical 4-digit SIC level. *T*-statistics are reported in parentheses. Standard errors are clustered at the firm level. *** (**) {*} denote significance at the 1% (5%) {10%} level.

	Dependent Variable: Emission Intensity			
	Scope 1	Scope 1+2	Scope 1	Scope 1+2
	(1)	(2)	(3)	(4)
Log(DADE)	-0.086**	-0.120***		
	(0.036)	(0.035)		
DADE/Board Size			-0.256**	-0.336***
			(0.107)	(0.103)
Size	0.026	0.023	0.026	0.023
	(0.022)	(0.023)	(0.022)	(0.023)
Debt	-0.086	-0.048	-0.086	-0.049
	(0.064)	(0.063)	(0.064)	(0.063)
Tobin's Q	0.010	-0.018*	0.010	-0.018*
	(0.009)	(0.009)	(0.009)	(0.009)
ROA	0.006	-0.069	0.005	-0.069
	(0.071)	(0.061)	(0.071)	(0.061)
Log(Board Size)	0.046	0.093**	-0.006	0.022
	(0.048)	(0.044)	(0.047)	(0.043)
Log(Avg. Age)	-0.009	-0.033	-0.012	-0.037
	(0.190)	(0.184)	(0.189)	(0.184)
Log(Avg. Experience)	0.004	0.023	0.004	0.023
	(0.038)	(0.036)	(0.038)	(0.036)
Observations	13,695	13,695	13,695	13,695
Firm FE	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes
Adj R^2	0.965	0.959	0.965	0.959

Table 5. Directors with Abnormal Disaster Experience and Corporate Climate Policies

This table reports the results from linear probability regressions estimating the likelihood that a firm has a select climate policy as a function of Directors with Abnormal Disaster Experience (DADE), controlling for other firm characteristics. The sample period is from 2003 to 2022. The outcome variable is an indicator variable indicating the existence of one of the following corporate climate policies: Board Climate Authority, indicating that the board has the highest responsibility on the firm's climate policies; Emission Targets, indicating that the firm has emission targets or reduction initiatives; or Managerial Climate Incentives, indicating that the firm gives management climate-related incentives. DADE is defined as a director who had previously experienced a climatic natural disaster that caused damages exceeding $1 billion in 2022 dollars while working for a different firm. Odd numbered columns report the results using Log(DADE). Even numbered columns report the results using DADE/Board size. All other variables are defined in Appendix Table A1. We include firm and industry-by-year fixed effects, where industry is defined at the historical 4-digit SIC level. *T*-statistics are reported in parentheses. Standard errors are clustered at the firm level. *** (**) {*} denote significance at the 1% (5%) {10%} level.

	Dependent Variable:					
	Board Climate Authority		Emission Targets		Managerial Climate Incentives	
	(1)	(2)	(3)	(4)	(5)	(6)
Log(DADE)	0.188***		0.100		0.152**	
	(0.062)		(0.063)		(0.075)	
DADE/Board Size		0.579***		0.320*		0.412*
		(0.179)		(0.192)		(0.229)
Size	0.096***	0.096***	0.116***	0.116***	0.111***	0.111***
	(0.030)	(0.030)	(0.031)	(0.031)	(0.031)	(0.031)
Debt	0.174	0.170	0.273	0.271	0.200	0.193
	(0.193)	(0.192)	(0.200)	(0.199)	(0.223)	(0.224)
Tobin's Q	-0.012	-0.011	0.000	0.000	0.017	0.017
	(0.021)	(0.021)	(0.024)	(0.024)	(0.028)	(0.028)
ROA	0.430	0.403	0.661*	0.649	0.776	0.745
	(0.311)	(0.310)	(0.396)	(0.400)	(0.509)	(0.510)
Log(Board Size)	0.230	0.350**	0.155	0.221	0.313**	0.402***
	(0.154)	(0.149)	(0.153)	(0.148)	(0.151)	(0.150)
Log(Avg. Age)	-0.020	-0.016	-0.112	-0.111	-0.037	-0.031
	(0.458)	(0.459)	(0.453)	(0.453)	(0.510)	(0.513)
Log(Avg. Experience)	0.008	0.007	0.058	0.057	-0.038	-0.038
	(0.072)	(0.072)	(0.080)	(0.079)	(0.079)	(0.079)
Observations	1,162	1,162	1,162	1,162	1,162	1,162
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.209	0.209	0.136	0.136	0.150	0.146

Table 6. Influence of Directors

This table reports the results from OLS regressions of Scope 1 and 2 emission intensities on the number of Directors with Abnormal Disaster Experience (DADE) with varying committee roles (Panels A and B) and gender (Panel C). The sample period is from 2003 to 2022. Emission intensities are CO_2 equivalents in metric tons divided by the company's dollar sales. In Panel A, DADE_Comm is the number of DADEs who currently serve on any of the following committees: governance, audit, ESG/sustainability, compensation, finance, or risk. DADE_NonComm is the number of DADEs who do not currently serve on any of these committees. In Panel B, DADE_Comm and DADE_NonComm are defined separately for each of the six committee types. In Panel C, DADE_Gender is the number of DADEs whose gender are male (columns 1 and 2) or female (columns 3 and 4). All other variables are defined in Appendix Table A1. We include firm and industry-by-year fixed effects, where industry is defined at the historical 4-digit SIC level. *T*-statistics are reported in parentheses. Standard errors are clustered at the firm level. *** (**) {*} denote significance at the 1% (5%) {10%} level.

Panel A. Committee vs. Non-Committee

	Dependent Variable: Scope 1+2 Emission Intensity			
	(1)	(2)	(3)	(4)
Log(DADE_Comm)	-0.065**			
	(0.027)			
DADE_Comm/Board Size		-0.269***		
		(0.100)		
Log(DADE_NonComm)			-0.031	
			(0.024)	
DADE_NonComm/Board Size				-0.175
				(0.133)
Size	0.025	0.024	0.022	0.021
	(0.023)	(0.023)	(0.023)	(0.023)
Debt	-0.053	-0.054	-0.051	-0.051
	(0.063)	(0.063)	(0.064)	(0.064)
Tobin's Q	-0.017*	-0.017*	-0.017*	-0.017*
	(0.009)	(0.009)	(0.009)	(0.009)
ROA	-0.066	-0.067	-0.073	-0.073
	(0.061)	(0.061)	(0.062)	(0.062)
Log(Board Size)	0.066	0.028	0.046	0.039
	(0.043)	(0.043)	(0.043)	(0.042)
Log(Avg. Age)	-0.007	-0.010	-0.038	-0.039
	(0.185)	(0.184)	(0.183)	(0.183)
Log(Avg. Experience)	0.020	0.021	0.014	0.014
	(0.036)	(0.036)	(0.036)	(0.036)
Observations	13,695	13,695	13,695	13,695
Firm FE	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes
Adj R^2	0.959	0.959	0.959	0.959

(continued)

Table 6. Influence of Directors (continued)

Panel B. Subcommittees

	Dependent Variable: Scope 1+2 Emission Intensity											
Subcommittee:	Governance		Auditing		ESG or Sustainability		Compensation		Finance		Risk	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log(DADE_Comm)	-0.045*		-0.054**		-0.149**		-0.031		-0.022		-0.032	
	(0.024)		(0.024)		(0.071)		(0.027)		(0.033)		(0.047)	
DADE_Comm/Board Size		-0.210*		-0.302***		-0.777**		-0.171		-0.129		-0.119
		(0.119)		(0.115)		(0.384)		(0.127)		(0.192)		(0.268)
Size	0.024	0.024	0.024	0.024	0.024	0.025	0.022	0.023	0.023	0.023	0.023	0.023
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Debt	-0.056	-0.056	-0.053	-0.054	-0.057	-0.054	-0.055	-0.056	-0.053	-0.053	-0.053	-0.053
	(0.064)	(0.063)	(0.064)	(0.063)	(0.063)	(0.063)	(0.064)	(0.063)	(0.064)	(0.064)	(0.064)	(0.064)
Tobin's Q	-0.017*	-0.017*	-0.017*	-0.017*	-0.017*	-0.017*	-0.017*	-0.017*	-0.017*	-0.017*	-0.017*	-0.017*
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
ROA	-0.069	-0.069	-0.066	-0.065	-0.080	-0.079	-0.069	-0.070	-0.071	-0.070	-0.071	-0.071
	(0.062)	(0.062)	(0.062)	(0.062)	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)
Log(Board Size)	0.051	0.031	0.054	0.028	0.051	0.042	0.048	0.033	0.042	0.039	0.043	0.041
	(0.042)	(0.043)	(0.043)	(0.043)	(0.042)	(0.042)	(0.043)	(0.043)	(0.043)	(0.043)	(0.042)	(0.043)
Log(Avg. Age)	-0.006	-0.008	-0.017	-0.015	-0.031	-0.033	-0.012	-0.012	-0.024	-0.024	-0.024	-0.023
	(0.185)	(0.185)	(0.183)	(0.183)	(0.181)	(0.180)	(0.184)	(0.184)	(0.183)	(0.183)	(0.183)	(0.183)
Log(Avg. Experience)	0.017	0.017	0.018	0.018	0.013	0.013	0.016	0.017	0.015	0.015	0.015	0.015
	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)	(0.037)	(0.036)	(0.036)
Observations	13,695	13,695	13,695	13,695	13,695	13,695	13,695	13,695	13,695	13,695	13,695	13,695
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959

(continued)

Table 6. Influence of Directors (continued)

Panel C. Male vs. Female Directors

	Dependent Variable: Scope 1+2 Emission Intensity			
Gender:	Male		Female	
	(1)	(2)	(3)	(4)
Log(DADE_Gender)	-0.114***		0.003	
	(0.031)		(0.041)	
DADE_Gender/Board Size		-0.381***		-0.056
		(0.112)		(0.258)
Size	0.024	0.023	0.022	0.022
	(0.023)	(0.023)	(0.023)	(0.023)
Debt	-0.051	-0.049	-0.054	-0.054
	(0.063)	(0.063)	(0.064)	(0.064)
Tobin's Q	-0.018*	-0.018**	-0.017*	-0.017*
	(0.009)	(0.009)	(0.009)	(0.009)
ROA	-0.070	-0.069	-0.072	-0.072
	(0.061)	(0.061)	(0.061)	(0.061)
Log(Board Size)	0.091**	0.024	0.040	0.040
	(0.043)	(0.043)	(0.043)	(0.043)
Log(Avg. Age)	-0.011	-0.023	-0.022	-0.025
	(0.185)	(0.184)	(0.183)	(0.183)
Log(Avg. Experience)	0.027	0.026	0.014	0.014
	(0.036)	(0.036)	(0.036)	(0.036)
Observations	13,695	13,695	13,695	13,695
Firm FE	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes
Adj R^2	0.959	0.959	0.959	0.959

Table 7. Director Independence and CEO Influence

This table reports the results from OLS regressions of Scope 1 and 2 emission intensities on the number of Directors with Abnormal Disaster Experience (DADE) with varying independence (Panel A), or on the number of DADEs interacted with indicators of CEO Influence (Panel B). The sample period is from 2003 to 2022. Emission intensities are CO2 equivalents in metric tons divided by the company's dollar sales. In Panel A, DADE_Indep is the number of DADEs who are independent directors, and DADE_NonIndep is the number of DADEs who are not. In Panel B, CEO Influence is an indicator variable indicating whether the CEO of the firm is also the Board Chairman (columns 1 and 2) or whether the CEO is also a DADE (columns 3 and 4). All other variables are defined in Appendix Table A1. We include firm and industry-by-year fixed effects, where industry is defined at the historical 4-digit SIC level. T-statistics are reported in parentheses. Standard errors are clustered at the firm level. *** (**) {*} denote significance at the 1% (5%) {10%} level.

Panel A. DADE Independence

	Dependent Variable: Scope 1+2 Emission Intensity			
	(1)	(2)	(3)	(4)
Log(DADE_Indep)	-0.096***			
	(0.036)			
DADE_Indep/Board Size		-0.323***		
		(0.109)		
Log(DADE_NonIndep)			-0.063*	
			(0.038)	
DADE_NonIndep/Board Size				-0.314
				(0.231)
Size	0.023	0.022	0.023	0.023
	(0.023)	(0.023)	(0.023)	(0.023)
Debt	-0.051	-0.050	-0.052	-0.053
	(0.063)	(0.063)	(0.064)	(0.064)
Tobin's Q	-0.017*	-0.018*	-0.017*	-0.017*
	(0.009)	(0.009)	(0.009)	(0.009)
ROA	-0.064	-0.065	-0.076	-0.075
	(0.061)	(0.061)	(0.061)	(0.061)
Log(Board Size)	0.084*	0.026	0.044	0.037
	(0.044)	(0.043)	(0.043)	(0.042)
Log(Avg. Age)	-0.019	-0.023	-0.041	-0.036
	(0.185)	(0.184)	(0.183)	(0.183)
Log(Avg. Experience)	0.024	0.024	0.013	0.012
	(0.036)	(0.036)	(0.036)	(0.036)
Observations	13,695	13,695	13,695	13,695
Firm FE	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes
Adj R^2	0.959	0.959	0.959	0.959

(continued)

Table 7. Director Independence and CEO Influence (continued)

Panel B. CEO Influence

	Dependent Variable: Scope 1+2 Emission Intensity			
CEO Influence:	Board Chair CEO		DADE CEO	
	(1)	(2)	(3)	(4)
Log(DADE) × CEO Influence	-0.124*		-0.024	
	(0.065)		(0.084)	
Log(DADE)	-0.095***		-0.106***	
	(0.035)		(0.037)	
DADE/Board Size × CEO Influence		-0.263*		0.047
		(0.155)		(0.182)
DADE/Board Size		-0.267**		-0.319***
		(0.104)		(0.116)
CEO Influence	0.144	0.060	-0.005	-0.051
	(0.089)	(0.055)	(0.120)	(0.064)
Size	0.023	0.022	0.023	0.023
	(0.023)	(0.023)	(0.023)	(0.023)
Debt	-0.049	-0.049	-0.047	-0.048
	(0.063)	(0.063)	(0.063)	(0.063)
Tobin's Q	-0.018*	-0.018*	-0.018*	-0.018*
	(0.009)	(0.009)	(0.009)	(0.009)
ROA	-0.069	-0.070	-0.073	-0.073
	(0.061)	(0.061)	(0.061)	(0.061)
Log(Board Size)	0.091**	0.023	0.088**	0.022
	(0.045)	(0.043)	(0.045)	(0.043)
Log(Avg. Age)	-0.016	-0.025	-0.045	-0.048
	(0.184)	(0.184)	(0.185)	(0.185)
Log(Avg. Experience)	0.023	0.022	0.021	0.021
	(0.036)	(0.036)	(0.036)	(0.036)
Observations	13,695	13,695	13,695	13,695
Firm FE	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes
Adj R^2	0.959	0.959	0.959	0.959

Table 8. Accumulated vs. Recent Experience

This table reports the results from OLS regressions of Scope 1 and 2 emission intensities on the number of Directors with Abnormal Disaster Experience (DADE) who have accumulated past abnormal disaster experience over varying window periods throughout their careers. The sample period is from 2003 to 2022. Emission intensities are CO_2 equivalents in metric tons divided by the company's dollar sales. DADE_Window is the number of DADEs who had experienced disasters within the past 20 years (columns 1 and 2), past 10 years (columns 3 and 4), or past 5 years (columns 5 and 6). All other variables are defined in Appendix Table A1. We include firm and industry-by-year fixed effects, where industry is defined at the historical 4-digit SIC level. *T*-statistics are reported in parentheses. Standard errors are clustered at the firm level. *** (**) {*} denote significance at the 1% (5%) {10%} level.

	Dependent Variable: Scope 1+2 Emission Intensity					
Experience Window:	Past 20 Years		Past 10 Years		Past 5 Years	
	(1)	(2)	(3)	(4)	(5)	(6)
Log(DADE_Window)	-0.130***		-0.083***		-0.052***	
	(0.037)		(0.029)		(0.017)	
DADE_Window/Board Size		-0.359***		-0.313***		-0.200**
		(0.105)		(0.107)		(0.079)
Size	0.023	0.023	0.022	0.022	0.021	0.021
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Debt	-0.047	-0.048	-0.046	-0.046	-0.052	-0.052
	(0.063)	(0.063)	(0.063)	(0.063)	(0.063)	(0.063)
Tobin's Q	-0.018*	-0.018*	-0.018*	-0.018*	-0.017*	-0.017*
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
ROA	-0.068	-0.070	-0.065	-0.069	-0.069	-0.071
	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)
Log(Board Size)	0.095**	0.020	0.073*	0.029	0.055	0.036
	(0.044)	(0.043)	(0.043)	(0.043)	(0.042)	(0.043)
Log(Avg. Age)	-0.054	-0.052	-0.064	-0.066	-0.063	-0.056
	(0.182)	(0.183)	(0.181)	(0.182)	(0.179)	(0.180)
Log(Avg. Experience)	0.026	0.025	0.021	0.021	0.019	0.018
	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)
Observations	13,695	13,695	13,695	13,695	13,695	13,695
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.959	0.959	0.959	0.959	0.959	0.959

Table 9. Smaller Disasters

This table reports the results from OLS regressions of Scope 1 and 2 emission intensities on the number of Directors with Abnormal Disaster Experience (DADE) who have past experiences of natural disasters that caused varying degrees of property and crop damage. The sample period is from 2003 to 2022. Emission intensities are CO_2 equivalents in metric tons divided by the company's dollar sales. DADE_Damage is the number of DADEs who had experienced disasters that caused damages of $1–5 billion (columns 1 and 2), $0.5–1 billion (columns 3 and 4), or $0.1–0.5 billion (columns 5 and 6), in 2022 dollars. All other variables are defined in Appendix Table A1. We include firm and industry-by-year fixed effects, where industry is defined at the historical 4-digit SIC level. *T*-statistics are reported in parentheses. Standard errors are clustered at the firm level. *** (**) {*} denote significance at the 1% (5%) {10%} level.

	Dependent Variable: Scope 1+2 Emission Intensity					
Damage (in 2022 US Dollars):	$ 1 – 5 billion		$ 0.5 – 1 billion		$ 0.1 – 0.5 billion	
	(1)	(2)	(3)	(4)	(5)	(6)
Log(DADE_Damage)	-0.082***		0.028		0.038	
	(0.027)		(0.043)		(0.039)	
DADE_Damage/Board Size		-0.304***		0.295		0.099
		(0.097)		(0.285)		(0.102)
Size	0.024	0.024	0.023	0.022	0.022	0.022
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Debt	-0.049	-0.049	-0.054	-0.055	-0.054	-0.055
	(0.063)	(0.063)	(0.064)	(0.064)	(0.064)	(0.064)
Tobin's Q	-0.018*	-0.018*	-0.017*	-0.017*	-0.017*	-0.017*
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
ROA	-0.071	-0.070	-0.071	-0.072	-0.071	-0.070
	(0.062)	(0.061)	(0.062)	(0.062)	(0.062)	(0.062)
Log(Board Size)	0.072	0.023	0.031	0.043	0.013	0.044
	(0.043)	(0.043)	(0.047)	(0.042)	(0.053)	(0.042)
Log(Avg. Age)	-0.042	-0.038	-0.029	-0.036	-0.025	-0.022
	(0.184)	(0.183)	(0.180)	(0.179)	(0.182)	(0.183)
Log(Avg. Experience)	0.022	0.023	0.013	0.011	0.014	0.014
	(0.036)	(0.036)	(0.037)	(0.036)	(0.036)	(0.036)
Observations	13,695	13,695	13,695	13,695	13,695	13,695
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.959	0.959	0.959	0.959	0.959	0.959

Table 10. High-Emission vs. Low-Emission Subsamples

This table reports the results from OLS regressions of Scope 1 and 2 emission intensities on the number of DADEs for subsamples consisting of high- and low-emission industries (columns 1 to 4) and firms (columns 5 to 8). The sample period is from 2003 to 2022. Emission intensities are CO_2 equivalents in metric tons divided by the company's dollar sales. DADE is defined as a director who had previously experienced a climatic natural disaster that caused damages exceeding $1 billion in 2022 dollars while working for a different firm. The sample is divided into high- and low-emission industries or firms each year based on the median industry or firm in terms of its lagged scope 1 emission intensity. All other variables are defined in Appendix Table A1. We include firm and industry-by-year fixed effects, where industry is defined at the 4-digit SIC level. *T*-statistics are reported in parentheses. Standard errors are clustered at the firm level. *** (**) {*} denote significance at the 1% (5%) {10%} level.

	Dependent Variable: Scope 1+2 Emission Intensity							
	Industry Subsamples				Firm Subsamples			
	High-Emission		Low-Emission		High-Emission		Low-Emission	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(DADE)	-0.204***		-0.072*		-0.153***		-0.111*	
	(0.065)		(0.042)		(0.052)		(0.059)	
DADE/Board Size		-0.502***		-0.183		-0.409***		-0.355*
		(0.164)		(0.132)		(0.137)		(0.203)
Size	0.024	0.023	0.025	0.024	0.007	0.006	0.034	0.035
	(0.043)	(0.043)	(0.027)	(0.027)	(0.028)	(0.028)	(0.044)	(0.044)
Debt	-0.044	-0.046	-0.038	-0.039	-0.094	-0.092	0.028	0.024
	(0.129)	(0.130)	(0.073)	(0.073)	(0.078)	(0.078)	(0.120)	(0.120)
Tobin's Q	0.019	0.019	-0.022**	-0.022**	-0.002	-0.002	-0.035*	-0.035*
	(0.025)	(0.025)	(0.010)	(0.010)	(0.009)	(0.009)	(0.018)	(0.018)
ROA	-0.120	-0.114	-0.051	-0.052	-0.050	-0.050	0.027	0.023
	(0.140)	(0.139)	(0.067)	(0.067)	(0.078)	(0.077)	(0.103)	(0.103)
Log(Board Size)	0.269***	0.133*	0.014	-0.024	0.155**	0.057	0.001	-0.065
	(0.088)	(0.080)	(0.051)	(0.051)	(0.067)	(0.062)	(0.069)	(0.070)
Log(Avg. Age)	0.400	0.399	-0.230	-0.231	0.281	0.273	-0.301	-0.303
	(0.425)	(0.426)	(0.195)	(0.195)	(0.301)	(0.300)	(0.258)	(0.257)
Log(Avg. Experience)	0.009	0.007	0.018	0.017	0.028	0.028	0.055	0.055
	(0.079)	(0.079)	(0.039)	(0.039)	(0.056)	(0.056)	(0.051)	(0.051)
Observations	4,209	4,209	9,274	9,274	6,443	6,443	5,236	5,236
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.935	0.935	0.914	0.914	0.941	0.941	0.904	0.904

Table 11. Large and Small Firms

This table reports the results from OLS regressions of Scope 1 and 2 emission intensities on the number of Directors with Abnormal Disaster Experience (DADE) for subsamples consisting of large (columns 1 and 2) and small firms (columns 3 and 4). The sample period is from 2003 to 2022. Emission intensities are CO_2 equivalents in metric tons divided by the company's dollar sales. DADE is defined as a director who had previously experienced a climatic natural disaster that caused damages exceeding $1 billion in 2022 dollars while working for a different firm. The sample is divided into large and small firms each year based on the median firm's lagged asset size. All other variables are defined in Appendix Table A1. We include firm and industry-by-year fixed effects, where industry is defined at the historical 4-digit SIC level. *T*-statistics are reported in parentheses. Standard errors are clustered at the firm level. *** (**) {*} denote significance at the 1% (5%) {10%} level.

	Dependent Variable: Scope 1+2 Emission Intensity			
	Larger Firms		Smaller Firms	
	(1)	(2)	(3)	(4)
Log(DADE)	-0.152***		-0.050	
	(0.057)		(0.054)	
DADE/Board Size		-0.357*		-0.232
		(0.185)		(0.159)
Size	0.000	-0.003	0.049**	0.049**
	(0.056)	(0.056)	(0.024)	(0.024)
Debt	-0.092	-0.099	-0.034	-0.033
	(0.189)	(0.191)	(0.067)	(0.067)
Tobin's Q	-0.055**	-0.057**	-0.002	-0.002
	(0.023)	(0.023)	(0.009)	(0.009)
ROA	-0.213	-0.218	-0.056	-0.057
	(0.155)	(0.154)	(0.069)	(0.069)
Log(Board Size)	0.090	0.004	0.063	0.027
	(0.078)	(0.075)	(0.065)	(0.057)
Log(Avg. Age)	-0.124	-0.135	-0.209	-0.221
	(0.337)	(0.336)	(0.207)	(0.206)
Log(Avg. Experience)	-0.018	-0.022	0.061	0.063
	(0.057)	(0.058)	(0.052)	(0.052)
Observations	5,633	5,633	6,424	6,424
Firm FE	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes
Adj R^2	0.971	0.970	0.945	0.945

Table 12. Are the Effects Driven by Recent Trends in Attention to Climate Change?

This table reports the results from OLS regressions of Scope 1 and 2 emission intensities on the number of Directors with Abnormal Disaster Experience (DADE) and its interaction with *AfterParis*, an indicator variable equal to one for years 2017 or later, and zero for years 2017 or before. The sample period is from 2003 to 2022. Emission intensities are CO_2 equivalents in metric tons divided by the company's dollar sales. DADE is defined as a director who had previously experienced a climatic natural disaster that caused damages exceeding $1 billion in 2022 dollars while working for a different firm. We exclude the years 2015 and 2016 from this analysis, as these years were when the Paris Agreement was introduced and signed. All other variables are defined in Appendix Table A1. We include firm and industry-by-year fixed effects, where industry is defined at the historical 4-digit SIC level. *T*-statistics are reported in parentheses. Standard errors are clustered at the firm level. *** (**) {*} denote significance at the 1% (5%) {10%} level.

	Dependent Variable: Scope 1+2 Emission Intensity	
	(1)	(2)
Log(DADE) × AfterParis	0.046	
	(0.065)	
Log(DADE)	-0.150***	
	(0.050)	
DADE/Board Size × AfterParis		0.278
		(0.188)
DADE/Board Size		-0.498***
		(0.147)
Size	0.018	0.016
	(0.026)	(0.026)
Debt	-0.029	-0.028
	(0.067)	(0.067)
Tobin's Q	-0.022**	-0.022**
	(0.010)	(0.010)
ROA	-0.081	-0.082
	(0.067)	(0.066)
Log(Board Size)	0.078*	0.005
	(0.047)	(0.046)
Log(Avg. Age)	-0.065	-0.068
	(0.203)	(0.202)
Log(Avg. Experience)	0.037	0.035
	(0.038)	(0.038)
Observations	11,602	11,602
Firm FE	Yes	Yes
Industry-by-year FE	Yes	Yes
Adj R^2	0.959	0.959

Table 13. Do Directors with Abnormal Disaster Experience Affect Firm Performance?

This table reports the results from OLS regressions of outcome variables related to firm performance on the number of Directors with Abnormal Disaster Experience (DADE). The sample period is from 2003 to 2022. As outcome variables, we examine Firm Value measured by Tobin's Q (columns 1 and 2), Profitability measured by return on assets (columns 3 and 4), Asset Growth (columns 5 and 6), Sales Growth (columns 7 and 8), and Investment defined as capital expenditures divided by lagged assets (columns 9 and 10). DADE is defined as a director who had previously experienced a climatic natural disaster that caused damages exceeding $1 billion in 2022 dollars while working for a different firm. All other variables are defined in Appendix Table A1. We include firm and industry-by-year fixed effects, where industry is defined at the 4-digit SIC level. T-statistics are reported in parentheses. Standard errors are clustered at the firm level. *** (**) {*} denote significance at the 1% (5%) {10%} level.

	Dependent Variable:									
	Firm Value		Profitability		Asset Growth		Sales Growth		Investment	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log(DADE)	0.047		0.001		-0.005		-0.064		0.000	
	(0.045)		(0.005)		(0.017)		(0.056)		(0.003)	
DADE/Board Size		0.101		-0.003		-0.042		-0.156		-0.002
		(0.126)		(0.015)		(0.056)		(0.117)		(0.010)
Size	-0.304***	-0.304***	-0.016**	-0.016**	-0.347***	-0.347***	-0.053	-0.054	-0.020***	-0.020***
	(0.058)	(0.058)	(0.008)	(0.008)	(0.025)	(0.025)	(0.037)	(0.037)	(0.005)	(0.005)
Debt	0.493**	0.494**	0.042	0.042	-0.181***	-0.181***	-0.031	-0.032	-0.027***	-0.027***
	(0.215)	(0.215)	(0.027)	(0.027)	(0.070)	(0.070)	(0.127)	(0.128)	(0.008)	(0.008)
Tobin's Q	0.525***	0.525***	0.024***	0.024***	0.091***	0.091***	0.062***	0.062***	0.007***	0.007***
	(0.042)	(0.042)	(0.004)	(0.004)	(0.011)	(0.011)	(0.013)	(0.013)	(0.001)	(0.001)
ROA	-0.216	-0.215	0.093**	0.093**	0.284***	0.284***	-0.902***	-0.902***	0.014	0.014
	(0.267)	(0.267)	(0.040)	(0.040)	(0.078)	(0.078)	(0.279)	(0.279)	(0.009)	(0.009)
Log(Board Size)	-0.058	-0.032	0.006	0.006	-0.004	-0.009	0.100	0.064	0.001	0.001
	(0.089)	(0.090)	(0.011)	(0.011)	(0.030)	(0.030)	(0.066)	(0.045)	(0.004)	(0.004)
Log(Avg. Age)	0.086	0.087	-0.012	-0.012	0.100	0.099	-0.366**	-0.367**	-0.005	-0.005
	(0.342)	(0.342)	(0.036)	(0.037)	(0.106)	(0.106)	(0.186)	(0.186)	(0.013)	(0.013)
Log(Avg. Experience)	0.040	0.041	0.001	0.001	-0.028	-0.027	-0.014	-0.015	-0.002	-0.002
	(0.057)	(0.057)	(0.006)	(0.006)	(0.022)	(0.022)	(0.022)	(0.022)	(0.003)	(0.003)
Observations	13,652	13,652	13,652	13,652	13,652	13,652	13,652	13,652	13,595	13,595
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-by-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.782	0.782	0.606	0.606	0.332	0.332	0.115	0.115	0.717	0.717

Table 14. Exogenous Director Turnovers

This table reports the results from difference-in-differences (DID) regressions of Scope 1 and 2 emission intensities on a cross-sectional dummy variable, *DADE Death*, indicating whether a firm exogenously loses a DADE during our sample period without replacement due to the death of the director, and its interaction with *Post*, an indicator variable equal to one for years after the exogenous turnover event (or pseudo-event for matched firms). Each treatment firm that experiences a *DADE Death* is matched to a control firm that never experiences such exogenous turnovers belonging to the same industry with the closest propensity score as of the year before the death event. The propensity scores are computed from a logistic regression of *DADE Death* on firm size, debt, Tobin's Q, ROA, and board size. We then stack treatment firms and control firms within each matching cohort over the years –5 to +5 with respect to the exogenous turnover year (or pseudo-event year for the control firm). The sample period is from 2003 to 2022. Emission intensities are CO_2 equivalents in metric tons divided by the company's dollar sales. In column 3, the combined value of scope 1 and 2 emissions is capped at twice the value of scope 1 emissions. All other variables are defined in Appendix Table A1. We include firm-by-cohort and year-by-cohort fixed effects. *t*-statistics are reported in parentheses. Standard errors are clustered at the firm-by-cohort level. *** (**) {*} denote significance at the 1% (5%) {10%} level.

	Dependent Variable: Emission Intensity		
	Scope 1	Scope 1+2	
	(1)	(2)	(3)
DADE Death × Post	0.160***	0.046	0.152**
	(0.060)	(0.069)	(0.065)
Size	0.162	0.157	0.203
	(0.130)	(0.141)	(0.162)
Debt	0.360	0.524*	0.438
	(0.311)	(0.297)	(0.391)
Tobin's Q	0.051	0.002	0.118**
	(0.056)	(0.033)	(0.059)
ROA	0.081	-0.071	-0.033
	(0.315)	(0.243)	(0.343)
Log(Board Size)	-0.024	0.171	0.000
	(0.138)	(0.203)	(0.149)
Log(Avg. Age)	-0.001	-0.006	-0.011
	(0.008)	(0.010)	(0.010)
Log(Avg. Experience)	-0.013	0.002	-0.014
	(0.011)	(0.012)	(0.011)
Observations	1,000	1,000	1,000
Firm-by-cohort FE	Yes	Yes	Yes
Year-by-cohort FE	Yes	Yes	Yes
Adj R^2	0.980	0.968	0.966