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SHUSHU LIAO, NHUT H. NGUYEN, AND CAMERON TRUONG

CEO's Early-life Experience of Disasters and Corporate Environmental Performance

We investigate the nexus between the early-life disaster experiences of chief executive officers (CEOs) and their firms' environmental performance metrics. We hypothesize that first-hand experience of the adversities of natural disasters in the formative years of a CEO can catalyze a transformation in their environmental cognizance and perspective. This transformation is postulated to have a beneficial influence on their corporations' strategic frameworks for environmental risk mitigation. Our results show that entities steered by CEOs exposed to disasters in their early life have fewer incidences of environmental issues. These findings remain consistent even when controlling for other factors or using alternative methods. We suggest that CEOs with early disaster experience have an enhanced perception of risk ramifications, which inculcates a prudential approach to decision making, potentially heightening the environmental risk profile of their enterprises.

Key words: CEOs; Disaster; Early-life experience; Environmental performance.

Addressing environmental, social, and governance (ESG) concerns has become a critical focus for companies in recent times, as stakeholders are increasingly considering these factors in their investment choices, (e.g., Chen *et al*., 2018; Christensen *et al*., 2022; Demers *et al*., 2021). Extant research has shown a strong link between the personal background of a CEO and the variety observed in company strategies (Benmelech and Frydman; 2015; Bernile *et al*., 2017; Capalbo *et al*., 2018; Lai *et al*., 2020; Malmendier *et al*., 2011; Sunder *et al*., 2017, among others). Consequently, a key research area is exploring how a CEO's past experiences influence their approach to managing not only shareholder interests but also those of the wider community and stakeholders.[1] This study aims to

SHUSHU LIAO (shushu.liao@the-klu.org) is with Kühne Logistics University, Department of Leadership and Management. NHUT H. NGUYEN is with Auckland University of Technology. CAMERON TRUONG is with Monash University.

[1] This type of research consistently suggests that a CEO's personal experiences can mould their inherent preferences. Among these individual experiences, encounters with natural disasters and climate change are considered particularly significant. For instance, the research conducted by Bernile *et al*. (2017) reveals a non-linear relationship between the degree of CEOs' early-life exposure to natural disasters and the level of risk-taking in their subsequent corporate actions. Sugerman *et al*. (2021) contend that people tend to learn about the significance of climate change through personal experiences beyond education and media coverage.

analyze if a CEO's experiences with natural disasters in their formative years have a consistent effect on a firm's environmental strategies.[2]

We propose that there are two theoretical frameworks for predicting how CEOs' early encounters with natural disasters influence their firms' approach to environmental issues. First, from a psychological viewpoint, experiencing disasters instills fear and trauma due to potential harm or death, as noted by Goldfrank *et al.* (2003). This leads to a natural predisposition towards managing environmental risks. Such experiences heighten a CEO's awareness of environmental threats, like climate change, enhancing their understanding of the role of environmental management in mitigating disaster risks. Therefore, CEOs with first-hand disaster experience may be more sensitive to environmental risk consequences and thus more prudent in decisions affecting their firm's environmental footprint.[3]

Second, early-life disaster experiences affect CEOs' perception of risk, particularly concerning environmental challenges like climate change (Malmendier *et al.*, 2011). These experiences enhance CEOs' cognition and anticipation of the importance of environmental management to mitigate disaster-related risks. As a result, these CEOs might adopt more cautious and proactive approaches in their decision-making processes to manage and reduce environmental risks, reflecting in the firm's stronger ESG initiatives and performance.

The research question in our study is, however, not without tension. It is possible that surviving natural disasters equips CEOs with valuable crisis management skills, enhancing their confidence in navigating corporate risks. The relationship between experiencing natural disasters and subsequent behaviour is complex, as demonstrated by Castillo and Carter (2011) in their findings on trust and reciprocity. According to Bernile *et al.* (2017), CEOs who have faced less catastrophic disasters may become more risk tolerant. Existing studies, such as Godfrey (2005) and Orlitzky and Benjamin (2001), show that corporate social performance can mitigate firm risk. Therefore, it is conceivable that CEOs with early-life disaster experiences gain emotional resilience, enabling them to handle risk and uncertainty more effectively. This emotional resilience could lead to a decreased reliance on the reputation benefits of corporate social performance to manage firm risk. Furthermore, such CEOs might display increased tolerance for risks, including those related to environmental litigation or regulatory challenges in climate change.

[2] A growing body of research, such as Cronqvist *et al.* (2012), Gupta *et al.* (2021), Petrenko *et al.* (2016), Xu and Ma (2021), links the distinct personality characteristics of CEOs with their firms' financial and accounting choices and their public reporting. This relationship exists because CEOs play a key role in forming corporate policies and setting the overarching cultural narrative or 'tone at the top'.

[3] Our study adds a unique perspectivee by highlighting how a CEO's direct experience with natural disasters enhances their focus on environmental issues, differing from O'Sullivan *et al.* (2021), who argue that disaster experiences primarily foster stronger community ties.

To evaluate the variations in CEOs' early-life experiences with natural disasters, our study employs a methodology developed by Bernile *et al.* (2017). This approach assumes that lasting memories from childhood start forming at age five and go up to age 15, following Nelson (1993). We thus analyze the intensity of disasters in the CEO's birth county from five to 15 years post their birth. Disaster data are sourced from the SHELDUS™ database at the University of South Carolina, covering events from 1960 to 2019. This database, combined with details of the CEO's birth county, helps us quantify their early-life disaster experiences to define our study variable.

We collect data on environmental performance from the MSCI/KLD database, a prominent provider of ESG metrics, formulating three environmental performance indicators: environmental concern (*ENV_CON*), environmental strength (*ENV_STR*), and net environmental score (*ENV_STR* minus *ENV_CON*). These indicators are based on the firm's positive ('strength') or negative ('concern') environmental impact. We include seven environmental 'strength' factors, such as services and beneficial products, pollution prevention, and clean energy, among others, and seven 'concern' factors, including hazardous waste, regulatory issues, and climate change implications, to gauge these impacts. We provide empirical support for the hypothesis that CEO's early-life experiences influence ESG outcomes. Specifically, we observe that firms led by CEOs who encountered disasters in their early years exhibit significantly fewer environmental concerns, even after considering firm-specific, industry, and temporal factors. This effect is economically meaningful, with such firms showing a 0.27 standard deviation reduction in environmental concerns relative to the firms led by CEOs without early-life disaster experience. Nonetheless, there is no discernible impact of early-life disaster experience on environmental strengths. Our analysis thus reveals a generally positive correlation between early-life disaster experience and the net environmental score.[4]

We subject our research findings to high granularity of environmental concerns and find no notable link between early-life disaster experience and hazardous waste concerns. However, there is a marked negative correlation between such experiences and issues like regulatory problems, significant emissions, and climate change. For example, firms with disaster-experienced CEOs demonstrate an 86% lower concern about significant emissions.

We acknowledge the potential issue of endogeneity and take several steps to address it. First, we reassess the relationships by factoring in omitted variables, including a range of macro factors from the CEOs' childhood like county population, regional and national GDP, local weather, social values, and religiosity. This helps eliminate the possibility that early-life macroeconomic trauma shapes their risk perception, a concept discussed in previous research by Cheng *et al.* (2021) and Malmendier *et al.* (2011), along with considerations of

[4] We reinforce this argument by supplementing the ESG data from KLD with environmental scores from *Refinitiv* Asset4 and *Sustainalytics* ESG risk ratings in the Online Appendix.

CEO and corporate culture and external governance dynamics. Despite these adjustments, a strong negative link persists between CEOs' early-life disaster experiences and environmental concerns.

Second, we adopt a propensity score matching method to pair CEOs with and without disaster experiences based on geographical proximity and other baseline controls, finding that the former group's companies have fewer environmental concerns. Furthermore, our use of two-stage least squares instrumental variable analysis, with state-level disaster fatalities as the instrument, confirms the robustness of our primary findings.

Next, we examine the impact of the 2010 BP Deepwater Horizon oil spill, an unanticipated event raising the cost of environmental negligence, as a quasi-natural experiment. This allows us to assess whether CEOs having experienced disaster in their childhoods lead their firms to proactively address environmental concerns post-crisis. Our difference-in-differences analysis shows that post-spill, firms under such CEOs exhibit fewer environmental concerns than their counterparts.

Finally, we conduct placebo tests to assess data noise, involving random assignments of CEOs to birth counties and years. These tests show no significant link between placebo CEO disaster experiences and environmental concerns, reinforcing the credibility of our results. Our conclusions remain consistent when utilizing alternative disaster experience measures, such as per-capita fatality rates or economic damage caused by disasters, further consolidating our findings.

Overall, our research contributes to two areas of scholarly literature. First, it contributes to the burgeoning body of work investigating how CEO attributes influence their commitment to ESG matters. Existing research has shown that various CEO characteristics, such as tenure (Chen *et al.*, 2019), having a first-born daughter (Cronqvist and Yu, 2017), being married (Hegde and Mishra, 2019; Hilary *et al.*, 2017), and possessing traits like hubris (Arena *et al.*, 2018), significantly affect the development of corporate ESG or ethical practices. Our study extends this narrative by illustrating how a CEO's early-life experiences with disasters can lead to reduced environmental concerns within their companies, thereby expanding the discussion on the determinants of corporate social responsibility policies.

Second, corporate social and environmental responsibility has increasingly attracted the attention of various stakeholders including investors, employees, regulators, institutions, and non-profit organizations. Therefore, it is useful to understand what factors affect, and how much, corporate managers' decisions regarding their firms' environmental performance. Our results offer insights that CEOs' formative experiences can influence both their organizations and broader society. While we cannot completely define a CEO's risk tolerance, we suggest that their early encounters with disasters might shape their fundamental and consistent risk attitudes, especially concerning environmental risks. Given that these individuals hold critical roles in influencing organizational culture, and because their early childhood experiences have a profound psychological impact, our study

highlights the importance of these early-life events in shaping corporate behaviour and decision making.[5]

Considering that the early-life experiences assessed in our study are fixed over time and our research is geographically confined to a single country, it is improbable that our results are affected by varying economic or institutional elements.[6] In that regard, our paper contributes to the literature that has studied CEO's early-life encounters (e.g., Bernile *et al*., 2017; Elder, 1998; Malmendier *et al*., 2011; Xu and Ma, 2021), analysts' experiences of disastrous events (Bourveau and Law, 2021), and fund managers' exposure to high temperature (Di Giuli *et al*., 2022) and how it is translated into financial decisions.

THEORETICAL DEVELOPMENT

Theories on neoclassical economics (e.g., Bertrand and Schoar, 2003; Weintraub, 2002) suggest that CEOs, as rational agents, should make consistent corporate decisions when provided with identical information, implying that individual CEO characteristics should not affect firm outcomes. In contrast, upper echelons theory, introduced by Hambrick (2007), posits that CEOs' personal values significantly affect their decision making, allowing for substantial variance in corporate actions and outcomes. This is supported by studies such as Chatterjee and Hambrick (2007) and Hambrick and Mason (1984), which highlight the impact of managerial attributes on firm policies and results.

In our research, we investigate how CEOs' personal histories, particularly early-life experiences with natural disasters and climate change, shape their professional judgement and actions regarding environmental risk mitigation. Addressing Moser and Martin's (2012) call for broader ESG research, we examine the potential influences of these early-life experiences on CEOs' environmental decision making. The debate here centres on two conflicting perspectives: psychologically,

[5] Our study contributes new perspectives on the economic relevance of CEO style patterns, an area that intersects with disciplines such as accounting, finance, and management. CEO style patterns influence a range of corporate risk management decisions and are informed by professional (as discussed by Benmelech and Frydman, 2015; Law and Mills, 2017) and personal experiences (referenced in works by Bernile *et al*., 2017; Davidson *et al*., 2019; Malmendier *et al*., 2011; Schoar and Zuo, 2017), as well as innate tendencies (explored by Dyreng *et al*., 2010; Hrazdil *et al*., 2021; Matsa and Miller, 2013). By identifying early-life experiences as a foundational aspect of CEOs' inherent predispositions, our research highlights how these experiences can significantly impact organizational culture and decision-making processes.

[6] Such factors, while possibly foundational to initial life experiences, could evolve over time or differ across countries. For example, most of the existing literature points to executive compensation as a key method to influence a CEO's risk preferences. However, executive compensation is linked to various firm characteristics and strategies, and often changes over time. As a result, while compensation-related risk incentives play a crucial role in shaping corporate risk-taking activities, they are unlikely to reflect a CEO's inherent risk preferences. Our empirical context is unique because early-life exposure to disasters is not something CEOs can choose, which suggests that our findings are less likely to be affected by endogeneity concerns.

individuals with traumatic experiences, like natural disasters, may develop enhanced stress or anxiety disorders, leading to risk-averse or precautionary behaviour in managing environmental risks. This is supported by evidence suggesting that significant life events, including climate-related disasters, profoundly affect individuals' emotional and cognitive processing, thereby influencing their decision making, as found in various studies (Fullerton *et al.*, 1992; Goldfrank *et al.*, 2003; Lerner and Keltner, 2000, 2001; Sugerman *et al.*, 2021). This emotional and cognitive impact is echoed in the professional arena, where, for example, analysts from hurricane-affected regions tend to give more conservative forecasts (Bourveau and Law, 2021), and fund managers in hotter climates show a greater propensity for endorsing green initiatives (Di Giuli *et al.*, 2022).

Research indicates that childhood experiences profoundly influence adult behaviour, with early years being critical in shaping one's perspective (Bernile *et al.*, 2017; Elder, 1998; Malmendier *et al.*, 2011; Xu and Ma, 2021). Specifically, experiencing disasters in early life can heighten a CEO's perception of risks related to environmental challenges, like climate change, and consolidate their understanding of the need for environmental stewardship. We posit that CEOs who have witnessed the severe consequences of natural disasters might possess an increased awareness of environmental hazards. Consequently, such individuals are anticipated to be more circumspect in their decision-making processes, particularly in scenarios that could negatively impact the environment. In addition, these CEOs could follow more proactive approaches in improving the firm's environmental strengths. This consideration forms the basis for our initial hypothesis.:

H1: CEOs with early-life exposure to disasters are more likely to reduce corporate environmental concerns and/or improve environmental strengths.

On the other hand, the theory of psychological resilience (Conner and Davison, 2003; Luthar *et al.*, 2000) suggests that experiencing natural disasters might prepare CEOs to better handle uncertain and high-risk situations, potentially increasing their resilience to adversities. According to Bernile *et al.* (2017), CEOs exposed to non-lethal disasters often acquire a greater appetite for risk. Previous studies, such as those by Godfrey (2005) and Orlitzky and Benjamin (2001), have documented how corporate social performance can act as a buffer against firm risk by providing reputational or moral capital. Thus, it seems logical to assume that CEOs who have faced natural disasters early in life develop a kind of resilience and emotional strength, equipping them to navigate through volatility and uncertainty with less reliance on the reputational capital from their company's ethical actions to mitigate risk. Such CEOs might also show increased tolerance for risks related to environmental legal issues or regulatory compliance with respect to climate change. Based on these considerations, we present our second or alternative hypothesis:

H2: CEOs with early-life exposure to disasters are less likely to engage in improving the firm's environmental performance.

RESEARCH METHODOLOGY

CEO Early-life Disaster Experiences

We gather CEOs' names from the Compustat ExecuComp database spanning the years 1992–2018. To obtain information about the birthplace and birth date of the CEOs, we utilize data from *Marquis Who's Who*.[7] Subsequently, we employ a matching procedure to link the sample of CEOs from the ExecuComp database with the corresponding biographical data obtained from *Marquis Who's Who*. This matching process is initially performed using the CEO names, and we further verify the accuracy of the matching by cross-referencing it with the company names.[8] We exclude CEOs that are foreign-born and CEOs with no birth year or no county-level information on their birth places.

Prior research has consistently reported that the experiences individuals have in their early years play a crucial role in shaping their adult behaviours. Childhood is a critical phase for developing an individual's thinking patterns and values, as supported by studies from Bernile *et al.* (2017), Elder (1998), Malmendier *et al.* (2011), and Xu and Ma (2021). In our analysis, we measure CEOs' early-life experiences with disasters by examining the fatality rates of disasters in their birth counties during the ages of five to 15 years post their birth. This approach is inspired by Bernile *et al.* (2017), who argue that significant childhood memories are formed between these ages, referencing Nelson (1993).

We source disaster data from the SHELDUS™ database, maintained by the University of South Carolina, covering events from 1960 to 2019 with detailed reports on fatalities and economic losses. To minimize biases and ensure accurate event representation, our study only considers disasters post-1960. From an initial group of 1,238 US-born CEOs, we focus on 421 CEOs born after 1945, ensuring they were at least 15 years old by 1960 and thus fall within our study's timeline for disaster exposure.

We integrate this disaster data with the CEOs' biographical details, mapping each CEO to the relevant disaster incidents within their childhood county and age window. Our main variable for CEO disaster experience is binary, indicating whether a CEO experienced any fatal natural disaster during this defined period. In addition, we employ alternative metrics like the percentile of per-capita fatalities and the economic impact of disasters to strengthen the validity of our conclusions and confirm they are not tied to a singular definition of disaster experience.

[7] *Marquis Who's Who* publishes biographical data of millions of leaders. Its information is more accurate and in-depth, and it has a wider coverage than NNDB.com or *Register of Directors and Executives*.

[8] If there are multiple matches based on CEO's first name and last name while the middle name information is not available to validate the match, we exclude those CEOs to avoid Type II errors.

Environmental Ratings and Data Sample

We source the environmental ratings for companies from the MSCI ESG KLD STATS database, commonly known as KLD, a resource frequently used in economic and management research (e.g., Cronqvist and Yu, 2017; Krüger, 2015; Petrenko *et al.*, 2016). This database is acknowledged as a credible indicator of a firm's engagement with environmental issues. In KLD, firms are evaluated on various environmental 'strengths' and 'concerns'. These metrics assess if a firm has positively ('strength') or negatively ('concern') impacted the environment, with categories such as services and beneficial products, pollution prevention, low levels of recycling, and hazardous waste emissions, regulatory problems, and inadequate attention to climate change concerns.

To compile a comprehensive environmental performance indicator for each company, we sum up the respective strengths and concerns. However, as Mănescu (2011) notes, the raw corporate social responsibility (CSR) scores from KLD might not accurately reflect a firm's CSR efforts due to the fluctuating number of indicators over the years. Following the methodology recommended by Cao *et al.* (2019), we normalize these scores to create an adjusted index for each firm-year, dividing the number of concerns or strengths by the maximum number possible in that year, yielding adjusted scores between 0 and 1.

Financial and accounting data are sourced from the Compustat database, stock return information from the Center for Research in Security Prices (CRSP), and CEO-specific details like gender, tenure, and age from the Compustat ExecuComp database. Merging our sample with the environmental scores provided by KLD, covering the period from 1992 to 2018, we obtain a final sample consisting of 264 unique CEOs and a total of 1,675 firm-years. This sample allows us to conduct our baseline tests by ensuring that we have complete information available for the control variables, environmental ratings, and CEO disaster experiences.

Panel A of Table 1 presents the mean and standard deviation of CEO-specific disaster characteristics of our sample CEOs.[9] It shows that 50.6% of our sample CEOs have experienced at least one disaster in their $[t + 5, t + 15]$ birth year window and 28.7% of the CEOs in our sample have experienced at least one fatal disaster. On average, CEOs experience 1.772 disasters during their $[t + 5, t + 15]$ birth year window and the average fatality per million population across all our sample CEOs is 1.220.

Panel B of Table 1 reports the top five birth states of CEOs, top five birth states of CEO with disaster experience, and those with fatal disaster (disasters with non-zero fatalities) experience. The mode of CEO birth state is New York, which accounts for 18.5% of our entire CEO sample. It also shows that a vast majority of CEOs experiencing natural disasters in their childhood are born in New York, Massachusetts, New Jersey, Pennsylvania, and California.

[9] Before the merging of environmental ratings and financial information, we have 421 unique CEOs that are born after 1945 and have complete information on their birth county.

TABLE 1

NATURAL DISASTER AND CEO CHARACTERISTICS

Panel A: CEO-specific disaster characteristics

Variables	Obs.	Mean	S.D.
Indicator of CEO with disaster	421	0.506	0.501
Indicator of CEO with fatal disaster	421	0.287	0.453
No. of disaster per CEO	421	1.772	3.515
Fatalities per capita in million	421	1.220	7.087
No. of fatalities experienced	421	0.682	5.548

Panel B: Top 5 birth states of CEOs

Top 5 birth states of CEO		Top 5 birth states of CEO with disaster experience		Top 5 birth states of CEO with fatal disaster experience	
States	Number of CEOs	States	Number of CEOs	State	Number of CEOs
New York	78	New York	74	New York	52
Pennsylvania	35	Massachusetts	18	New Jersey	16
Illinois	33	New Jersey	16	Massachusetts	15
Ohio	31	Pennsylvania	13	California	8
California	24	California	12	Texas	7

Panel A summarizes the CEO-specific disaster characteristics of US-born CEOs with clear information on their birth county and with birth year after 1945. Panel B reports the top five birth states of CEOs, the top five birth states of CEO with disaster experience, as well as the top five birth states of CEO with fatal disaster (disasters with non-zero fatalities) experience.

EMPIRICAL METHODOLOGY

We examine the effect of CEO early-life disaster experience on a firm's environmental rating using the following baseline model:

$$\text{ENV\_PERF}_{it} = \alpha_0 + \alpha_1 \text{DIS\_CEO}_{it} + \alpha_j \text{Controls} + \text{Industry and Year FE} + v_{it}, \quad (1)$$

where ENV_PERF_{it} denotes an environmental index for firm i in year t. This is either environmental concerns, ENV_CON_{it}, environmental strengths, ENV_STR_{it}, or the net environmental performance, $ENV\_NET_{it} = ENV\_STR_{it} - ENV\_STR_{it}$. DIS_CEO_{it} is an indicator variable for CEOs who have experienced fatal natural disaster in their childhood. Because environmental scores differ significantly across industries, we therefore include industry dummies to account for industry-specific heterogeneity in environmental issues.[10] We also add year dummies to control for concomitant macroeconomic

[10] For example, the petroleum and natural gas industry performs the worst in the environment while the computer software sector is the best in this category (Di Giuli and Kostovetsky, 2014).

trends (e.g., the global financial crisis) or a time trend of firms becoming more concerned about CSR. We assess statistical significance throughout our paper using *t*-statistics computed based on standard errors two-way clustered by both executive and year (Petersen, 2009; Thompson, 2011).

Controls represents a vector of control variables that are likely to be related to a firm's environmental ratings. For instance, we expect a firm's environmental performance to be correlated with its size and growth rate. Therefore, to account for potential confounding factors and ensure the robustness of our results, we include several control variables. First, we control for firm-specific factors such as size, market-to-book ratio, and sales growth, as these variables have been found to be correlated with corporate social responsibility in previous finance and management literature.

In our study, we also account for financial constraints, known to affect corporate social responsibility, by integrating measures like the firm's tangibility ratio and leverage. The role of institutional investors is acknowledged as pivotal in driving ESG performance, whereas the immediate pressures exerted by financial analysts may limit firms' commitments to long-term social investments. We address these dynamics by including analyst coverage and institutional ownership as control variables.

Additionally, CEO characteristics form an important part of our analysis. We consider factors like CEO age and its square, CEO tenure and its square, CEO gender, and CEO stock ownership to examine how these CEO-specific traits may impact the company's environmental performance. These variables help us understand the potential effects of CEO demographics as well as the motivational impact of equity-based compensation on behavioural tendencies. To ensure the robustness of our analysis, we apply winsorization to the continuous variables at the 1% and 99% levels to mitigate the impact of extreme values. Detailed definitions of all variables can be found in Appendix.

Table 2 presents the summary statistics of key variables used to conduct our baseline tests. The statistics show that the mean value of *ENV_CON* is 0.065 and right skewed with a median value of 0.000. The mean level of *ENV_STR* is 0.089 while the mean value of *ENV_NET* is 0.022. Approximately 25% of our firm-year observations involve CEOs with fatal disaster experiences in their childhood.

In Panel C of Table 2, we present the results of univariate tests comparing the environmental concerns, environmental strength, and environmental net scores of firms led by CEOs with and without early-life exposure to fatal disasters. The analysis shows that firms headed by CEOs without early-life exposure to fatal disasters have an average environmental concern value of 0.074. In contrast, firms led by CEOs who experienced fatal disasters during their early life have a lower environmental concern score of 0.038. The *t*-statistics indicate a significant difference in *ENV_CON* between CEOs with fatal disaster experience and those without, with a value of –4.03. Additionally,

TABLE 2

DESCRIPTIVE STATISTICS

	N	Mean	SD	1%	50%	99%
Panel A: KLD environmental index						
ENV_CON	1,675	0.065	0.155	0.000	0.000	0.600
ENV_STR	1,675	0.089	0.191	0.000	0.000	0.800
ENV_NET	1,675	0.022	0.194	-0.600	0.000	0.600
Hazardous waste	1,060	0.101	0.301	0.000	0.000	1.000
Regulatory problems	1,445	0.109	0.312	0.000	0.000	1.000
Substantial emissions	1,521	0.083	0.277	0.000	0.000	1.000
Climate change	1,591	0.048	0.213	0.000	0.000	1.000
Panel B: Firm- and CEO-level characteristics						
DIS_CEO	1,675	0.248	0.432	0.000	0.000	1.000
Log_AT	1,675	8.541	1.755	5.116	8.403	12.587
MVBV	1,675	1.747	1.061	0.805	1.355	6.308
TANG	1,675	0.798	0.249	0.000	0.897	1.000
Sale_Growth	1,675	0.070	0.173	–0.403	0.060	0.658
Instown	1,675	0.648	0.300	0.000	0.723	1.116
Log_analysts	1,675	2.843	1.257	0.000	3.178	4.564
Leverage	1,675	0.252	0.189	0.000	0.239	0.772
Cash	1,675	0.126	0.149	0.001	0.067	0.679
Tenure	1,675	7.134	6.721	–4.000	5.000	29.000
Age	1,675	55.659	5.627	41.000	56.000	70.000
Female	1,675	0.033	0.178	0.000	0.000	1.000
Stock_Own	1,675	1.397	4.108	0.000	0.120	23.025

Panel C: Univariate test of CEO with versus without fatal early-life disaster experience

	ENV_CON	ENV_STR	ENV_NET
DIS_CEO = 0	0.074	0.090	0.014
DIS_CEO = 1	0.038	0.087	0.047
Differences	-0.035***	-0.003	0.033***
t test of differences	-4.03	-0.27	2.91

Panel D: Correlation

	CSR_NET	CSR_CON	ENV_NET	ENV_STR	ENV_CON	DIS_CEO
CSR_NET	1.000					
CSR_CON	–0.473*	1.000				
ENV_NET	0.515*	–0.152*	1.000			
ENV_STR	0.322*	0.353*	0.620*	1.000		
ENV_CON	–0.249*	0.586*	–0.483*	0.366*	1.000	
DIS_CEO	0.107*	–0.105*	0.086*	–0.011	–0.114*	1.000

This table reports descriptive statistics including number of observations, mean, standard deviation, 1%, 50%, and 99% percentile for variables used in our empirical analysis over the period 1992–2018 with non-missing values in environmental performance, CEO disaster experience, and control variables. See Appendix for variable definitions.

the difference in environmental net scores suggests that firms led by CEOs with fatal disaster experience exhibit significantly better environmental performance.

In Panel D of Table 2, we present the pairwise correlation matrix between CSR, environmental performance, and CEO early-life disaster experience.[11] There is a significant negative correlation between CEO early-life disaster experience and CSR concerns, suggesting that CEOs with such experiences tend to lead firms with lower environmental concerns. These findings imply that CEO early-life experiences have an impact on CSR performance, specifically in relation to environmental concerns.

EMPIRICAL RESULTS

CEO Early-life Disaster Experience and Environmental Performance

Table 3 presents the OLS estimates of our baseline regression model, which include both firm- and CEO-specific controls. When examining the regressions with environmental concerns, *ENV_CON*, as the dependent variable, we consistently observe negative coefficient estimates on CEO's early-life experience of fatal disasters, *DIS_CEO*, and these estimates are statistically significant (t-stat = -2.46 in column 1 and t-stat = -2.28 in column 4). This indicates a robust and significant relationship between a CEO's early-life experience of fatal disasters and the firm's environmental responsibility policies. Specifically, the coefficient estimate on *DIS_CEO* in column 1 suggests that the environmental concerns of a firm led by a CEO having experienced fatal disasters during their childhood are approximately 0.27 standard deviations lower than those of a firm with a CEO who has not. Hence, the evidence demonstrates a substantial and statistically significant impact of CEO early-life disaster experience on the environmental concerns of the firm they manage.

When examining regressions with environmental strengths, *ENV_STR*, as the dependent variable, the result in column 2 shows that a CEO's early-life experience of disasters has an insignificant impact on the firm's environmental strength score. The result for the net score for environmental performance in column 3 indicates that the effect of *DIS_CEO* on *ENV_NET* is positive and statistically significant at the 10% level. This suggests that the influence of a CEO's early-life experience of disasters on the firm's environmental practices is primarily manifested in reducing environmental concerns.

It is important to note that our findings may capture the effect of CEO early-life disaster experience on CSR or corporate goodness in general. Previous research, such as that of O'Sullivan *et al.* (2021), has documented that CEOs with early-life disaster experience place greater emphasis on maintaining strong relationships with the community and exhibit greater concerns for the well-being of others,

[11] CSR is defined as the difference between strengths and concerns across KLD's six dimensions of community, diversity, employees, product, environment, and human rights. The results align with the findings of O'Sullivan *et al.* (2021) as they reveal a positive association between CSR overall score and CEO early-life disaster experience, indicating that CEOs who experienced fatal disasters during their childhood tend to lead firms with higher CSR performance.

TABLE 3

DISASTER CEO AND ENVIRONMENTAL CONCERNS

	(1) ENV_CON	(2) ENV_STR	(3) ENV_NET	(4) ENV_CON	(5) ENV_STR	(6) ENV_NET
DIS_CEO	–0.042**	–0.002	0.040*	–0.040**	0.003	0.042*
	(–2.46)	(–0.09)	(1.76)	(–2.28)	(0.14)	(1.75)
Log_AT	0.033***	0.047***	0.014	0.021***	0.042***	0.021*
	(5.86)	(4.15)	(1.24)	(3.51)	(3.39)	(1.79)
MVBV	–0.011**	0.006	0.017**	–0.012**	0.005	0.017**
	(–2.30)	(0.96)	(2.67)	(–2.23)	(0.78)	(2.47)
TANG	0.053*	0.024	–0.031	0.053*	0.026	–0.028
	(1.95)	(0.86)	(–0.84)	(2.06)	(0.79)	(–0.70)
Sale_Growth	–0.054**	–0.009	0.042	–0.054**	0.008	0.059
	(–2.32)	(–0.28)	(1.01)	(–2.12)	(0.24)	(1.29)
Instown	–0.034	–0.018	0.012	–0.023	–0.012	0.007
	(–1.34)	(–0.80)	(0.42)	(–0.93)	(–0.44)	(0.22)
Log_Analysts	0.010*	0.002	–0.007	0.009	–0.002	–0.010
	(1.89)	(0.39)	(–0.98)	(1.50)	(–0.30)	(–1.36)
Leverage	–0.003	–0.004	0.008	–0.001	–0.009	0.005
	(–0.08)	(–0.10)	(0.16)	(–0.02)	(–0.18)	(0.10)
Tenure	–0.001	–0.001	0.000	–0.000	–0.002	–0.001
	(–0.49)	(–0.31)	(0.07)	(–0.09)	(–0.65)	(–0.58)
Age	–0.005	0.002	0.005	–0.009	0.006	0.012
	(–0.48)	(0.14)	(0.35)	(–0.68)	(0.40)	(0.92)
Age_sqrt	0.000	–0.000	–0.000	0.000	–0.000	–0.000
	(0.52)	(–0.29)	(–0.53)	(0.68)	(–0.56)	(–1.13)
Tenure_sqrt	–0.000	–0.000	0.000	–0.000	0.000	0.000
	(–0.30)	(–0.04)	(0.18)	(–0.81)	(0.41)	(0.98)
Female	0.061	0.031	–0.036	0.052	0.029	–0.027
	(1.66)	(1.03)	(–0.78)	(1.15)	(0.85)	(–0.54)
Stock_Own	0.001	–0.001	–0.002	0.000	–0.001	–0.001
	(0.74)	(–1.17)	(–1.69)	(0.24)	(–1.04)	(–0.92)
COM_CON				0.085**	0.087*	0.004
				(2.17)	(1.91)	(0.06)
PRO_CON				0.089*	–0.052	–0.142**
				(1.85)	(–0.82)	(–2.20)
HUM_CON				0.076	0.003	–0.092
				(1.26)	(0.04)	(–0.88)
DIV_CON				–0.028	–0.031	–0.011
				(–1.41)	(–0.93)	(–0.30)
EMP_CON				0.078**	0.079	–0.006
				(2.31)	(1.42)	(–0.13)
Constant	–0.100	–0.327	–0.173	0.093	–0.393	–0.409
	(–0.34)	(–0.72)	(–0.41)	(0.26)	(–0.86)	(–1.08)
Year_FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1,675	1,675	1,675	1,421	1,421	1,421
Adjusted R^2	0.488	0.421	0.218	0.531	0.404	0.204

This table reports the regression results of environmental concerns (columns 1, 4), environmental strength (columns 2, 5), and net environmental scores (columns 3, 6) on CEO with early-life disaster experience over the sample period 1992–2018. *t*-statistics based on two-way clustering (at the executive and year levels) robust standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

including both direct (e.g., employees and customers) and indirect stakeholders (e.g., the community and society at large). In columns 4–6, we further control for the CSR concerns with respect to community (*COM_CON*), product (*PRO_CON*), diversity (*DIV_CON*), human rights (*HUM_CON*), and employees (*EMP_CON*). Despite these additional controls, we find that the significant effects of *DIS_CEO* on *ENV_CON* and *ENV_NET* remain robust. This suggests that the psychological impact triggered by a CEO early-life disaster experience leads to a heightened awareness of the importance of environment-related risks and the significance of environmental protection. In the Online Appendix Table OA1, we include an analysis using environmental pillar scores from Refinitiv's Asset4 ESG database and Sustainalytics' ESG Risk Ratings to examine the robustness of our results regarding the overall environmental performance. We find that our findings hold true when using different proxies or measures of environmental ratings.[12]

In the Table OA2, we compare the results across different industries by dividing the sample into (i) industries with low versus high climate change exposure as defined in Table 3, Panel A in Sautner *et al.* (2023), and (ii) industries with above-median versus below-median environmental concerns.[13] The results in Table OA2 show that the tendency for CEOs with early-life disaster experiences to curtail environmental concerns are more pronounced among industry sectors with high climate change exposure or more severe environmental issues.

Given the results in Table 3 that CEO's early-life experience of disasters mainly affect the firm's environmental concerns rather than its environmental strengths, we will focus on *ENV_CON* for the rest of the analysis. Hence, in the next analysis, we investigate the impact of a CEO's early-life fatal disaster experience on the subcategories of KLD environmental concerns, namely 'Hazardous waste', 'Regulatory problems', and 'Substantial emissions'. Additionally, we explore the category of 'Climate change', which assigns high (negative) scores to firms that generate significant revenues from the sale of coal, oil, and related fuel products, directly or indirectly. We conduct regression analyses using each of the aforementioned subcategories of environmental concerns as the dependent variable.

[12] To evaluate a firm's overall environmental performance, we construct a composite index that combines ratings from KLD, Asset4, and Sustainalytics. Each industry-year is assigned a ranking value from 1 to 10, with firms in the highest decile of their environmental scores from KLD or Asset4 receiving a value of 10 (or a negative value of –10 for Sustainalytics' ESG Risk Ratings), and so on, down to firms in the lowest decile receiving a value of 1 (or a negative value of –1 for Sustainalytics' ESG Risk Ratings). All columns in Table OA1, which display various control sets, demonstrate that *DIS_CEO* has a significant and positive effect on the composite index of environmental scores. These results align with the findings obtained using data solely from KLD, providing further support for our conclusions.

[13] The industries identified as high climate change exposure are industries with 2-digit SIC code of 16, 17, 12, 29, 33, 36, 37, 41, 49, and 55. The industry sectors identified as having higher environmental concerns are industry sectors under the Global Industry Classification Standard (GICS) of Industrial, Energy, Materials, Consumer Staple, and Communication Services.

TABLE 4

SUBCATEGORY OF ENVIRONMENTAL CONCERNS

	(1) Hazardous waste	(2) Regulatory problems	(3) Substantial emissions	(4) Climate change
DIS_CEO	–0.021	–0.113***	–0.072**	–0.056*
	(–0.46)	(–2.99)	(–2.46)	(–1.93)
Log_AT	0.042***	0.049***	0.050***	0.017**
	(3.65)	(4.29)	(4.55)	(2.20)
MVBV	–0.036**	–0.030**	–0.009	–0.003
	(–2.33)	(–2.58)	(–1.21)	(–0.81)
TANG	0.082*	0.111**	0.015	0.074
	(1.88)	(2.09)	(0.30)	(1.24)
Sale_Growth	–0.079**	–0.068	–0.139**	–0.035
	(–2.53)	(–1.39)	(–2.75)	(–0.82)
Instown	–0.063	–0.088	–0.062	0.006
	(–0.84)	(–1.13)	(–1.54)	(0.18)
Log_Analysts	0.026*	0.015	0.008	0.003
	(2.06)	(1.00)	(0.80)	(0.31)
Leverage	–0.008	–0.030	–0.006	0.025
	(–0.08)	(–0.35)	(–0.11)	(0.45)
Tenure	0.005	–0.002	–0.001	–0.001
	(1.09)	(–0.38)	(–0.35)	(–0.28)
Age	–0.020	–0.037	0.006	–0.016
	(–0.95)	(–1.68)	(0.27)	(–0.97)
Age_sqrt	0.000	0.000*	–0.000	0.000
	(0.99)	(1.79)	(–0.15)	(1.10)
Tenure_sqrt	–0.000*	–0.000	–0.000	0.000
	(–2.01)	(–0.23)	(–0.22)	(0.01)
Female	–0.042	0.128	0.119	–0.004
	(–0.91)	(1.47)	(1.57)	(–0.20)
Stock_Own	0.000	0.000	0.002	–0.001
	(0.15)	(0.10)	(1.05)	(–0.75)
Constant	0.238	0.730	–0.510	0.256
	(0.41)	(1.12)	(–0.88)	(0.57)
Year_FE	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes
Obs.	1,060	1,445	1,521	1,056
Adjusted R^2	0.465	0.352	0.239	0.188

This table reports the regression results of disaggregated KLD environmental scores, i.e., 'Hazardous waste', 'Regulatory problems', 'Substantial emissions', and 'Climate change' on CEO with early-life disaster experience over the sample period 1992-2018. *t*-statistics based on clustered robust standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

The results, presented in Table 4, show that the coefficient estimates on *DIS_CEO* display a negative sign and are statistically significant for 'Regulatory problems', 'Substantial emissions', and 'Climate change' even after controlling for known determinants of environmental ratings. This implies that firms led by CEOs who experienced disasters in their early life are less likely to encounter regulatory issues, exhibit lower emissions of toxic chemicals, and less inclined to generate revenues from products that contribute to climate change.

Endogeneity Issues

The regression findings above highlight a robust association between a CEO's early-life experience of disasters and a decrease in environmental concerns. However, it is crucial to address potential endogeneity concerns that arise if common factors related to CEO early-life experiences also influence corporate environmental practices. To mitigate this issue, we employ three different approaches.

First, we control for economic and cultural factors associated with the CEO's birthplace, CEO's cultural background and corporate culture scores, and external factors that might confound the relationship, such as product market competition, hostile takeover threats, and the enactment of state-level climate action plans (SCAP). Second, we identify a 'control' group of firms with similar characteristics that are led by CEOs from neighbouring areas. Last, we employ state-level occurrences of natural disasters as an instrument to further address endogeneity concerns. These approaches help strengthen the identification of the causal relationship between CEO early-life experiences and corporate environmental practices.

Accounting for correlated omitted variables In this section we include additional controls to our baseline model to eliminate potential state-level cohort effects. We first examine economic context, weather conditions, social value, and religion based on the CEO's birthplace and birth year. For example, a state's geographical conditions can worsen the impact of a natural disaster (Srinivas and Nakagawa, 2008), and affect regional economic resources and people's attitudes towards investing in environmental projects. Therefore, geographic conditions can affect both the CEO's chance of experiencing a fatal disaster and corporate commitment to environmental issues. CEOs growing up in New York may be more likely to experience a major natural disaster than CEOs born in Iowa, but CEOs from New York are less likely to experience poverty in their childhood than those born in Iowa. The experience of poverty may potentially drive the differences in their prosocial values and altruistic behaviour (Xu and Ma, 2021).

We include controls for the natural logarithm of state-level GDP (*RegGDP*) and state-level population (*POP*) obtained from Gennaioli *et al.* (2012) to consider the influence of the regional economic conditions in the CEO's birth state. Additionally, we incorporate the log of US GDP in the CEO's birth year (*YearGDP*) to account for any potential impact of economic recessions during the CEO's childhood, following Malmendier *et al.* (2011). Column 1 of Table 5 presents the results with these economic condition controls. Although the effects of the CEO's birth state and birth year economic conditions are not statistically significant, the coefficient estimate for *DIS_CEO* remains significant. This indicates that the observed relationship between CEO early-life experiences and environmental concerns is not driven by the economic factors considered in our analysis.

Aside from natural disasters, a variety of environmental factors can cause changes in human health such as pesticide exposures, coastal environment, and

climate change (Resnik and Roman, 2007; Stewart *et al.*, 2008), which may aggravate the impact of a natural disaster and enhance people's environment-related cognitive stimulation. In terms of economic impacts, Gennaioli *et al.* (2012)

TABLE 5

TESTING FOR OMITTED VARIABLES

Panel A: Controlling for socio-economic factors of CEO's birth state and year

	(1) ENV_CON	(2) ENV_CON	(3) ENV_CON	(4) ENV_CON	(5) ENV_CON
DIS_CEO	–0.047**	–0.039**	–0.038**	–0.041**	–0.049**
	(–2.36)	(–2.11)	(–2.16)	(–2.37)	(–2.60)
POP	–0.014				–0.014
	(–1.29)				(–1.23)
RegGDP	0.063				0.071
	(0.94)				(0.93)
YearGDP	0.069				0.054
	(0.60)				(0.42)
Temperature		–0.002			–0.004
		(–0.94)			(–1.39)
Invdistcoast		–0.018			–0.029
		(–0.33)			(–0.22)
Social_Capital			0.009		–0.045
			(0.58)		(–1.57)
Catho_Protest				0.001	–0.013
				(0.20)	(–1.04)
Religiosity				–0.000	0.001
				(–0.12)	(0.83)
Controls	Yes	Yes	Yes	Yes	Yes
Industry and Year_FE	Yes	Yes	Yes	Yes	Yes
Obs.	1,428	1,637	1,672	1,610	1,376
Adjusted R^2	0.494	0.491	0.489	0.493	0.497

Panel B: Controlling for CEO culture, corporate culture, and external factors

(1) CEO cultural background		(2) Corporate culture		(3) External factors	
	ENV_CON		ENV_CON		ENV_CON
DIS_CEO	–0.056***	DIS_CEO	–0.040**	DIS_CEO	–0.062***
	(–2.98)		(–2.38)		(–2.94)
PDI	0.001*	Teamwork	0.008	Product fluidity	0.001
	(1.93)		(0.68)		(0.20)
IDV	–0.002*	Quality	–0.003	Hostile Takeover	0.087
	(–1.94)		(–0.38)	Index	(0.96)
MAS	0.001	Respect	0.011*	Climate Action	–0.028
	(1.32)		(1.79)	Plan	(–1.60)
UAI	–0.001	Integrity	–0.001		
	(–1.21)		(–0.03)		
		Innovation	–0.007		
			(–1.25)		
Controls	Yes		Yes		Yes

(Continues)

TABLE 5

CONTINUED

Panel B: Controlling for CEO culture, corporate culture, and external factors

(1) CEO cultural background	(2) Corporate culture	(3) External factors
ENV_CON	ENV_CON	ENV_CON
Industry and Year_FE	Yes	Yes	Yes
Obs.	1,626	1526	1404
Adjusted R2	0.502	0.489	0.487

Panel A reports the regression results of environmental concerns on CEOs with early-life disaster experience with additional controls for CEO's birth state's (or birth year's) economic situations, weather conditions, social value, and religion. Panel B reports the results when we control for CEO cultural values, corporate culture framework, and other external factors. *t*-statistics based on clustered robust standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

find that favourable geographical conditions such as lower average temperature and proximity to the ocean are positively correlated with regional income per capita. Therefore, we add temperature (*Temperature*) and proximity to the ocean of a CEO's birth state (*Invdistcoast*) as controls for environmental factors. Our main results shown in column 2 of Table 5 still hold.

Next, we account for the potential influence of social capital development in the CEO's birthplace, considering that individuals from areas with frequent disasters may have stronger social bonds with local residents. To capture this aspect, we include a proxy developed by Rupasingha *et al.* (2006), which measures the number of different social organizations and entities that are likely to foster the development of social capital.[14] Following a methodology similar to that of Lai *et al.* (2020), we calculate a state-level social capital score by averaging their social capital index across multiple years (1990, 1997, 2005, 2009, and 2014) and across all counties. The result in column 3 of Table 5 indicates the persistence of a negative relationship between a CEO's early-life experience of disasters and corporate environmental concerns even after controlling for the social capital development of the CEO's cohort (*Social_Capital*).

Additionally, we include controls for the influence of local religiosity in the CEO's birth state, which has been linked to CEO's risk aversion (Hilary and Hui, 2009), as well as the Catholic–Protestant ratio, which serves as a proxy for gambling propensity (Kumar *et al.*, 2011). *Religiosity* is measured as the proportion of religious adherents in a state, while *Catho_Protest* represents the ratio of the number of Catholics to the number of Protestants.[15] The results, as shown in column 4 of Table 5, continue to support our findings even after accounting for a CEO's religious

[14] See: http://aese.psu.edu/nercrd/community/social-capital-resources for details.

[15] Data are drawn from the American Religion Data Archive (ARDA): https://www.thearda.com/.

beliefs. In column 6, we consolidate all the additional controls discussed in this section into the baseline regression, and the coefficient estimate of *DIS_CEO* for *ENV_CON* remains negative and statistically significant.

We next examine whether other correlated omitted variables such as CEO cultural values, corporate culture framework, and other external factors that may confound our findings.[16] First, we re-examine the relationship by including the controls of CEO's cultural heritage computed by merging Hofstede's (2001) cultural scores for each country to the CEO's country of ancestry identified via the CEO's family name.[17] We look at Hofstede's (2001) four cultural dimensions, namely power distance (*PDI*), individualism (*IDV*), masculinity (*MAS*), and uncertainty avoidance (*UAI*), and link those cultural scores to the CEO based on the identified ancestry. Second, we further control for corporate cultural value of *Teamwork*, *Quality*, *Respect*, *Integrity*, and *Innovation* extracted from earnings call transcripts using machine learning techniques (Li *et al.*, 2021).[18]

Third, we allow for the controls of external factors that might influence environmental performance. For instance, Flammer (2015) finds that firms facing heightened product market competition engage more in CSR activities. We hence control for competitive threats experienced by the firm by including the product market fluidity measure developed in Hoberg *et al.* (2014). Moreover, takeover threats, as the market for corporate control and a vital mechanism of external governance, can have a strong impact on corporate social responsibility (Wongsinhirun *et al.*, 2022). We thus control for the firm-level hostile takeover index developed by Cain *et al.* (2017) in the estimation.[19] Finally, He *et al.* (2023) show that the enactment of SCAP enhances the perceived level of climate change risk in that state. We thus control for the staggered adoption of SCAP by using an indicator variable that equals one if the state has passed the plans and zero otherwise. The results of the above-discussed additional controls are shown in Panel B of Table 5 and reveal that the negative effects of CEO early-life disaster experiences on environmental concerns are robust after including the controls of CEO cultural norms, corporate cultural scores, and the impact of external governance and regulation mechanism.

Matching analysis to absorb geographical effects To mitigate concerns about potential confounding factors related to the CEO's place of birth, such as

[16] We thank an anonymous referee for this suggestion.

[17] We use the algorithm provided by *Namsor* to infer the country of origin based on CEO's family name. The assumption is that family names, along with cultural norms, are passed through generations and stay relatively unchanged. For example, a US-born CEO can adopt a Japanese cultural norm due to the nurturing of a Japanese family.

[18] We thank the authors for sharing the data with us.

[19] We thank Cain *et al.* (2017) for making the data of firm-level hostile takeover index publicly available. In the case of a missing value for the firm-level hostile takeover index, we replace it with the (2-digit) industry median in that year.

TABLE 6

IDENTIFYING THE EFFECT OF EARLY-LIFE DISASTER EXPERIENCE USING MATCHING

	(1) Control CEOs of the same state	(2) Control CEOs of the same state and matched by firm characteristics	(3) Control CEOs from neighbouring counties (within 100 miles)	(4) Control CEOs from neighbouring counties and matched by firm characteristics
	ENV_CON	ENV_CON	ENV_CON	ENV_CON
DIS_CEO	–0.050**	–0.050**	–0.037*	–0.046*
	(–2.22)	(–2.20)	(–1.71)	(–2.06)
Controls	Yes	Yes	Yes	Yes
Year_FE	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes
Obs.	831	704	882	731
Adjusted R^2	0.444	0.448	0.452	0.450

This table reports the regression results of environmental concerns on CEO early-life disaster experience over the sample period of 1992–2018 for a series of matched samples to absorb possible geographical effects. All regressions include baseline controls, industry, and year fixed effects. *t*-statistics based on clustered robust standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

economic conditions, crime rate, culture, or legal enforcement, we incorporated a range of state-level factors into our analysis above. To further address the possibility that CEOs with early-life disaster experience may cluster in specific regions with certain geographical characteristics, we perform a matching analysis. This allows us to compare the differences between CEOs who experienced fatal disasters (the treated group) and neighbouring CEOs who did not (the control group), thus isolating the impact of disaster experiences.

In columns 1 and 2 of Table 6, we establish control groups consisting of CEOs who did not experience fatal disasters during their early life (control CEOs) but were born in the same state as the treated CEOs. In columns 3 and 4, the control group comprises CEOs who did not experience fatal disasters during their early life but grew up within 100 miles of the birthplaces of the treated CEOs. In columns 2 and 4, we further refine the control groups by matching them to the treated groups based on the set of control variables used in the baseline model. The control groups are then narrowed to firms with the propensity scores, calculated based on the control variables, falling within a caliper distance of 0.1 (i.e., 0.5 times the pooled standard deviation of the propensity scores) from the propensity scores of the treated firms. We re-estimate the baseline regression using the matched samples. The results presented in Table 6 demonstrate that the negative relationship between CEO early-life disaster experience and corporate environmental concerns persists when analyzing the differences in outcome variables between the treated and control groups.

Instrumental variable approach To mitigate endogeneity concerns, we adopt an instrumental variable approach by introducing a variable that is expected to be correlated with CEO early-life disaster experience but unrelated to the firm's environmental ratings. To the extent that the likelihood of a CEO encountering natural disasters depends on the state from which the CEO comes, we exploit the variation in the disaster frequency of CEO's state of birth during their $[t + 5, t + 15]$ birth window, which is plausibly exogenous to the firm's environmental policies. The instrument is defined as the average number of fatal disasters occurring in a state from 1960 to the year of our youngest CEO's 15th birthday. The use of state-level variable as an instrument is a common approach in finance and business management literature (e.g., Giannetti and Zhao, 2019; Roussanov and Savor, 2014; Yonker, 2017). The states that have the highest average number of disasters in the sample are Florida, Louisiana, Texas, North Carolina, and Virginia.

Table 7 presents the results of our two-stage least squares (2SLS) regression analysis, which addresses the potential endogeneity issues by using an instrument that is significantly correlated with CEO disaster experience, *DIS_CEO*, in the first-stage regression (column 1). This indicates that our instrument meets the relevance criteria. In column 2, we report the result of the second-stage regression using the instrumented *DIS_CEO*, which shows that the negative and significant relationship between *DIS_CEO* and *ENV_CON* persists.

To account for the potential bias arising from firms selecting local CEOs who are from the same state as the company, we restrict our analysis to firms located in states different from the CEO's birth state (non-local CEO sample). This helps to address the concern that firms with higher disaster risk may be more inclined to hire local CEOs who have experienced disasters in their early life. Columns (3) and (4) of Table 7 present the results of the instrumental-variable regression using the non-local CEO sample. We find that our instrument remains relevant in this restricted sample, and the coefficient estimate on *DIS_CEO* remains negative and statistically significant. These findings suggest that the negative relationship between CEO early-life disaster experience and firm's environmental concerns is robust even when we account for the potential endogeneity issues through the instrumental-variable approach.

Robustness Check and Additional Tests

Evidence from the Deepwater Horizon oil spill In line with Dyck *et al.* (2019), we leverage the occurrence of the 2010 BP Deepwater Horizon oil spill as a quasi-natural experiment. This unforeseen event acted as an external shock that increased the financial implications of environmental concerns. We hypothesize that CEOs who experienced fatal disasters during their childhood would exhibit heightened sensitivity to environment-related issues. Accordingly, firms led by these CEOs would be more proactive in addressing their environmental concerns following the impact of the shock.

TABLE 7

INSTRUMENTAL VARIABLES APPROACH

	(1) DIS_CEO	(2) ENV_CON	(3) DIS_CEO	(4) ENV_CON
Log_num_dis	0.122***		0.136***	
	(9.49)		(8.83)	
DIS_CEO		–0.069**		–0.087**
		(–2.41)		(–2.40)
Log_AT	0.013	0.033***	0.002	0.038***
	(0.66)	(6.05)	(0.09)	(6.03)
MVBV	0.003	–0.011**	0.000	–0.013**
	(0.23)	(–2.33)	(0.03)	(–2.34)
TANG	–0.083	0.049*	–0.074	0.055**
	(–0.92)	(1.93)	(–0.86)	(1.96)
Sale_Growth	0.041	–0.052**	0.012	–0.053**
	(0.76)	(–2.31)	(0.20)	(–2.29)
Instown	0.023	–0.034	–0.042	–0.052*
	(0.31)	(–1.46)	(–0.63)	(–1.81)
Log_Analysts	–0.006	0.011**	–0.034	0.007
	(–0.28)	(2.04)	(–1.15)	(1.14)
Leverage	–0.067	–0.004	–0.084	–0.009
	(–0.48)	(–0.11)	(–0.56)	(–0.18)
Tenure	–0.001	–0.001	–0.003	–0.003
	(–0.10)	(–0.58)	(–0.35)	(–1.11)
Age	0.053	–0.003	0.052	–0.007
	(1.30)	(–0.33)	(1.10)	(–0.58)
Age_sqrt	–0.000	0.000	–0.000	0.000
	(–0.99)	(0.41)	(–0.87)	(0.62)
Tenure_sqrt	–0.000	–0.000	0.000	0.000
	(–0.24)	(–0.32)	(0.67)	(0.41)
Female	0.017	0.060*	0.003	0.074*
	(0.33)	(1.69)	(0.05)	(1.82)
Stock_Own	0.005	0.001	0.000	–0.000
	(1.22)	(0.85)	(0.12)	(–0.07)
Constant	0.013	0.033***	0.002	0.038***
	(0.66)	(6.05)	(0.09)	(6.03)
Year_FE	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes
Obs.	1,675	1,675	1,225	1,225
Adjusted R^2	0.537	0.484	0.604	0.473

This table reports the regression results of environmental concerns on CEO early-life disaster experience by instrumenting *DIS_CEO* with the disaster incidents of CEO's birth state. *Log_num_dis* is the log of average number of state-level fatal disaster over the period of 1960 to 1993 (1993 is the latest birth year of our sample CEOs). Definition of other variables is in Appendix. *t*-statistics based on clustered robust standard errors are reported in parentheses. ***, **, and * denote two-tailed significance at the 1%, 5%, and 10% levels, respectively.

To examine this hypothesis, we employ a difference-in-difference (DiD) methodology. We define the post-event period as one year after the event date (24 May 2010), while the pre-event period is one year prior to the event. We create a dummy variable called '*After*' to represent the post-event period, taking a value of one for the period between 24 May 2010, and 24 May 2011,

TABLE 8

EVIDENCE FROM THE DEEPWATER HORIZON OIL SPILL

	(1) ENV_CON	(2) ENV_STR
DIS_CEO_2009 × After	-0.031***	0.058
	(-4.15)	(1.10)
DIS_CEO_2009	-0.046**	-0.018
	(-2.27)	(-0.62)
After	-0.011	0.094***
	(-0.36)	(3.35)
Log_AT	0.039***	0.085
	(4.30)	(1.44)
MVBV	-0.015	-0.003
	(-1.28)	(-0.30)
TANG	0.076	0.007
	(1.36)	(0.22)
Sale_Growth	-0.027	0.005
	(-0.31)	(0.06)
Instown	-0.026	-0.031
	(-1.38)	(-2.22)
Log_Analysts	0.005	-0.003
	(0.62)	(-0.23)
Leverage	0.098	-0.111***
	(1.28)	(-4.04)
Tenure	0.003	-0.007***
	(0.82)	(-2.63)
Age	0.079	0.074**
	(1.53)	(5.67)
Age_sqrt	-0.001	-0.001***
	(-1.46)	(-7.28)
Tenure_sqrt	-0.000	0.000
	(-2.10)	(1.39)
Female	0.113	-0.082
	(1.19)	(-0.72)
Stock_Own	0.007	0.004
	(1.80)	(1.44)
Constant	-2.486*	-2.476***
	(-1.72)	(-76.17)
Year_FE	Yes	Yes
Industry_FE	Yes	Yes
Obs.	211	211
Adjusted R^2	0.470	0.512

This table reports the regression results of environmental concerns and strengths on CEO early-life disaster experience surrounding the event of the Deepwater Horizon oil spill that occurred on 24 May 2010. *After* is a dummy variable that is equal to one if firm's calendar date is between 24 May 2010 and 24 May 2011, and zero if firm's calendar date is between 24 May 2009 and 24 May 2010. *DIS_CEO_2009* is equal to one if firms are headed by CEOs with early-life disaster experience in year 2009 (prior to the event), and zero otherwise. *t*-statistics based on clustered robust standard errors are reported in parentheses. ***, **, and * denote two-tailed significance at the 1%, 5%, and 10% levels, respectively.

and zero for the period between 24 May 2009, and 24 May 2010. Treated firms are those led by disaster-experienced CEOs before the 2009 event, identified as *DIS_CEO_2009*.

Table 8 presents the results of our difference-in-difference (DiD) analysis, including industry and year fixed effects, for both environmental concerns and environmental strength scores. The coefficient of *After* is negative, albeit statistically insignificant, suggesting that firms have a greater incentive to reduce their environmental concerns following the BP Deepwater Horizon oil spill shock. Importantly, the coefficient of the interaction term *DIS_CEO_2009* × *After* is negative and statistically significant. This suggests that firms led by CEOs who experienced fatal disasters during their early life exhibit significantly stronger incentives to address their environmental concerns after the shock.

We perform the same estimation procedure for environmental strength, but the coefficient of *DIS_CEO_2009* × *After* is positive but statistically insignificant. Overall, these results indicate that firms headed by CEOs with early-life fatal disaster experiences are significantly more proactive in addressing environmental issues following an environmental shock that amplifies the financial importance of mitigating environmental concerns.

Placebo tests We perform a falsification test to assess the robustness of our findings. In this test, we randomly assign birth counties, birth years, or both to each CEO in our sample, creating placebo CEOs. We then repeat the process of measuring early-life fatal disaster experience for these placebo CEOs by matching their biographical information with disaster events based on county and year of birth. The baseline regression from Table 3 is re-run using the placebo CEOs. This procedure is repeated 1,000 times, and the coefficient estimates, *t*-statistics, and corresponding *p*-values are recorded for each replication.

Panel A of Table 9 presents the average coefficient estimates, *t*-statistics, and *p*-values over the 1,000 replications. The coefficient estimates are found to be statistically insignificant in all columns. Additionally, less than 1% of the replications yield negative and significant coefficients. Columns 1 and 2 of Table 9 demonstrate that CEO birth year and birth county fixed effects, respectively, do not account for corporate environmental concerns in the absence of CEO early-life disaster experience. Column 3 suggests that the observed relationship between CEO early-life disaster experience and the firm's environmental concerns likely reflects the CEO's attitudes towards environmental risk influenced by their early-life experiences, rather than other CEO traits such as age or gender.

In Panel B, we present a distribution plot of the estimates from the placebo CEO early-life disaster experiences. The dotted line represents our estimated value for *DIS_CEO* from the baseline specification (–0.042). It can be observed that our baseline effect of *DIS_CEO* is located far to the left of the distribution of the placebo test estimates. Overall, we do not find a systematic pattern indicating the influence of placebo CEO early-life disaster experience on corporate environmental concerns. This supports the validity of our findings

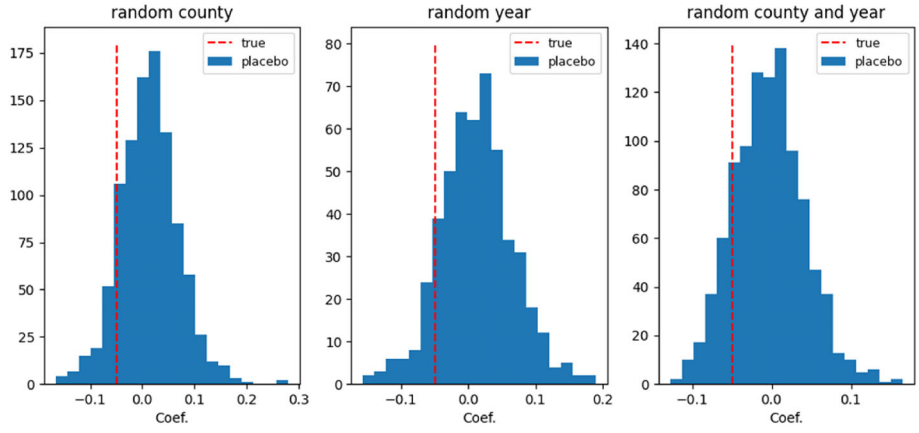
TABLE 9

PLACEBO TESTS

Panel A: Average coefficient estimates on placebo CEO disaster experience

	(1) Randomly distributed county of birth	(2) Randomly distributed year of birth	(3) Randomly distributed year of birth and county of birth
	ENV_CON	ENV_CON	ENV_CON
Mean coef. of DIS_CEO	0.014	0.013	–0.003
Mean *t* stats. of DIS_CEO	0.049	0.048	0.035
Mean *p* value of DIS_CEO	0.450	0.459	0.415
Percentage of negative and 5% significant	0.30%	0.30%	0.60%

Panel B: The distribution of the estimates on placebo CEO disaster experience



Panel A of this table reports the regression estimates of our baseline models in Table 3 when we randomly assign a birth county (column 1), a birth year (column 2), both birth county and birth year (column 3) to each CEO. We repeat the regression procedures 1,000 times and record the average of the coefficient estimates on *DIS_CEO*, the average of *t*-statistics, and the average of corresponding *p*-values across the 1,000 replications. We also show the percentage of coefficient estimates on *DIS_CEO* that are significantly negative at the 5% level. Panel B of this TABLE plots the distribution of our coefficient estimates on *DIS_CEO*.

regarding the impact of actual CEO early-life disaster experience on environmental concerns.

Various measures of CEO disaster experiences In this section, we re-run our regression analysis using different classifications of disaster experience. In particular, we evaluate the effects regarding the intensity of disasters and the nature of disasters a CEO had experienced. We first use the total sum of fatalities per capita of natural disasters our sample CEOs experienced in their $[t + 5, t + 15]$ birth year window. To mitigate the effects of outliers, we use the percentile rank of disaster-related per-capita fatalities. Second, we divide CEOs according to those who experienced extreme fatal disasters and those who experienced medium fatal disasters. CEOs with fatal disaster experiences in the top quarter of total fatalities per capita are identified as *Extreme*, and the rest are identified as *Medium*.

Furthermore, we draw on information about property and crop damage measured in million US dollars and replicate the above-mentioned procedures to capture the severity of disasters CEOs experienced in their early life. Lastly, we combine the data of economic damage and fatalities per capita and use percentile ranks of total damages as well as the classification of *Extreme* and *Medium* total damage to re-evaluate the impact of CEO disaster experience. Details of variable constructions are shown in the Appendix.

The regression results with these alternate measures of severity of CEO disaster experience are reported in Panel A of Table 10. Columns 1 and 2, 3 and 4, and 5 and 6 show the results using total per-capita fatalities, economic damage, and the combination of both per-capita fatalities and economic damages, respectively, as the measure of the severity of CEO disaster experience. Columns 1, 3, and 5 show that our results hold even if we apply a continuous variable to capture CEO disaster experience. Column 2 in Table 10 shows that our conclusions are valid for both CEOs who experienced extreme fatal disasters, *Extreme_Fat*, and those experiencing medium fatal disasters, *Medium_Fat*. This finding differs from those of Bernile *et al.* (2017) by showing that the relationship is *not* driven by the nonmonotonic effects of disaster experience on CEO's risk appetite.

Even though the economic magnitude on *Medium_Fat* is larger than that of *Extreme_Fat*, the difference disappears when we look at the measure of economic damage, that is, the coefficient for *Medium_Dmg* does not differ from that for *Extreme_Dmg* as shown in column 4. Most importantly, as shown in column 6, when we combine the measure of economic damage and per-capita fatalities, the coefficient for *Medium_FatDmg* turns insignificant after controlling for *Extreme_FatDmg*, and its economic size is 40% smaller than that of *Extreme_FatDmg*.

Next, we examine whether the nature of the disasters (i.e., hurricane or storm, wildfire, drought, coastal) CEOs experienced plays a role in affecting how they manage corporate environmental concerns.[20] We use indicator

[20] We thank an anonymous referee for this suggestion.

TABLE 10

VARIOUS INTENSITIES AND NATURE OF CEO DISASTER EXPERIENCES

Panel A: Intensities of disasters

	(1)	(2)	(3)	(4)	(5)	(6)
Fatalities	–0.046**					
	(–2.39)					
Extreme_Fat		–0.038**				
		(–2.27)				
Medium_Fat		–0.110**				
		(–2.07)				
Dmg			–0.029**			
			(–2.13)			
Extreme_Dmg				–0.038**		
				(–2.27)		
Medium_Dmg				–0.040*		
				(–1.77)		
Fat_Dmg					–0.032***	
					(–3.03)	
Extreme_FatDmg						–0.056*
						(–2.03)
Medium_FatDmg						–0.034
						(–1.53)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry&Year_FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1675	1675	1675	1675	1675	1675
Adjusted R^2	0.482	0.490	0.480	0.484	0.485	0.483

Panel B: Nature of disasters

	(1)	(2)	(3)	(4)
Wildfire	–0.032			
	(–1.64)			
Hurricane		–0.045**		
		(–2.50)		
Drought			–0.008	
			(–0.29)	
Coastal				–0.029
				(–0.43)
Controls	Yes	Yes	Yes	Yes
Industry&Year_FE	Yes	Yes	Yes	Yes
Obs.	1675	1675	1675	1675
Adjusted R2	0.482	0.489	0.478	0.478

This table reports the regression results of environmental concerns on various measures of CEO early-life disaster experience. All regressions include baseline controls, industry and year fixed effects. Details of variable constructions are shown in Appendix. *t*-statistics based on clustered robust standard errors are reported in the parenthesis and ***, **, and * denote two-tailed significance at the 1%, 5%, and 10% levels, respectively.

variables for each type of disaster a CEO experienced and tabulate the results in Panel B of Table 10. We find a negative association between CEO early-life disaster experience and corporate environmental practices across all types of

natural disasters. However, this relationship is only statistically significant for the experiences of hurricanes or tropical storms.[21]

CONCLUSIONS

Our study investigates how CEOs' experiences with disasters during their early years influence their firms' dedication to environmental responsibility, using data from the MSCI/KLD ESG database. We document a notable link between CEOs who experienced disasters early in life and a reduction in environmental concerns within publicly traded companies in the US. This connection persists even when considering various factors, including macroeconomic conditions, climate variations, and the religious context of the CEO's place of birth. The results are also robust to the inclusion of the CEO's cultural background, corporate culture, and external market factors. In analyzing specific environmental concerns, we find a clear association between CEO early-life disaster encounters and issues like regulatory problems, significant emissions, and climate change. These findings indicate that the early disaster experiences of CEOs are crucial in shaping their commitment to broader environment-focused corporate practices.

We analyze the Deepwater Horizon oil spill as an external shock to evaluate its effects. Using the DiD method, we compare the variation in environmental concerns between firms led by CEOs who had early-life disaster experiences (the treatment group) and those led by CEOs without such experiences (the control group) before and after the oil spill incident. Our findings indicate a reduction in environmental concerns among the treatment firms post spill. This trend persists in analyses using propensity score matched samples and instrumental variable techniques.

Placebo tests reveal that having a CEO with early-life disaster experience does not inherently affect environmental concerns. Moreover, our results are stable even after adjusting for factors related to the CEO's place of birth. This research highlights the impact of CEOs' early-life disaster experiences on their environmental awareness, leading to discernible differences in how firms approach environmental management.

This observation is crucial for policy making, especially as corporations globally are increasingly recognizing the importance of ESG performance and are striving to integrate value creation in these domains. The role of personal characteristics of CEOs in fostering sustainable corporate practices is gaining attention in the academic literature, as highlighted by Cronqvist and Yu (2017), and is particularly vital in the timely and proactive management of ESG issues. Thus, firms could

[21] The result is not surprising given that around 90% of fatal disasters are considered to be related to hurricanes or tropical storms.

proactively use these insights in leadership selection and development processes, aligning executive experiences with the firm's strategic priorities in environmental stewardship and sustainability.[22] While fatal disaster experience during adulthood is not a focus in this study, we believe that such experience may interact with childhood experience and play a role in CEO's corporate environmental policies. We leave this potential avenue for future research.

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[22] Practically, insights in our study suggest that firms might benefit from considering the personal background and experiences of their CEOs when formulating ESG strategies. For businesses looking to enhance their ESG performance, acknowledging the influence of CEOs' early-life disaster experiences could lead to more effective and sensitive environmental risk management. This could, in turn, help firms not only to meet regulatory standards and societal expectations but also to pioneer in sustainable practices, leveraging these experiences to foresee and mitigate potential environmental risks more effectively.

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APPENDIX A

VARIABLES DEFINITIONS

ENV_CON	Aggregate KLD environmental concern scores. We adjust the score by dividing the raw score by the maximum possible number of environmental concerns score in a given year.
ENV_STR	Aggregate KLD environmental strength scores. We adjust the score by dividing the raw score by the maximum possible number of environmental strength score in a given year.
ENV_NET	'ENV_STR' minus 'ENV_CON'
Composite Index	A composite index that combines ratings from KLD, Asset4, and Sustainalytics to evaluate a firm's overall environmental performance across all ratings.
Hazardous waste	An indicator variable for whether the company's liabilities for hazardous waste sites exceed $50 million, or the company has recently paid substantial fines or civil penalties for waste management violations. A company having the score of 1 for having hazardous concern.
Regulatory problems	An indicator variable for whether the company has recently paid substantial fines or civil penalties for violations of air, water, or other environmental regulations, or it has a pattern of regulatory controversies under the Clean Air Act, Clean Water Act, or other major environmental regulations. A company having the score of 1 for having regulatory problems.
Substantial emissions	An indicator variable for whether the company's legal emissions of toxic chemicals (as defined by and reported to the EPA) from individual plants into the air and water are among the highest of the companies followed by KLD. A company receiving the score of 1 for substantial emissions.
Climate change	An indicator variable for whether the company derives substantial revenues from the sale of coal or oil and its derivative fuel products, or the company derives substantial revenues indirectly from the combustion of coal or oil and its derivative fuel products. Such companies include electric utilities, transportation companies with fleets of vehicles, auto and truck manufacturers, and other transportation equipment companies. A company receiving the score of 1 for engaging in actions that can cause climate change.
DIS_CEO	An indicator variable that takes the value of one if CEOs have experienced fatal disaster in their $[t + 5, t + 15]$ birth year window.
Fatalities	The percentile rank of total per-capita fatalities of natural disasters our sample CEOs experience in their $[t + 5, t + 15]$ birth year window.
Dmg	The sum of the percentile rank of total property damage and crop damage our sample CEOs experience during natural disasters in their $[t + 5, t + 15]$ birth year window.
Fat_Dmg	The sum of 'Dmg' and 'Fatalities'.
Extreme_Fat (Extreme_Dmg, Extreme_FatDmg)	An indicator variable that takes the value of 1 if 'Fatalities' ('Dmg', 'Fat_Dmg') is in the top quarter, and zero otherwise.

(Continues)

Medium_Fat (Medium_Dmg, Medium_FatDmg)	An indicator variable that takes the value of 1 that record the value of 1 in 'DIS_CEO' but record the value of 0 in 'Extreme_Fat' ('Extreme_Dmg',' Extreme_FatDmg'), and zero otherwise.
Log_AT	Natural logarithm of total assets.
MVBV	Market-to-book of total assets ratio. Market-to-book of assets ratio is measured at the beginning of the year and is defined as the market value of assets (the market value of assets is market value of common stock plus total assets minus total common equity minus deferred taxes) divided by book value of total assets.
TANG	The ratio of tangible assets to total assets.
Sale_Growth	Percentage change of sales.
Instown	Percentage of ownership by institutional investors.
Log_Analysts	Natural logarithm of analysts following.
Leverage	The sum of long-term debt plus debt in current liabilities divided by total assets.
Cash	Cash and marketable securities divided by total assets.
Tenure	Tenure of CEOs.
Age	Age of CEOs
Female	An indicator variable for female CEOs.
Stock_Own	Percentage of total stock ownership by CEOs.
POP	Population for the CEO's birth state in the CEO's birth year.
RegGDP	Natural logarithm of GDP in the CEO's birth state.
YearGDP	Natural logarithm of GDP of U.S. in the CEO's birth year.
Temperature	Temperature of the CEO's birth state.
Invdistcoast	Proximity to the ocean of the CEO's birth state.
Social_Capital	Social capital score of the CEO's birth state.
Catho_Protest	The ratio of the number of Catholic adherents to the number of Protestant adherents for the CEO's birth state.
Religiosity	The proportion of religious adherents in a state for the CEO's birth state
PDI	Power Distance index based on Hofstede's characterization of national cultures for a CEO according to the CEO's origin implied by their last name.
IDV	Individualism versus Collectivism index based on Hofstede's characterization of national cultures for a CEO.
MAS	Masculinity versus Femininity index based on Hofstede's characterization of national cultures for a CEO.
UAI	Uncertainty Avoidance index based on Hofstede's characterization of national cultures for a CEO.
Teamwork	Corporate cultural value of teamwork extracted from earnings call transcripts using machine learning techniques based on Li *et al.* (2021).
Quality	Corporate cultural value of quality.
Respect	Corporate cultural value of respect.
Integrity	Corporate cultural value of integrity.
Innovation	Corporate cultural value of innovation.
Product fluidity	The changes in a firm's product space due to moves made by competitors in the firm's product market, sourced from Hoberg *et al.* (2014).
Hostile Takeover Index	Firm-level hostile takeover index developed by Cain *et al.* (2017).
Climate Action Plan	A dummy variable that takes the value of one if the state has passed the plans, and zero otherwise.

SUPPORTING INFORMATION

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Appendix S1: Supplementary Appendix