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HEADS MUST ROLL: HOW EXTERNAL AND INTERNAL FACTORS COMBINE TO IMPROVE CORPORATE ENVIRONMENTAL PERFORMANCE

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ABSTRACT

Despite decades of widespread corporate sustainability programs, corporate greening remains insufficient. What can drive firms to go greener? Drawing from an attention-based view of the firm, we hypothesize that a significant external shock can draw greater organizational attention to greening. However, the increased attention will fail to produce improvement in environmental performance unless it is combined with an internal shock sufficient to disrupt established routines. Through an empirical test of a large longitudinal data set, we indeed find that the external shock of a large environmental fine shifts organizational attention toward environmental issues. However, this shift in attention does not lead to improved corporate environmental performance unless accompanied by an internal shock, CEO turnover. If the CEO remains after a large environmental fine, corporate environmental performance does not improve. These findings help to explain the disconnect between green talk and action after decades of corporate sustainability and points out the need for further investigation of the combination of external and internal factors that can drive further improvements in corporate environmental performance.

Key words: attention-based view, environmental fines, environmental performance, CEO turnover

Today, most firms voluntarily undertake a myriad of greening initiatives, which they openly tout through annual sustainability reports and other public disclosures (Winston, 2021). Even associations such as the Business Roundtable (2021) and the U.S. Chamber of Commerce (2021) actively promote corporate sustainability, issuing a global "call to action" and declaring that "on climate change, inaction is simply not an option."

Nevertheless, the actions firms have taken in furtherance of sustainability have proven inadequate in the aggregate (Barnett, Henriques, & Husted, 2022). While firms have done much to harvest the profitable "low-hanging fruit" over the last several decades, serious environmental challenges linger and worsen (Burbano, Delmas, & Cobo, 2024; IPCC, 2023). For example, firms have developed and adopted numerous greening technologies, yet carbon output from industrial activity continues to increase (Lindsey, 2020). As firms and their trade associations broadly espouse the importance of their actions in sustaining the planet, six of the nine planetary boundaries that sustain life on Earth have been transgressed (Richardson et al., 2023). Thus, even though corporate sustainability is mainstream, management scholars (Bansal et al., 2024) continue to echo the concerns of international organizations (UNEP, 2024) and scientific researchers (Richardson et al., 2023) in urging significantly greater improvements in corporate environmental performance.

What can drive further improvement in corporate environmental performance (CEP)? Scholars have identified a litany of factors that drive firms to "go green," such as competitiveness (King & Lenox, 2002), legitimation and ecological responsibility (Bansal & Roth, 2000), or regulatory pressures (Aragon-Correa, Marcus, & Vogel, 2020). In any case, now that corporate sustainability is "commonplace, often deeply embedded in corporate structure and culture, and managed by professional senior staff" (Barnett et al., 2021: 35), firms are seldom grappling with the initial decision to go green. Instead, firms tend to be locked into

patterns of "corporate conscience" (Short & Toffel, 2010) with well-established routines for greening. Improving CEP at this stage thus entails disrupting the status quo.

In this paper, we explain how external and internal factors combine to bring about further improvement in CEP. Drawing from an attention-based view (ABV) of the firm (Ocasio, 1997) and the broader behavioral theory of the firm (Cyert & March, 1963) literature in which an ABV is grounded, we theorize that the combination of regulatory fines and CEO turnover can disrupt established patterns of organizational attention to facilitate actions that improve environmental performance. We first hypothesize that after receiving a large environmental fine, firms[2] pay more attention to environmental issues. Regulatory interventions are substantive shocks that can disrupt established firm routines and have been among the most successful tools to elicit improvement in CEP (Aragon-Correa et al., 2020). However, as regulatory interventions spur compliance, they can harm motivation (Ayres & Braithwaite, 1992). Yet, with much of the low-hanging fruit of greening already exploited, improving CEP requires additional motivation to search for latent greening opportunities (Delmas, Russo, & Montes-Sancho, 2007). Thus, we further address what can transform this attention into action.

The patterns of organizational attention that affect how firms behave are highly dependent on leadership (Ocasio, 1997). Leadership turnover is a disruptive but common occurrence (Finkelstein, Hambrick, & Cannella, 1996; Haveman, Russo, & Meyer, 2001), especially after a large environmental fine. Thus, we further hypothesize that when CEO turnover follows an environmental fine, organizational inertia around greening innovations can be overcome, enabling increased attention to transform into substantive action on sustainability.

We test our hypotheses on North American public firms that received large environmental fines from 2006 to 2016, analyzing the impact of these fines on environmental

[2] Managers, not firms, make decisions. Nevertheless, we use firms and managers interchangeably, in consonance with an ABV's focus on the organizational level of analysis. Though we are concerned with what firms do, managers are the actors within these firms.

performance in subsequent years. As expected, we find that large fines are associated with increases in attention to environmental issues. However, we also find that this increased attention is not associated with improvements in CEP unless the CEO departs the firm. If the CEO remains after a significant environmental fine, then CEP does not improve. Thus, in our sample of firms receiving significant environmental fines, CEO turnover proved necessary to move firms beyond more talk of greening and on to substantive improvements in CEP.

Our findings provide partial answer to calls to explain why, after decades of corporate sustainability programs, too many organizations make far less progress than they should (Bansal et al., 2024). In contrast to ABV's "Principle 1", which states that "what decision-makers do depends on what issues and answers they focus their attention on" (Ocasio, 1997: 189-90), we find a significant gap between attention and action. Our findings suggest the need for a combination of external and internal disruptive events to shake up established greening routines in ways adequate to turn greater attention to greening into greater action on actual environmental performance, at least in our sample of firms that faced environmental fines. Further exploration of the gap between organizational attention and action is warranted, consonant with recent calls in the ABV literature (e.g., Joseph et al., 2024; Ocasio, Laamanen, & Vaara, 2018; Shepherd, McMullen, & Ocasio, 2017).

In the next section, we develop hypotheses that relate environmental fines and leadership turnover to improvements in CEP. Thereafter, we describe the dataset and methodology we use to analyze it. Next, we describe the results of our analyses. We conclude with a discussion of their implications for both CEP and an ABV of the firm.

DRIVING IMPROVEMENT IN CORPORATE GREENING

Firms have been greening – that is, finding ways to "become more environmentally responsible in their operations" (Schaefer & Harvey, 1998: 109) – for decades. The burgeoning scholarly literature on greening has identified a variety of reasons why firms have gone green (Bansal &

Roth, 2000). For example, the intrinsic motivation of a top executive can cause a firm to suddenly prioritize environmental issues (e.g. HBS, 2016). However, environmental epiphanies such as these are relatively rare.

Though grounded in ethical considerations (Wood, 1991), the growth in greening has been driven primarily by firms' pursuit of long-term economic self-interest. When firms expect to gain ample private benefit from advancing ecological good, they are likely to undertake initiatives to do so (McWilliams & Siegel, 2001). Scholars have shown that there are indeed many ways that it "pays to be green" (Berchicci & King, 2007). For example, launching environmental initiatives can help firms gain reputational capital, which buffers them from harm and provides favorable access to unfolding opportunities (Fombrun, Gardberg, & Barnett, 2000). Through greening, firms can differentiate their products and services and thereby gain competitive advantage (Porter & van der Linde, 1995). Greening can also increase firm efficiency (Hart, 1995) and innovativeness (King & Lenox, 2002). Given these and a range of other benefits, strong environmental performance has been associated with strong financial performance (Barnett & Salomon, 2012).

However, the "business case" paradigm underpinning much of the growth in corporate sustainability favors quick, competitive, and consumption-oriented solutions over the sorts of cooperative, long-term initiatives needed to resolve complex environmental problems (Barnett et al., 2022). Though the ecological concern of executives and the profit motive have been adequate to drive some firms to make exemplary environmental advances, the need for further corporate greening overall remains great. Our ecosystem is in peril as rising greenhouse gas emissions intensify global warming (IPPC, 2023). Firms are major polluters, so improved CEP is a key part of reversing this (UNEP, 2024). Although firms have made many commitments to a myriad of actions to inhibit climate change, firms often miss the targets they set for themselves by substantial margins (Bain, 2022). Across a wide range of greening initiatives, firms have

tended toward easy wins, while much more must be done to achieve sustainable production (Rivera & Clement, 2019).

For those firms still not doing enough, the lingering and concerning gap in corporate sustainability need not be attributed to lack of environmental concern from top executives or a shortage of profitable but complex and substantive greening opportunities. Firms may simply overlook desirable sustainability initiatives (Dowell & Muthulingam, 2017). Managers must notice opportunities for greening amidst the unlimited stimuli constantly competing for their limited attention (e.g. Kiesler & Sproull, 1982; Vuori, 2024). Noticing these opportunities thus requires active search (Starbuck & Milliken, 1988).

Shu et al. (2020) identify the importance of environmental scanning for the adoption of green management. King and Lenox (2002) note that the presence of significant search costs can deter firms from finding profitable greening opportunities. Moreover, demand for greening may be latent and so go unnoticed and unexploited unless a regulatory change in institutional conditions provides managers with the incentive to search (cf. Delmas et al., 2007). Furthermore, the desirability of a greening opportunity is largely in the eye of the beholder. Calculations of the ability of a potential greening initiative to create intangible goodwill are inherently subjective and small tweaks in subjective attention may have large implications for these long-term projections, providing managers with significant discretion over the outcomes of potential options (cf. Barnett, 2008).

In sum, a firm is more likely to "go green" when ecological issues progressively become more salient and individuals in the organization place greater value on them (Bansal & Roth, 2000). However, corporate structures and mindsets around greening may constrain the aggregate effectiveness of greening initiatives (Barnett et al., 2021). To get firms to "go greener," it is necessary to disrupt established organizational routines in order to draw more attention to latent sustainability opportunities. While not easy to break out of the inertia of

established corporate greening routines (Phillips & Phillips, 2010), salient events can shift greater attention to environmental issues and spur actions needed to improve CEP (Confino, 2012).

Drawing from an attention-based view (ABV) of the firm (Ocasio, 1997), we argue that a combination of salient events can disrupt routinized organizational behavior and shift managerial attention and action toward greater greening. An ABV is "a metatheory of organizational action and adaptation" (Ocasio, 2011: 1286) that explains firm behavior as "the result of how firms channel and distribute the attention of their decision-makers" (Ocasio, 1997: 187). When attention is channeled and distributed differently within a firm, and when a firm's communication practices change (Ocasio et al., 2018), the decisions made within that firm change. Thus, an ABV explains changes in firm behavior by analyzing changes in the structures of attention allocation (Ocasio, 1997) and patterns of communication (Ocasio et al., 2018).

The principle that organizations "selectively attend to some external events while ignoring others" (Hoffman & Ocasio, 2001: 415) underpins an ABV of the firm. Firms' boundedly rational decision-makers can attend to only a portion of the virtually unlimited stimuli with which they are confronted (Simon, 1947; March & Simon, 1958). To help cope with information overload, firms establish explicit and implicit structures and routines (Cyert & March, 1963; Nelson & Winter, 1982). These structures and routines shape sensemaking processes and direct managerial attention toward some aspects of the operating environment while creating blind spots toward others (March & Simon, 1958).

HYPOTHESES

An ABV argues that by analyzing how firms channel and distribute the attention of their decision-makers towards some stimuli and away from others, one can understand how firms behave (Ocasio, 1997). For example, Yu, Engleman, and Van De Ven (2005) used an ABV to explain how a merger integration went awry because the acquiring firm's structures directed

managerial attention toward the wrong aspects of the integration process, while Barnett (2008) used an ABV to show how variation in attention structures explains variation in how firms manage their portfolios of real options.

Through its core principle of situated attention (Ocasio, 1997), an ABV can explain not only why some firms behave differently than others, but also why a given firm's behavior changes. Situated attention "implies that individual decision-makers will vary their focus of attention depending on the situation, and that consistency (or variance) in attention and behavior is dependent more on consistency (or variance) in the characteristics of the situation rather than characteristics of the individuals" (Ocasio, 1997: 190). Disruptive events are commonly the cause of variance in situated attention, bringing about change in the focus of attention of a firm's decision-makers and thereby altering firm behavior. For example, Thornton and Ocasio (1999) showed how a shift in the publishing industry's institutional logic caused publishers to attend to different aspects of leadership and thereby changed how they managed executive succession, and Cho and Hambrick (2006) examined deregulation as a driver of shifting patterns of managerial attention in the airline industry.

Likewise, a disruptive event can shift the attention of a firm's decision-makers toward environmental issues, leading to changes in the firm's greening practices (Mellado et al., 2025). The routines and structures associated with organizational greening have been widely adopted and routinized (Forbes & Jermier, 2002). To go beyond current practices and find new opportunities for greening, firms must engage in active search. Yet, drawing from a behavioral theory of the firm (Cyert & March, 1963), in which an ABV is grounded (Ocasio, 2011), active search can be characterized as "problemistic." That is, engaging in search consumes a firm's limited resources, so firms tend to avoid it unless a problem arises that triggers the need to do so. Specifically, "an organization requires a motivation to search, and performance below its aspiration provides this motivation" (Posen, Keil, Kim, & Meissner 2018: 211). When a firm

falls short of its aspirations, decision-makers shift their attention toward seeking solutions to this problem.

Firms tend to be reactive toward improving CEP: "appropriate policies are instituted only after a facility recognizes its environmental failings" (Russo & Harrison, 2005: 590). What can bring about such recognition? Here, we focus on the role of environmental fines because they are "a mainstay of nearly every industrialized nation's environmental policy" (Gray & Shimshack, 2011: 3) and serve as a salient indicator of environmental failings. The number and importance of environmental fines imposed on firms have exponentially increased in recent decades (Garret, 2014; Marquis, & Bird, 2018). Numerous studies have shown that the perceived threat and enforcement of environmental laws can prompt improvements in CEP (Gray & Shimshack, 2011; Shimshak & Ward, 2005; Romero, Freedman & O'Conner, 2018), but the attentional mechanisms by which this happens have not been specified. We highlight that fines signal that a firm's environmental performance fails to meet minimum legal standards and reflect high visibility organizational misconduct on environmental issues. The stock market also reacts to regulatory fines as bad news (Karpoff, Lott, & Wehrly, 2005). Violators lose market value after regulatory sanctions are announced, and these negative reactions to "eco-harmful" behaviors have increased over time (Flammer, 2012). Thus, environmental fines highlight failures in a firm's environmental approach and can motivate search for actionable opportunities to improve its performance. Accordingly, we expect:

Hypothesis 1: Firms increase attention to environmental issues after receiving an environmental fine.

The core logic of an ABV is that focused attention drives action, and so shifts in attention drive changes in behavior (Ocasio, 1997). Applying this logic to greening, we note that as technology advances and markets evolve, opportunities for further greening arise. Absent search, many profitable opportunities for greening may go unnoticed (King & Lenox, 2002). But as firms pay

more attention to greening, they are more likely to find actionable opportunities. The increased attention to environmental issues that results from an environmental fine should thus drive improvements in CEP.

And yet, studies show that regulatory interventions do not always produce desired changes in corporate behavior and performance (Dean & Brown, 1995; Maqsood et al., 2025). Environmental regulation is largely effective at achieving compliance with laws (Gray & Shimshack, 2011). However, formal punishment such as regulatory fines can destroy intrinsic motivation (Ayres & Braithwaite, 1992) and create resistance (Winter & May, 2001), which is problematic when firms need to find innovative environmental solutions that go beyond compliance and the low-hanging fruit of sustainability already exploited. Thus, while a large environmental fine may bring greater attention to greening and help find new opportunities, more organizational disruption and change may be needed to enable a firm to adequately exploit those opportunities.

Leadership turnover commonly occurs following organizational misconduct (Wiersema & Zhang, 2013) and various forms of corporate social irresponsibility (Chiu & Sharfman, 2018). When leadership turnover occurs on the heels of an environmental fine, we expect that it can create a disruption to organizational routines adequate to transform the added attention to environmental issues into improvements in CEP.

Drawing from Hambrick and Mason (1984), Ocasio (1997: 197) argued that "the most critical players in attention regulation are typically the CEO and the top management group." They serve as the main conduits of attention allocation within a firm and have specific "knowledge structures" (Walsh, 1995) that direct attention to what they perceive to be the most relevant aspects of the firm's environment (Shepherd et al., 2017). When leaders remain in place, so too do their knowledge structures, and so the firm's strategic direction remains intact (Nadkarni & Narayanan, 2007). But when leaders change, new knowledge structures and new

communication styles and patterns arise (Ocasio et al., 2018), and so mental models change, new agendas are established, and different decisions and behaviors result (Ocasio, 2011).

There are many examples of firms replacing top leadership after major environmental debacles in order to signal the pursuit of significant improvements in CEP. For example, Volkswagen replaced long-time CEO Martin Winterkorn and multiple top executives at the height of the "Dieselgate" scandal in late 2015, after he admitted that the carmaker manipulated software in 11 million diesel vehicles worldwide in order to cheat regulatory emissions tests. The new CEO's first statement was to announce that Volkswagen would "do everything it can to develop and implement the most stringent compliance and governance standards in our industry" (Bartels, 2015). Compliance monitoring put in place thereafter indicates that VW followed through on this statement (Sun, 2020).

Executive succession aids unlearning of problematic practices and facilitates organizational adaptation (Van der Vegt, De Jong, Bunderson, & Mollernan, 2010; Virany, Tushman, & Romanelli, 1992; Zhang & Rajagopalan, 2004). Subordinates tend to ignore the efforts of established leaders to implement new practices (Moss & Sanchez, 2004), whereas turnover can provide the credibility needed to convince internal and external stakeholders to implement organizational changes (Chen & Hambrick, 2012). New leaders review current and past organizational problems in order to understand and reestablish organizational priorities (Virany et al., 1992). New CEOs often bring fresh knowledge and strategic perspectives to bear, generating new ideas and initiatives and facilitating acceptance of them (Vera & Crossan, 2004). New leaders also spend a substantial amount of time working with subordinates to develop joint expectations and learning how to integrate their respective expectations (Denis, Langley, & Pineault, 2000).

Overall, a change in leadership can alter the knowledge, credibility, interrelationships, and communications within a firm, and these alterations can create significant changes in how

a firm behaves and performs (Hutzschenreuter, Kleindienst, & Greger, 2012). Thus, executive succession is commonly viewed as an important mechanism for increasing the adoption of new strategies and practices (e.g., Van der Vegt et al., 2010; Virany et al., 1992; Zhang & Rajagopalan, 2004). Therefore, we hypothesize that the changes in attention structures that are part of CEO turnover, bringing new knowledge, credibility, interrelationships, and communication channels to the firm, aid in transforming the increase in attention to environmental issues that occurs after an environmental fine into practices that improve CEP.

Hypothesis 2: CEO turnover following an environmental fine helps transform attention to greening into improved corporate environmental performance.

DATA AND METHODS

We use a matched pairs methodology (Cochran, 1953) to create a representative sample. Matched pairs analysis is commonly used to assess how treated groups change over time relative to untreated groups that are as similar as possible except for their treatment status (cf., Kassinis & Vafeas, 2002; Short & Toffel, 2010). Using this method, we isolate and measure the effects of a large environmental fine by comparing firms receiving such fines (the treated group) with substantively similar ones that did not (the control group).

The matched-pair design provides an effective method for analyzing relatively rare events, offering more accurate results than random sampling (Daily, 1996; O'Connor et al., 2006). It better controls for potential confounding variables by ensuring that the analysis includes similar cases across multiple variables, differing only in the variable under study (Schnatterly, 2003). In this study, the matching process controls for factors such as financial performance, size, pollution level, capital intensity, sector category, and the period of an environmental fine.

The Refinitiv Eikon database lists the amounts that public firms headquartered in the US and Canada paid annually for environmental fines. Using all the information available in

this database for firms that reported data regarding environmental fines from 2006 to 2016, we yield an initial sample of 1,116 observations at 258 different firms. We stopped at 2016 because that date allows us to analyze improvement in environmental performance over the subsequent three-year period (i.e., 2009-2019), without having to rely on 2020 data, during which changes in company production may have occurred due to the pandemic.

We consulted three independent experts to gauge how large an environmental fine must be to capture top management attention and set the treatment threshold at $500,000 accordingly. There were 89 cases in which environmental fines reached or exceeded $500,000 in a year, forming our initial sample of treated cases. The remaining 1,027 observations form our initial control group. To ensure a clean distinction between treated and untreated cases, we excluded from the control group all cases in which fines were between $250,000 and $500,000, as well as those firms that reported environmental fines of $500,000 or more in any year during the two years before the year of the fine in any treated case. We also excluded cases with missing information in the sampled period about environmental performance, financial performance, or size, resulting in a sample of 75 treated and 727 control cases.

We analyzed the sensitivity of our results to the selection of these limits, repeating the analyses with environmental fines of at least $1 million (50 treated cases) and $1.5 million (42 treated cases). We obtained the same results, though the higher minimum fines significantly reduce the sample size and thereby hamper reliability. We also conducted our analysis with an additional selection criterion: the fine must represent at least $500 per $10 million of revenue (or $50,000 per $1 billion of revenue). This criterion limits our sample to 46 pairs (138 companies in total). Using this refined sample, we repeated our analyses and obtained the same results.

To identify the firms most similar to those receiving large environmental fines among the control cases, we use nearest-neighbor matching. This entails calculating the distance

between pairs of observations with regard to a set of covariates and then matching each subject to a comparable observation that is closest to it. Specifically, we include the covariates on financial performance, size, pollution level, and capital intensity. We also force matched firms to belong to the same pollutant industry category and time period as treated firms. This stringent criterion of belonging to the same industry allows us to control for the level of environmental regulatory pressures faced by firms. It is important to note that large fines imposed on firms operating in more lenient regulatory environments may have different consequences (Tashman & Rivera, 2016).

For nearest-neighbor matching, we assigned two control firms to each treated observation, which is the maximum number of viable matches in our sample. When a control firm was identified as one of the two best matches for more than one treated firm, we assigned the next-best option for one of the treated firms based on the nearest neighbor. The matching process failed for five treated observations, and we lost two additional treated cases due to missing documents that were necessary for text analyses. Our final sample is thus composed of 68 treated observations and 136 untreated cases, for a total of 204 total cases belonging to nine Global Industry Classification Standard (GICS) sectors. The sectors represented in our sample are determined by the treated companies. Those that received fines exceeding $0.5 million during the analysis period include energy (30.9%), utilities (29.4%), materials (15.7%), industrials (7.8%), consumer (5.9%), health care (4.4%), real estate (2.5%), information technology (2%), and communication services (1.5%). The average penalty for treated firms is $25.85 million, as compared to $31,000 for control firms.

To test the effectiveness of the overall matching process, we use a conditional logistic regression model. In this model, as O'Connor, Priem, Coombs, and Gilley (2006: 499) note: "Model fit and parameter estimate statistical insignificance, in relation to the outcome variable, would demonstrate satisfactory matching and minimal selection bias." The results show no

statistically significant differences between the groups regarding four of the six matching criteria (financial profitability, capital intensity, pollutant sector, and period). However, there are differences in size (coef=0.02; p=0.006) and pollution level (coef=0.03; p=0.010). To limit confounding effects from this, we include the matching variables as control variables in all the analyses.

Variables

Organizational attention to environmental issues. Consistent with recent calls in the ABV literature for research that goes beyond structural approaches to attention allocation by analyzing the vocabulary that decision-makers use (Ocasio et al., 2018), we conduct automated text analysis of company documents to gauge changes in organizational attention patterns. Text analysis is widely used throughout the social sciences and in organization studies, including in the ABV literature (Ocasio, 2011), where studies primarily draw from letters to shareholders in publicly traded companies' annual reports (e.g., Cho & Hambrick, 2006; Eggers & Kaplan, 2007; Gamache, McNamara, Mannor, & Johnson, 2015). Content analysis of CEOs' letters to shareholders is a valid construct to capture the CEOs' mental models and is highly correlated with alternative measures drawn from CEO demographics and their strategic approaches in the industry (Surroca, Prior, & Tribo, 2016).

The use of text analysis is based on the idea that words that are frequently used are cognitively central and reflect what is most on the writer's mind; words used infrequently or not at all are at the cognitive periphery, perhaps representing uncomfortable or alien concepts (Huff & Schwenk, 1990). Although letters to shareholders have multiple purposes, including conveying a positive impression, they still reflect major managerial initiatives, concerns, and points of view. Professional writers are often involved, but senior executives direct the writers and carefully review and refine their drafts (Abrahamson & Hambrick, 1997). Supporting the

validity of such analyses, Huff and Schwenk (1990) found that the patterns of managerial attributions in these letters accurately reflect executives' attempts at sensemaking.

Through online searches and augmented by direct communication with firms, we obtained shareholder letters for the treated firms and their corresponding control firms in the period of analysis. To develop a dictionary of words associated with organizational attention to environmental issues, we first generated a set of seed words that are closely identified with environmental issues. We drew from the list of key words used by Walls and Hofman (2013) and also searched for variations of these words and words related to attention to environmental issues (e.g., climate change, pollution, green). Three judges independently rated each word on a scale of 1 to 7, evaluating if it described attention to environmental issues. The judges were three senior academic experts in the field of organizations and the natural environment. Following Cho and Hambrick (2006), we retained any word that received a score of six or more from all three judges; a medium, low, or very low rating from a single judge was ample to exclude a word. The judges also manually analyzed 20 shareholder letters to see the words in context and to enhance identification of problematic words with mixed or odd meanings. For instance, they found that "energy" was not indicative of environmental issues in many situations, "natural" was mostly associated with "natural gas," and "sustainable" and "environment" were often used in ways inconsistent with the focus of this study. The final list of words included: emission/s, clean, climate change, environmental, environmentally, global warming, green, pollution, renewable, sustainability, and waste. We also searched for variations of the list of words, using the option "wildcard searches". Wildcard is a character that stands in for a number of variations so that multiple versions of a word or word variations may be searched for and identified with one search (e.g., green*= greening, greener, greenest, etc.). Where shareholder letters were unavailable, as was the case with 39 of the 204 observations, we substituted the "Business" section of the 10K annual report for the entire

period. We conducted the automated text analysis on shareholder letters published two years before and after an environmental fine. Thus, we analyzed four documents for each firm in our sample – two before and two after a fine – for a total of 816 documents.

We define organizational attention to environmental issues as the difference between organizational attention to environmental issues before and after the fine. Organizational attention to environmental issues before the fine represents the number of environmental words in the shareholder letter at t_{-1} and $t_{-2,}$ with t being the year of the penalty. Organizational attention to environmental issues after the fine represents the number of environmental words in the shareholder letter at t and t_{+1}.

To be sure we are capturing changes in attention resulting from environmental fines, we created an alternative measure, which we label "attention to environmental and regulatory issues". This measure involves identifying words related to both environmental and regulatory matters. To select these regulatory words, we followed the same process as we did for environmental words, including the use of three independent judges. The resulting list of words included: emission/s, clean, climate change, environmental, environmentally, global warming, government/s, green, law, legal, legislator/s, legislation/s, legislative, policymakers, pollution, renewable, regulation, regulations, regulator/s, regulatory, sustainability, and waste. We repeated the analyses with this alternative measure of attention and the results were the same as those obtained in the main model.

CEP improvement. We measure this by assessing the change in environmental performance three years after receiving an environmental fine (t_3-t_0). A three-year period recognizes that environmental improvements require a significant amount of time to be implemented and to produce positive effects on environmental performance (Ortiz-de-Mandojana & Bansal, 2016). A robustness check showed that the general direction of our result remained unaltered when instead using a two-year period. We measure environmental

performance using the environmental pillar score available in the Refinitiv database. Refinitiv is a well-known ESG database that contains information about firms that represent over 85% of global market capitalization. Refinitiv has more than 630 metrics on environmental, social, and governance factors (Refinitiv, 2022) and is extensively used in business studies to evaluate environmental performance (e.g., Giannarakis, Mallidis, Sariannidis, & Konteos, 2023; Orazalin, & Mahmood, 2021; Thimm & Rasmussen, 2023). Refinitiv includes three environmental pillar categories: resource use, emissions reduction, and innovation. The resource use score evaluates a firm's ability to reduce material, energy, and water usage, and to improve supply chain management. The emission reduction score measures a firm's commitment to reducing environmental emissions in its operations. The innovation score assesses a firm's capacity to lower environmental costs for customers and create new market opportunities through eco-friendly technologies and products (Refinitiv, 2022).

We seek to measure the change in environmental performance resulting from fines for any type of environmental violation. Therefore, to assess change in environmental performance, we use an aggregate measure of the three pillars provided by Refinitiv. The environmental performance score is expressed as a measure between 0 and 100, with a higher score indicating better environmental performance (Refinitiv, 2022). We repeated the analyses using only the emissions reduction dimension from the environmental score pillar. Emissions have been frequently highlighted in prior literature as the environmental performance measure that can most comprehensively reflect the overall outcomes of changes in environmental strategy (e.g., Vié, Colapinto, Torre, & Liuzzi, 2019). We obtained results consistent with those presented in the main model.

Environmental fine. This variable is the amount (in millions of dollars) of environmental fines that a firm paid in a given year, as gathered from the ESG database. The sample includes a wide dispersion in the amount of fines. Eighteen fines are below $1 million,

36 are in the range of $1 to $5 million, 7 are between $5 and $50 million, and 7 exceed $50 million. We defined our variable as continuous to avoid losing information due to categorization and to capture the full variability of the phenomenon.

CEO turnover. This variable is coded 1 for CEO replacement in the year of the reported environmental fine and 0 if there was no replacement. We obtained data from the Officer Details Report available at Thompson.

Control variables. In the treatment effects analysis, we use six covariates: financial performance, size, pollution level, capital intensity, sector category, and the period of an environmental fine. We also include these covariates as control variables in the moderated multiple regression models. Additionally, we control for duality, using a dummy variable coded 1 if a CEO also held the chair position on the firm's board and 0 otherwise, and we control for board independence, using the percentage of independent directors.

We use ROA and net sales (in billions of dollars) to control for financial performance and size, respectively, because previous research has consistently shown that they influence firm turnover and environmental performance (e.g. Christmann, 2004; Sharma, 2000). Additionally, because capital-intensive projects may generate more pollution and are more likely to be sanctioned, we control for each firm's capital intensity by using the value of property, plant, and equipment after depreciation, divided by sales (cf., Bansal, 2005). We also control for high-pollutant sectors because heavy polluters may be more sensitive to institutional pressure (Berrone, Fosfuri, Gelabert, & Gomez-Mejia, 2013). We categorize energy and utilities as high-pollutant sectors, since they have the highest CO_2-equivalent emissions in our sample and are the largest sources of greenhouse gas emissions from human activities during the period of analysis, 2006-2016 (EPA, 2018). Finally, we include year dummies.

RESULTS

Table 1 reports the descriptive statistics and correlations of the variables in our models. As shown, none of the independent variables are highly correlated. Moreover, the variance inflation factor (VIF) values are within acceptable limits for all control and independent variables.

Insert Table 1 about here

Table 2 reports the regression and combined effect analyses. We first analyze the total effect of *environmental fine* on *organizational attention* using an ordinary least squares (OLS) model. As we have a matched-pair design, we estimate the variance-covariance matrix using the cluster option to specify that the standard errors allow for intragroup correlation—that is, the observations are independent across pairs (clusters) but not necessarily within pairs (Rogers, 1993). Model 1 shows that the coefficient for *environmental fine* is statistically significant (coeff=0.03 | p=0.000), indicating that it has a positive effect on *organizational attention* to environmental issues, in support of Hypothesis 1.

Insert Table 2 about here

Hypothesis 2 predicts a moderating effect. However, to gain a deeper understanding of how CEO turnover relates to the relationship between organizational attention and CEP improvement, we first test for a mediating effect. Mediation analysis focuses on identifying the mechanism through which the X–Y relationship occurs (Baron & Kenny, 1986). A variable functions as a mediator to the extent that it explains the relationship between the predictor and the outcome variable. Therefore, in our analysis, we examine whether CEO turnover serves as the mechanism through which increased attention following a fine leads to CEP improvement.

Model 2 shows the mediation effect of *organizational attention* on *CEP improvement* using causal mediation analysis (*medeff* Stata models) (Hicks & Tingley, 2011), in which the mediator equation and the outcome equation are modeled via OLS. In both cases, we use a

cluster option by pairs to specify that the standard errors allow for intragroup correlation. If nothing is specified, the causal mediation analysis assumes that the levels of the treatment are 0 and 1 (Hicks & Tingley, 2011). We normalized the treatment variable in all the mediation analyses to range between 0 and 1.

Model 2 again captures the significant positive effect between *environmental fine* and *organizational attention* (coeff=-32.16 | p=0.000); however, our result does not show a statistically significant coefficient for the direct relationship between *organizational attention* and *CEP improvement*. The results displayed at the bottom of Table 2 confirm this: the ACME is statistically insignificant, as the confidence interval for this value contains zero [LLCI: -3.516, ULCI: 5.170]. We repeat the analyses with causal mediation using parametric regression models (*paramed* Stata models) (Emsley & Liu, 2013) in Model 3 and obtain the same results. Thus, the increased attention to environmental issues does not have a direct effect on improvement in CEP in our sample.

We next examine whether *CEO turnover* can transform the increased *organizational attention* into *CEP improvement,* as proposed in Hypothesis 2. A moderator is a variable that influences the direction and/or strength of the relationship between a predictor and the outcome variable (Baron & Kenny, 1986). In our study, we test whether the impact of organizational attention on CEP improvement varies in magnitude depending on a third variable: CEO turnover. Specifically, in Model 3, we test whether there is a moderating effect of *CEO turnover* on the relationship between *organizational attention* and *CEP improvement.* To conduct the moderation analysis, we center the continuous independent variables. As shown in Model 4, the interaction effect is positive and significant (coeff 0.32| p=0.000). Therefore, we find support for Hypothesis 2 by confirming that *CEO turnover* and *organizational attention* have a joint positive interactive effect on *CEP improvement.*

Figure 1 illustrates the two models tested to examine the potential role of a CEO change in the relationship between organizational attention and CEP improvement. The findings allowed us to discard the mediation model, providing support for the moderation model proposed in hypothesis 2.

Insert Figure 1 about here

Finally, we graphically illustrate the relationship between *CEO turnover*, *organizational attention*, and *CEP turnover* in Figure 2. Figure 2 shows that *organizational attention* is positively related to *CEP improvement* when *CEO turnover* follows *environmental fine*. Interestingly, the relationship between *organizational attention* and *CEP improvement* is almost nonexistent when the CEO remains.

Insert Figure 2 about here

DISCUSSION

Our results suggest that, paraphrasing a famous anthropomorphic frog, it ain't easy being greener. We found that large environmental fines increased the attention that sampled firms gave to environmental issues. However, this increase in attention did not transform into improvement in CEP unless accompanied by CEO turnover. Thus, we found that the combination of an external and internal shock led to improved CEP, whereas an external shock alone was inadequate.

These intriguing results have significant implications for research and practice. Environmental fines are a core regulatory mechanism used to generate environmental changes in firms (Aragon-Correa et al., 2020), yet they are focused more on remediation than on prevention and, as a consequence, they may be less effective than stakeholder pressure under specific circumstances (Kassinis & Vafeas, 2006). Adding to this literature, we find that a large environmental fine can serve as a shock ample to change attentional patterns in firms. However, the effect of such a fine on CEP is moderated by organizational leadership, supporting previous

work that highlights the importance of internal agents for achieving broader social and environmental impacts (Alt & Spitzeck, 2016; Heucher et al., 2024; Mellado et al., 2025). Attention produces action through people, so turnover in key people can shift attention structures in strategic ways and work as an important mechanism for increasing the adoption of new strategies and practices that allow CEP improvements. In contrast, a retained CEO may be hesitant to take the multi-year action needed to substantively improve CEP after a large environmental fine, and instead may wish to pay the fine and move on. Overall, organizational leadership is an important factor to account for in understanding how to get firms to go greener.

Our results also have interesting implications for the ABV literature. An ABV explains firm behavior based on attention allocation, arguing through its "first principle" that firm behavior is a function of selective attention allocation (Ocasio, 1997). This principle is shared broadly in the well-established managerial theories on which an ABV is built, to include the foundational work of Simon (1947). According to Ocasio (1997: 202): "Existing theories of bounded rationality, enacted environments, and managerial cognition all share the first principle of the theory – that what decision-makers do depends on how they selectively focus their attention on certain characteristics of the organization and its environment, and ignore others." We found that major events can shift the focus of attention within a firm. However, to link this shift in attention to specific actions, we must account for the role of leadership, as attention produces action through people.

Our analysis shows that greater organizational attention to environmental issues does not automatically translate into improvements in environmental performance, highlighting a persistent gap between attention and action in the ABV literature. While most of the ABV literature has focused on the conditions associated with organizational attention to specific topics and their subsequent implications (e.g. Hendricks, Slangen, & Heugens, 2017; McCann & Shinkle, 2017), studies in the last decade have begun to examine the factors influencing the

gap between attention and action. For example, some empirical studies demonstrate that attention fails to lead to subsequent action when top management attention is not aligned with employee attention at the operational level (e.g. Kanashiro & Rivera, 2019; Vuori & Huy, 2016; Rhee, Ocasio, & Kim, 2019). Top management team trust also has an important role in facilitating learning from failures and improved strategic decisions (Carmeli, Tishler, & Edmondson, 2012). Other work argues that attention will fail to produce action when resources and capabilities to implement the agendas attracting managerial attention are lacking (e.g. Kaplan, 2008). The difficulty firms have experienced in adapting to natural disasters exacerbated by climate change, for example, suggests that executives require not only heightened attention to environmental issues but also a more sophisticated investment model to implement the necessary improvements (Rivera Oh, Oetzel, & Clement, 2022). An analysis of the U.S. printing and publishing industry has shown that top management diversity helps to broaden the scope of organizational attention and its subsequent ability to innovate (Narayan, Sidhu, & Volverda, 2021). Individuals composing the top management team and their attention structure also affect their collective ability to diagnose strategic issues (Maqsood et al., 2025; Miller & Lin, 2022). Where the need for strategic change is clear, managers may engage in sensegiving efforts designed to decouple talk from action, enabling symbolism to prevail over substantive change (Fiss & Zajac, 2006; Kanashiro & Rivera, 2019). Our findings extend the ABV literature, as well as the literature on environmental performance, by showing that leadership turnover after large environmental fines may influence the potential to transform attention into environmental action.

Our study furthers the ABV literature by fostering a deeper understanding of how issues that are communicated across an organization shape what gets done within it (Ocasio, Loewentein, & Nigam, 2015). Our analysis of organizational attention through letters to shareholders confirm that there were significant changes in managers' utilization of vocabulary,

thus answering calls for attention to the role of communication in the ABV literature (Ocasio et al., 2018). However, our results suggest that the ABV focus on vocabulary needs a more detailed examination of the symbolic role of the leadership narrative in the firm.

In addition, while the literature on environmental performance is dominated by the resource-based view of environmentally proactive firms, suggesting that certain valuable resources and capabilities are a requirement for environmental progress (Aragon-Correa & Sharma, 2003; Bansal, 2005; Klassen & Whybark, 1999; Marcus & Geffen, 1998), our results extend this literature by showing that resources with negative implications (e.g., organizational experience with fines and turnover) may serve as a stimulus for positive changes under certain circumstances.

This study, of course, has limitations. First, our analysis was conducted on a sample of North American firms. Although similar behavioral patterns could be observed in other regions, it is important to note that cultural differences might significantly influence the way fines impact attention and the specific mechanisms driving changes in CEP. For instance, variations in societal attitudes toward regulations, enforcement practices, and the perceived fairness of fines could alter the observed effects. These cultural and contextual factors underscore the importance of conducting future studies that explore how such dynamics unfold in diverse geographical and cultural contexts.

Second, although we aimed to compare fined firms with similar non-fined firms in our matching process, firms in our control group are smaller on average in terms of revenue. Nevertheless, our sample is as optimal as possible given the available data. However, there are also some unique characteristics of our sample that might partially limit the generalizability for our findings. Environmental regulatory uncertainty in the sampled period, including political doubts about orientation and future levels of climate change stringency, may have influenced CEOs to perceive environmental issues as a technical field in which they assumed a more

executive and less active role in pushing beyond attention and into action. Scholars have offered myriad examples of how most CEOs tend to maintain little interest in environmental issues under regulatory uncertainty (Aragon-Correa et al., 2020), even if some proactive leaders may benefit in this situation (e.g., Kolk & Mulder, 2011).

Third, our variable *environmental fine* is designed to capture the total dollar amount of fines a company receives each year for the analyzed period (2006-2016). The objective is to determine whether this monetary penalty influences corporate environmental performance (CEP). While this study focuses on the monetary value of fines, the frequency with which a company is fined could also provide further insights into whether repeated fines draw greater attention to environmental issues. This is an area that future research could explore further.

Fourth, future research might also consider different factors that can ameliorate the gap between regulatory stimuli, attention, and action. For example, Vuori and Huy (2016) note that certain attention structures influence shared emotions, and these shared emotions amongst organizational participants can either enable or, as shown in their study, inhibit effective adaptation to changing environmental conditions. Additionally, contingent external dimensions may either enhance or hamper the adoption of environmental initiatives (Dowell & Muthulingan, 2017; Marquis, Toffel, & Zhou, 2016) and different levels of institutional monitoring make organizations' responses to environmental fines more effective (Kanashiro & Rivera, 2019). Furthermore, turnover in other executives directly involved in environmental operations after a large environmental fine, other than the CEO, should be studied in future analyses. Additionally, our annual measures of CEO turnover and fines may fail to capture relevant effects that happen across years. Moreover, other measures of CEP that capture a range of additional environmental impacts should be tested. More generally, it would be useful to analyze the environmental performance effects associated with a range of combinations of external and internal factors across a range of countries (cf. Matten & Moon, 2008).

Finally, scholars may also wish to investigate the relationship between environmental fines, leadership turnover, and CEP at the industry level. The reputational impacts of environmental misconduct at one firm have been shown to spread across an industry (King, Lenox, & Barnett, 2002), creating "commons problems" that can drive firms to create new institutions to improve environmental performance across the industry (Barnett & King, 2008). Hoffman and Ocasio (2001) explored how various shocks shift attention to the environment within an industry. King and Lenox (2000) showed that the industry self-regulatory institutions that arise in the aftermath of this attentional shift led to no substantive improvement in CEP. However, this limited literature has not considered the moderating role of leadership turnover in explaining why some firms are more likely than others to improve CEP in the aftermath of environmental misdeeds and resulting fines at another firm in the industry.

Our results also have implications for practitioners and policy makers. A special report on regulatory sanctions in *The Economist* (2014: 20) stated that "in another era, this sort of research might have been of purely academic interest, but now it is needed to create a more reasonable, disinterested, cohesive, and transparent system." We agree. Our longitudinal analysis of the largest environmental fines in the U.S. and Canada reveals that the existence of a financial penalty can raise organizational attention, but it may not be ample to guarantee positive subsequent change in a firm's environmental performance. Our results have shown that internal structural changes facilitate the transformation of this attention into subsequent environmental improvements.

CONCLUSION

Corporate greening, while widespread and deeply embedded, has proven insufficient overall. Regulatory intervention can drive firms to focus more attention on greening, but transforming this attention into substantive improvement in environmental performance is facilitated by internal change that can disrupt established routines. Future research should explore additional

combinations of external and internal factors that are ample to drive further improvement in corporate environmental performance.

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Table 1.
Descriptive Statistics and Correlations [a]

Variable	Mean	SD	1	2	3	4	5	6	7	8	9
1. Org. attention	0.14	15.84									
2. Env. Fine	8.64	70.28	0.11								
			0.115								
3. CEP improvement	2.36	12.60	0.09	-0.08							
			0.216	*0.285*							
4. Financial profitability	3.30	6.97	0.02	0.05	-0.05						
			0.808	*0.516*	*0.443*						
5. Size	30.26	61.11	-0.00	0.09	-0.05	0.21					
			0.965	*0.215*	*0.439*	*0.002*					
6. Capital intensity	0.46	0.29	-0.01	0.06	0.07	0.02	0.05				
			0.845	*0.409*	*0.346*	*0.776*	*0.477*				
7. Pollutant sector	0.60	0.49	-0.11	0.09	0.05	0.14	0.03	0.17			
			0.119	*0.220*	*0.491*	*0.042*	*0.716*	*0.016*			
8. CEO duality	0.61	0.49	0.01	-0.07	-0.02	0.26	0.19	-0.16	0.03		
			0.932	*0.313*	*0.790*	*0.000*	*0.007*	*0.026*	*0.719*		
9. Board independence	84.62	9.64	-0.14	-0.16	-0.04	-0.12	0.01	-0.15	-0.03	-0.07	
			0.043	*0.019*	*0.616*	*0.094*	*0.854*	*0.037*	*0.641*	*0.338*	
10. CEO turnover	0.09	0.28	0.17	-0.03	0.03	0.02	-0.01	-0.03	0.04	0.04	-0.18
			0.014	*0.707*	*0.646*	*0.745*	*0.890*	*0.715*	*0.565*	*0.595*	*0.009*

[a]Table contains Pearson's correlation coefficient. P-values in italics. n=204 firms.

Table 2.
Regression and Causal Mediation Analyses for Organizational Attention

	Model 1		Model 2		Model 3 (paramed)		Model 4	
Organizational attention	coeff	se	coeff	se	coeff	se	coeff	se
Financial profitability	0.06	0.14	0.06	0.14	0.06	0.19		
Size	-0.01	0.01	-0.01	0.01	-0.01	0.02		
Capital intensity	0.50	4.99	0.50	4.99	0.50	3.96		
Pollutant sector	-6.12**	2.07	-6.12**	2.07	-6.12**	2.31		
CEO duality	0.64	2.49	0.64	2.49	0.64	2.35		
Board independence	-0.10	0.14	-0.10	0.14	-0.10	0.12		
Year dummies	*Included*		*Included*		*Included*			
Env fine	**0.03*** **	**0.01**	**32.16*** **	**5.64**	**0.03***	**0.02**		
CEO turnover	9.10*	4.16	9.10*	4.16	9.09*	3.86		
Constant	12.09	14.97	12.09	14.97	12.09	10.85		
R^2	*0.14*		0.14		0.14			
F R2 (d.f)	14.94***	(11,67)	14.94***	(11,67)	2.76**	(11,192)		
CEP improvement								
Financial profitability			-0.17	0.12	-0.16	0.15	-0.18	0.11
Size			-0.01	0.01	-0.00	0.02	-0.01	0.01
Capital intensity			3.72	2.58	3.64	3.26	4.27	2.61
Pollutant sector			-0.12	1.55	-0.00	1.95	-0.18	1.55
CEO duality			-0.05	2.02	-0.10	1.93	0.14	2.01
Board independence			-0.01	0.08	-0.01	0.10	-0.03	0.08
Year dummies			*Included*		*Included*		*Included*	
Env fine			-12.57***	2.59	-0.04	0.06	-0.01***	0.00
Organizational attention			0.04	0.07	0.03	0.06	-0.00	0.08
Ceo Turnover					-0.31	3.22	-2.66	1.78
Env. fine x Org. attention					0.00	0.00		
Org. attention X Ceo turnover							0.32***	0.09
Constant			1.10	7.47	1.30	8.92	1.06	7.41
R^2			*0.09*		*0.03*		*0.11*	
F R2 (d.f)			7.85***	(11,67)	1.47	(13,190)	11.18***	(13,67)

Causal Mediation Analyses for Model 2

	Mean	[95% Coef. Interval]	
ACME	1.026	-3.516	5.170
Direct effect	-12.628	-17.527	-7.649
Total Effect	-11.602	-17.011	-5.379
% of Total Effect mediated	-0.087	-0.189	-0.060

[a] † 0.1 * 0.05 **0.01 ***0.001 level. All the relevant exact p-values in our analysis are included in the text. n=204.

Figure 1.
Combined effect of attention and CEO turnover

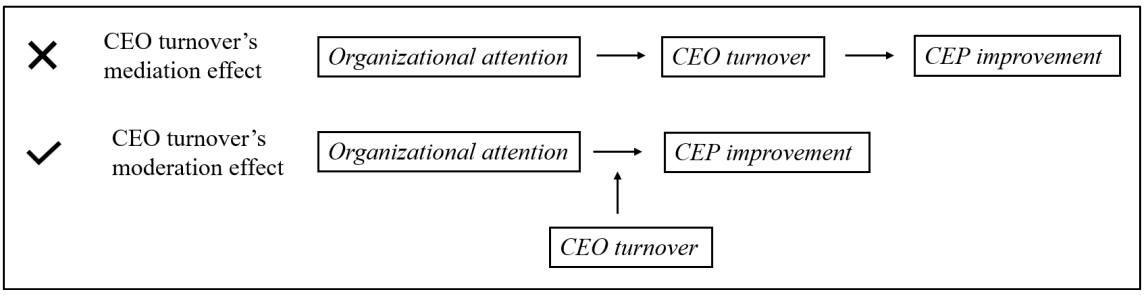

Figure 2.
Combined effect of attention and CEO turnover