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ESG and CEO turnover around the world

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ABSTRACT

We investigate whether CEOs around the world are held accountable for stakeholder-related corporate misbehavior. The likelihood of CEO turnover increases significantly when the media coverage of the ESG incidents reaches extreme levels. CEO turnovers occur even in the cases where an incident does not lead to a stock price decline. In such cases, the board likely has a non-pecuniary motive for the turnover. This suggests that such non-pecuniary reputational concerns are an important determinant of CEO turnover decisions around the world, especially when the firm is facing intense public pressure due to stakeholder-related corporate misbehavior. This effect is more pronounced when firms are headquartered in stakeholder-oriented countries like many European countries.

1. Introduction

When corporate misbehavior has a direct impact on shareholders, it has a well-documented effect on Chief Executive Officer (CEO) turnover (Desai et al., 2006; Hazarika et al., 2012; Karpoff et al., 2008a). Following financial misrepresentation, for instance, CEOs are often fired and some are even sent to jail (Karpoff et al., 2008a). However, less is known about how corporate misbehavior that harms firms' nonfinancial stakeholders (employees, customers, the environment, communities) affects managerial turnover. While the traditional shareholder governance model holds the firm and its management exclusively responsible to shareholders' interests, there is a long-standing debate on whether corporations' accountability extends also to its stakeholders and the society they operate in (Ferrell et al., 2016; Macintosh, 1999). In this paper, we study whether boards around the world hold CEOs accountable for stakeholder-related corporate misbehavior.

When corporate social irresponsibility is accompanied by a stock price decline, i.e., shareholders are hurt, the interests of shareholders should align with those of stakeholders (Karpoff, 2021). Environmental, Social, and Governance (ESG)-related scandals such as Volkswagen's *emission scandal* in 2015 and British Petroleum's *Deepwater Horizon oil spill* in 2010 lead to a widespread negative media coverage, hurt both shareholders and stakeholders, and ultimately resulted in the dismissals of the firms' CEOs. Such heavy media coverage of ESG issues could taint a firm's business reputation (Baloria and Heese, 2018) and harm future sales and earnings, which are

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a form of pecuniary costs (Dupont and Karpoff, 2020). Thus, we expect that such damage to corporate reputation could trigger boards to act decisively as shareholders are hurt.

However, boards could choose to discipline their CEOs also due to ESG incidents that hurt primarily the stakeholders. As the media can shame both the managers and the directors alike, which "affects their reputations in the eyes of society at large" (Dyck and Zingales, 2002), the directors may be tempted to shift the blame to the CEO. Such reputational considerations tend to be non-quantifiable and refer to social status and self-esteem (Dupont and Karpoff, 2020). An anecdotal example of this is Rio Tinto's *Juukan Gorge* incident, where the firm blew up a 46,000-year-old sacred indigenous site in its mining operations. The company did not directly violate any laws, and our estimate of the cumulative abnormal return (CAR) for the [−5, +5] window is roughly +8%. Nevertheless, the incident led to widespread negative media scrutiny of the firm and resulted in the CEO being replaced. While we are, to our knowledge, the first to consider the effects of ESG incidents on CEO turnover in a comprehensive international sample, our main contribution lies in attempting to separate pecuniary and non-pecuniary effects in board decision-making related to CEO replacements. In that effort, we base our work on Karpoff and Lott (1993) who measure the total pecuniary costs of corporate misbehavior by its valuation effect, which captures both the direct costs such as legal penalties and clean-up costs as well as the indirect costs such as an increase in a firm's cost of capital and/or a decrease in sales due to lost reputational capital. With the same logic, reputational effects that are not reflected in firm valuation are non-pecuniary. In simple terms, when a CEO is replaced despite good stock performance upon a severe ESG incident that attracts intense media coverage, we argue that the board's motive to replace the CEO involves non-pecuniary considerations, such as loss of personal reputation and shaming by the media.

The boards' non-pecuniary motives could vary by country. For example, in many civil-law countries, stakeholder representatives serve on the corporate boards (Adams and Ferreira, 2007), the local media exerts stronger pressure on firms to behave in a socially responsible manner (Bénabou and Tirole, 2010), and the firms in these countries tend to pay more attention to stakeholder interests and ESG practices (Liang and Renneboog, 2017). Therefore, we hypothesize that, following ESG issues with little impact on shareholder wealth, CEO turnover odds can vary by country-specific focus on stakeholder interests. Our international sample of turnovers allows us to test such a hypothesis, as we can include various country-level covariates —E/S/G norms among them— in our analysis.

It is possible that investors are not able to estimate the full extent of the pecuniary costs of an ESG incident accurately. In that case, our analysis would overestimate the non-pecuniary costs, as we have thus far relied on the short-term stock reaction as a measure of pecuniary costs. To alleviate this concern, we also consider metrics that capture the long-term materiality of an ESG-incident, including changes in sales, market share, profit margin, the composition of the board, and institutional ownership.

To test the above hypotheses, we collect information about CEO turnovers in 18 countries. We combine manually collected data from annual company reports and various biographical online sites with ExecuComp, Orbis, and CapitalIQ datasets for a total of 2254 CEOs. The data on ESG-related news coverage is compiled by RepRisk. Each day, RepRisk screens >100,000 media and stakeholder sources for ESG-related news in 23 different languages. Based on the severity, the scope, and the expected impact of the news, RepRisk quantifies a firm's risk exposure to stakeholder issues (the "ESG risk") with their Reputational Risk Index (RRI), which varies between −1 and 100. We obtain the monthly RRI for the constituents of the S&P 500 and the Stoxx Europe 600 indexes and extract the peak RRI for each firm in each calendar year. Following RepRisk's methodology, we divide firms into three categories based on their peak RRI in a year: (1) normal, (2) high, and (3) extreme levels. We then contrast the CEO turnover rates in the extreme risk category (i.e., the most intense media coverage) to the rest of the sample. By using an objective news-related metric on negative ESG-performance, we alleviate common concerns that ESG metrics are affected by "greenwashing" —whereby firms exaggerate their corporate citizenship virtues in order to manipulate their CSR-ratings— and reliability issues (Berg et al., 2022).

Our univariate analysis indicates that the unconditional probability of observing a CEO turnover in the [−6, 12] monthly interval (we follow Beneish et al. (2017) in choice of interval) is significantly higher for firms with extreme risk exposure (RRI $\geq$ 60) in a year than it is for firm-years with RRI below 60 (18.9% versus 13.9%). Multivariate logistic regression models indicate that, ceteris paribus, the probability of a CEO losing his or her job is roughly 9.4 percentage points higher (average marginal effects; 24.0% versus 14.6%) when a firm has extreme risk exposure in a year. These results are robust to the inclusion of CEO-specific, firm-level, and country-level control variables; year, industry, and country fixed effects; a wide variety of model specifications; as well as employing alternative measures of CEO turnover. Moreover, the results of a regression kink design (Card et al., 2015), suggest that there is a significant slope change in CEO turnover probability which occurs around the cutoff for extreme RRI, and not at lower RRI values.

We next ask whether non-pecuniary motives alone are sufficient to instigate boards to replace a CEO for an ESG event. We find that, besides the ESG events with negative CARs, also the ones with positive CARs are connected to higher CEO replacement odds. This finding is concentrated to the ESG events for which there is intense pressure put on the firm and its executives by the media and the public (proxied by the RRI reaching levels of 60 or above). It is robust to numerous control variables, using different event windows, and also to use of alternative materiality variables as opposed to the short-term stock reaction.

In our international sample, we explore three country level channels for the non-pecuniary effect, capturing environmental, social, and governance norms, respectively, of a country. We find that CEO turnovers connected to positive stock reactions are more pronounced in countries that have high E, S, and G norms, respectively, as measured by the Yale Environmental Performance Index, the Employment Laws index by Botero et al. (2004), and the Voice and Accountability Index (a World Governance Indicator) by the World Bank, respectively. This effect is also stronger in the more stakeholder-oriented European countries (of which many have a civil-law system in place) than in the US (a shareholder-oriented common-law country) (Liang and Renneboog, 2017; Tirole, 2001).

The above findings provide insights into three different strands of the literature. First, by analyzing the link between ESG risk and the probability of CEO replacement in an international sample of firms, we contribute to the vast literature examining ex post disciplining of managers following various types of misconduct (Karpoff et al., 2008a; and others) by documenting that also non-pecuniary motives can play a role in CEO replacement decisions. Second, we provide new evidence regarding country-level

differences in importance of ESG/CSR (Liang and Renneboog, 2017). And third, we shed light on the non-pecuniary motives behind the CEO turnovers and the media's role in corporate governance (Baloria and Heese, 2018; Dyck et al., 2008; Dyck and Zingales, 2002; Kuhnen and Niessen, 2012; Miller, 2006) by providing evidence that media pressure following an ESG incident can have a distinct impact on CEO turnover beyond the effect of the stock market reaction it causes. The disciplining role of the media during ESG incidents with non-pecuniary implications can vary cross-sectionally with the sensitivity of countries to stakeholder issues.

2. Background and hypothesis development

Karpoff et al. (2008b) note that market-based disciplining applied on managers and firms for misconduct (the indirect pecuniary costs), combined with monitoring effects arising from strong corporate governance (Fama and Jensen, 1983; Levit and Malenko, 2016; Nguyen et al., 2016) and a legal system with firm-level penalties (the direct pecuniary costs), can deter corporate misbehavior. Also, corporate accountability reporting (Christensen, 2016), corporate culture (Liu, 2016), and whistleblowers (Dyck et al., 2010) can be effective in detecting and curbing misbehavior. On the other hand, unethical managers (Cline et al., 2018), CEO connectedness (Khanna et al., 2015), and competitive incentives within the management team (Haß et al., 2015) can make things worse.

Corporate misbehavior related to a firm's financial statement (earnings restatements, financial fraud, etc.) tends to generate pecuniary losses for shareholders over and beyond the size of the direct costs (Karpoff and Lott, 1993), which suggests that a large portion of this shareholder wealth loss can be as attributed to reputational penalties (lost sales, higher costs, etc.). Furthermore, legal penalties and investor reactions to misbehavior vary by the type of economic misconduct (Bizjak and Jeffrey, 1995; Gande and Lewis, 2009; Haslem et al., 2017; Karpoff et al., 2008b). Nonetheless, the common feature of such misconduct is that shareholders are impacted by them, and as a result the corporate boards tend to replace the top executives.[1]

Whether corporate misbehavior with no direct link to investors triggers CEO replacement remains an open question. Socially questionable managerial indiscretions (sex scandals, etc.) tend to increase the likelihood of forced CEO turnover, and this effect is more pronounced when they lead to pecuniary reputational penalties for the firm (Cline et al., 2018). There are also types of misconduct that fail to instigate substantial reputational losses for the firm, such as environmental violations (Karpoff et al., 2005). Other factors not directly linked to shareholders that have been argued to affect the likelihood of CEO turnover include nonfinancial motives of prosocial directors and employees (Bereskin et al., 2020), and significant improvements (decreases CEO turnover odds) versus declines (increases CEO turnover odds) in a firm's CSR performance (measured using ESG/CSR ratings) (Dai et al., 2021). Aharony et al. (2015) report that environmental lawsuits do not increase CEO turnover odds in a sample of US firms, but their study focuses only on lawsuits in US. Although both economic and other types of corporate misbehavior often receive substantial attention from media and non-governmental organizations (NGOs), many ESG issues may not lead to lawsuits due to lack of effective regulation addressing the particular issue (Bénabou and Tirole, 2010). Nonetheless, the negative media publicity can affect factors such as CEO compensation setting (Kuhnen and Niessen, 2012) and director reputation (Colak et al., 2022). In a related paper to ours, Burke (2022) finds that the number of news articles covering ESG issues is associated with an increased likelihood of CEO turnover in US firms. Our study adds to this literature by considering the effects of ESG risk on CEO turnover in an international sample, with rich variation in ESG focus across countries. This cross-country sample allows us to analyze whether ESG incidents with little impact on shareholder wealth (non-pecuniary) would influence CEO turnover decisions by the board, of which little is known (Dupont and Karpoff, 2020). Thus, we hypothesize that:

Hypothesis 1. *In an international sample of firms, ESG risk increases CEO turnover odds.*

In a shareholder governance world, an ESG risk that materializes in losses for shareholders (there are pecuniary costs) is expected to increase CEO turnover odds. However, a natural question is whether boards would replace CEOs for ESG incidents with little or no pecuniary costs. This could be the case if the media pressures directors to act not just in the shareholders' best interest —which is their fiduciary duty— but in a "socially acceptable" manner (non-pecuniary effects) (Dyck and Zingales, 2002). We hypothesize that such non-pecuniary motives associated with ESG issues can be a driver of the CEO replacement decisions around the world:

Hypothesis 2. *The non-pecuniary considerations related to an ESG issue have a significant impact on the CEO replacement decision around the world.*

Only a few prior studies investigate CEO turnovers in an international setting. Defond and Hung (2004) use a sample from 33 countries, and report that the probability of the CEO being fired following poor performance increases with strength of country's law enforcement institutions. Burns et al. (2023) report that CEO turnover sensitivity to poor performance varies by a country's cultural values and legal regimes. Finally, using a sample of Chinese firms, You et al. (2018) report that negative news by market-oriented media increases the odds of forced CEO turnover. Our third hypothesis focuses on the inherent differences between countries in terms of their sensitivity to ESG problems. We build on the notion that some countries, such as many civil-law countries, are more sensitive to stakeholder issues (Tirole, 2001), and consequently firms in these countries tend to score high on ESG ratings (Liang and Renneboog, 2017). Thus, we expect that firms in more stakeholder-oriented countries (high E/S/G norms) are more likely to replace a

[1] Overall, poor firm performance significantly increases the probability of CEO replacement regardless of whether the firm is involved in a misconduct (Eisfeldt and Kuhnen, 2013; Warner et al., 1988; Weisbach, 1988). Interestingly, factors outside of a CEO's control, such as industry- or market-wide performance shocks, also increase CEO turnover odds (Jenter and Kanaan, 2015). Furthermore, Huson et al. (2001) report that forced CEO turnover has become more common over time but the relationship between poor firm performance and turnover has remained largely the same.

CEO for ESG issues which do not necessarily reduce firm value, but the negative media coverage is intense enough to shame the corporate board in front of the public:

Hypothesis 3. *The non-pecuniary motives behind the CEO replacement decisions by the board vary by country-specific factors.*

3. Data sources

3.1. CEO turnover data

Our sample of CEO turnovers in 18 different countries is manually constructed using the following steps. We focus only on large companies that were part of either the S&P 500 or the Stoxx Europe 600 indices between 2007 and 2017. We find 1747 such firms.[2] We attain data on CEO turnovers in S&P 500 firms from the ExecuComp database, and manually check and verify the timing of each turnover event. For Stoxx Europe 600 firms, we hand-collect information on CEOs' names and replacement announcement dates using various databases and online sources (e.g., CapitalIQ, Orbis, annual reports, online biographies of executives, and other websites). Whenever a CEO change occurs in a calendar year *t*, we keep information for the incumbent CEO who is being replaced. If a firm has multiple CEO changes in a year, we remove observations for newly assigned CEOs as we view these as less likely to be held culpable for the misbehavior that occurred during that year. We also manually gather information on CEOs' nationality, age, tenure, gender, chairman status, founder status, etc.

For all the CEO turnovers, we follow Hazarika et al. (2012) and remove those cases in which the company was acquired, merged, or there was a spinoff. Using manually collected announcement dates for the 1564 CEO turnovers in our sample, we track CEO replacements in the fixed [−6, 12] monthly interval relative to the month in which the RRI index peaks in a calendar year. Our choice of interval follows Beneish et al. (2017) who argue for the inclusion of six months prior to an incident as boards could be aware of a firm's ESG issues before the media learns about them and replace the CEO based on this information.[3] We gather CEO data between July 2006 and December 2018, as the period for observing risk exposure is between 2007 and 2017 and we track turnover a maximum of 12 months after, and 6 months prior, a peak in the RRI index in month *m* of year *t*. Using this interval, we find that the average CEO turnover rate (in the [−6, 12] monthly interval) in our cross-country sample is 14.1%.[4]

In addition, Burns et al. (2023) argue that it is difficult to distinguish between voluntary and forced CEO turnovers in an international study as cultural variation across countries could affect the willingness of firms to communicate the real reasons behind a replacement. Therefore, in additional tests, we follow the methodology in Jenter and Lewellen (2021), which relies on more objective criteria to classify the turnovers into the ones caused by poor performance (performance-induced) and the ones which occur when performance is strong (other).

3.2. RepRisk data

To measure ESG risk, we rely on the RepRisk database (available via WRDS) which measures the intensity of media coverage of an ESG-related issue, and which is often used by major banks, financial institutions, and corporations around the world as a due diligence, research, and monitoring tool. RepRisk is a Swiss-based company which uses machine learning algorithms to screen 100,000 public media sources for stakeholder-related ESG issues in 23 different languages each day (as of September 2021). The database covers ESG risk exposure of >120,000 public and private companies. When a new risk incident occurs, RepRisk analyzes the novelty and severity of the incident to estimate the impact it is expected to have on a firm's risk exposure. This process is quantified in the form of a reputational risk index (RRI), and it is mostly based on non-subjective measures such as the number of news articles covering a certain ESG incident, the number of persons affected by the incident, the statuses and circulations of the newspapers reporting on the incident. The database also includes information on a firm's top ESG issues and their types, and the news counts for top issues by severity and by reach. The RepRisk data are available for 1568 of the 1747 firms in our CEO turnover sample.

The RRI index captures the negative media attention to ESG issues and hence differs conceptually from traditional ESG/CSR performance ratings in several ways. For instance, ESG/CSR ratings rely to some degree on self-reported content (such as "sustainability reports" or "sustainability sections" in annual reports). Common critiques of such measures are that a firm may be able to influence its ESG score by overstating its ESG/CSR activities (so called greenwashing), and that ratings vary considerably between

[2] This sample includes also firms that were later removed from these indices, to avoid survivorship bias. This is important in our context as our focus is on negative media events which could instigate a significant loss of market value, leading to the exclusion of the firm from the index. Additionally, by focusing on large public companies, we mitigate some of the concerns that media scrutiny is likely to be higher for larger than for smaller firms.

[3] To mitigate reverse causality concerns, we employ in robustness tests alternative CEO turnover intervals: [−3,12], [−1,12], [0,12], and [−3, 6], respectively. We also change the tracking of turnovers so that it is relative to the first month in which the RRI crosses 60 in a year (rather than the month in which the RRI peaks).

[4] When measuring CEO turnover by calendar years, we find that the turnover rate is 9.5%. In comparison, Burns et al. (2023) and Defond and Hung (2004) report annual turnover rates of 12% and 15%, respectively. The lower rate reported by us and Burns et al. (2023) may be due to the manual screening of CEO turnovers and the removal of merger-related turnovers. Also, the average CEO turnover rates in our sample stratified by country (depicted in Table Panel D of Table 1) are similar to those reported in Burns et al. (2023). Finally, the CEO turnover rate in our study is quite similar to other studies based on US data, such as Jenter and Lewellen (2021).

rating agencies (Berg et al., 2022). In addition, low rankings on these metrics do not necessarily mean that a firm has negative ESG issues (which is the focus of this study), it may simply invest, or report, less on ESG activities than similar firms. We avoid such problems by relying instead on an objective measure of negative media attention to ESG, a variable which a company does not control directly. This point is also argued by Li and Wu (2020) and Gantchev et al. (2022).[5]

The RRI index is an integer variable that ranges from −1 to 100. According to RepRisk's classification, values equal to −1 indicate that a firm has no reported ESG issues, and values between 0 and 24 indicate low ESG risk exposure. Similarly, values between 25 and 49 indicate medium, 50–59 high, 60–74 very high, and 75–100 extremely high risk exposures. If a firm in any given month has new risk incidents, the RRI can go up, depending on the impact (severity, novelty, and reach) of the incident and the news. If there are no incidents, the RRI decays at a rate of 25 every two months if the index value is between 25 and 100, and at a rate of 25 every eighteen months if the value is between −1 and 24. According to RepRisk's methodology, values of 50 or above indicate that a firm has elevated levels of risk exposure to ESG issues, while values under 50 indicate "normal" levels of risk exposure. For example, RepRisk notes that when larger firms have no major ESG issues, they are still expected to have values between 25 and 49 due to their larger media coverage compared to smaller firms.

We group firm-year observations into three groups depending on the level of risk exposure: (1) normal levels ($-1 \leq RRI \leq 49$), (2) high levels ($50 \leq RRI \leq 59$), and (3) extreme levels ($60 \leq RRI \leq 100$). This procedure follows the RepRisk methodology, except that we combine firms with very high and extremely high risk exposure into the same group (which we name *Extreme RRI*) as there are only 13 firm-years with extremely high RRI in our sample.[6] To illustrate how the RRI index moves over time, Fig. 1 shows the monthly progression of the RRI for Volkswagen for years 2015 and 2016 and portrays how the firm's RRI jumped to extreme levels following the outbreak of the emission scandal in September 2015. The gray bars indicate the months (−6 through 12) for which CEO turnover is tracked around a peak in RRI in a year.

3.3. Other data sources

Accounting variables are from COMPUSTAT. Data on total stock returns are from COMPUSTAT Global and North America, as well as from Center for Research in Security Prices (CRSP; used to calculate the market-adjusted stock performance control variable). Data on institutional ownership are from FactSet, and data on corporate board characteristics come from BoardEx. Country-level time-variant control variables are similar to those used in Liang and Renneboog (2017) and are attained from sources including World Bank Database, Polity IV, etc. Detailed descriptions of the variables, and their data sources, are shown inAppendix Table A.1.

4. Empirical methodology, sample construction, and event study

This section describes our main empirical specification (turnover likelihood estimation), our panel sample construction, and our event study methodology using the RRI measure.

4.1. Turnover likelihood estimation

We model the probability of a CEO being replaced at firm *i* when an extreme RRI is observed in year *t*. Turnover is measured in the [−6, 12] monthly interval relative to a peak in the RRI index in month *m* of year *t*. Our baseline model is given by the equation:

$$Pr\left(Turnover_{i,t}=1\right)=F\left(\beta_0+\beta_1 Extreme\ RRI_{i,t}+\boldsymbol{X}_{i,t}^{'}\delta+\boldsymbol{Z}_{i,t-1}^{'}\gamma+\boldsymbol{C}_{i,t-1}^{'}\varphi+\eta_t+\xi_c+\theta_s\right), \quad (1)$$

where *F*(.) is the cumulative logistic distribution, *i* indicates the firm, *c* the country, *s* the industry, and *t* the year.[7] $\boldsymbol{X}_{i,t}$ is a vector of CEO-control variables; $\boldsymbol{Z}_{i,t-1}$ is a vector of firm-level accounting, stock performance, governance, and institutional ownership controls measured in year *t–1* (except for the stock performance which is measured during the months [−24, −1] relative to the month of the peak RRI in year *t*); and $\boldsymbol{C}_{i,t-1}$ is a vector of time-variant country-level controls measured in year *t–1*. We winsorize all continuous control variables at the 1st and 99th percentiles. Year, country, and industry fixed effects are represented by η_t, ξ_c, and θ_s, respectively. The calendar year fixed effects account for potential yearly variation in CEO turnover rates; country fixed effects (where firm

[5] The correlation between the peak RRI in a year and Refinitiv's ESG Total Score variable in our sample is 0.43, which rather surprisingly indicates that firms with higher ESG scores tend to have higher ESG risk. In Fig. IA.3 in the Internet Appendix, we illustrate that for firm-years with extreme RRI (≥60) the RRI index –for which higher values indicate higher ESG risk– rises in the years before peaking in year *t*, and decreases afterwards. In contrast, the ESG scores by MSCI and Refinitiv –for which higher values represent better ESG performance– are relatively stable before a peak in RRI occurs in year *t*, but then start to increase, possibly as firms aim to improve their stakeholder relations in response to the incident.

[6] These 13 firm-year observations are: Transocean in 2010 and 2011; Siemens in 2007; Baxter International in 2008; General Motors in 2014; Equifax in 2017; UBS Group in 2010 and 2011; Fiat Chrysler in 2014; Volkswagen in 2014 and 2015; Walmart in 2008; and Rolls-Royce Holdings in 2017. The CEO turnover rate, measured in the [−6, 12] monthly window, following these ESG incidents is extremely high at 46.2%.

[7] We follow prior papers investigating CEO turnover and estimate a pooled logit model (Cline et al., 2018; Jenter and Kanaan, 2015; Karpoff et al., 2008a) in which we include year, industry, and country fixed effects and cluster standard errors by firm (Wooldridge, 2010). However, additional tests indicate that our results are robust to using linear probability models (Peters and Wagner, 2014) as well as a conditional fixed effects logistic regression (Khanna et al., 2015).

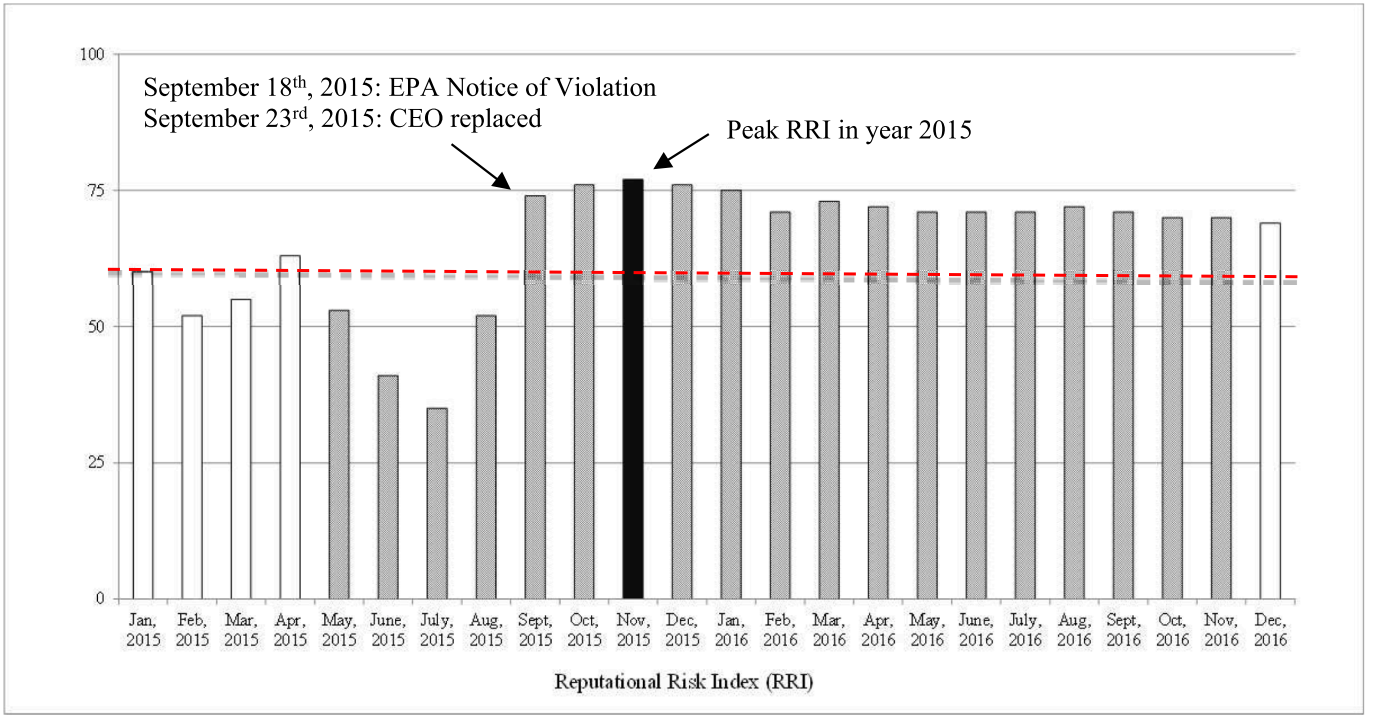

Fig. 1. RepRisk's Reputational Risk Index (RRI).
The figure shows the progression of the RepRisk's reputational risk index (RRI) for Volkswagen in years 2015–2016. The US Environmental Protection Agency (EPA) filed a notice of violation against Volkswagen on September 18th, 2015 for cheating on emission tests (https://www.epa.gov/sites/production/files/2015-10/documents/vw-nov-caa-09-18-15.pdf). As denoted by the figure, the peak RRI (black bar) occurred two months after the scandal break out, in November 2015. The gray bars denote the [−6, 12] monthly interval in which CEO turnover is tracked around a peak in the yearly RRI for year 2015, and the red dotted line represents RRI $\geq$ 60 (extreme risk exposure). The CEO of Volkswagen, Dr. Martin Winterkorn, was replaced on September 23rd, 2015 (https://www.nytimes.com/2015/09/24/business/international/volkswagen-chief-martin-winterkorn-resigns-amid-emissions-scandal.html). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

headquarters are) and industry fixed effects (based on four-digit Standard Industrial Classification codes (SIC4)) control for country-specific and industry-specific latent factors that can affect CEO turnover odds. In all tests, we cluster standard errors by firm. This is consistent with Wooldridge (2010, chapter 15.8), who recommends including time indicators and clustering standard errors by the panel identifier when working with panel data in a logit model. To ensure that our results are robust to the choices of estimation model and clustering, we employ several alternative estimation methods (shown in Appendix Table A.2).

4.1.1. Extreme RRI, annual RRI, and construction of our annual panel data

The main independent variable in Eq. (1) is an indicator variable for extreme risk exposure (*Extreme RRI* = 1 if 60 ≤ RRI ≤ 100) in a year. For most of the years, the independent variable *Extreme RRI*$_{i,t}$ can take the value of zero if the firm had no major ESG incident covered intensely by the media in a year. Thus, when estimating Eq. (1), we work with an annual panel data that is constructed by merging firm's annual accounting variables with its annual *Extreme RRI*$_{i,t}$ indicator and the annual *Turnover*$_{i,t}$ indicator, which tracks CEO turnover in the [−6, 12] monthly interval relative to the month in a year in which the RRI peaks. In different sets of specifications, we use two alternative measures of risk exposure: the *Annual RRI*, which is the highest RRI level in a year, and the *Relative RRI*, which is *Annual RRI* divided by the average RRI of a firm's country (50%) and industry (50%) in that same year (follows RepRisk's methodology).

Next, we discuss the construction of this annual panel data. We follow Cline et al. (2018), and construct a panel data set of extreme ESG risk firm-years (*Extreme RRI* = 1) and less risky firm-years from the universe of companies listed in S&P 500 and STOXX 600 indices. In the vast majority of the firm-years in our sample, the RRI index never reaches extreme levels, and thus those years are non-event years. Our estimation methodology essentially compares extreme periods (extreme risk is reached; RRI ≥ 60) to non-event periods (RRI < 60) and calculates the turnover odds in each period conditional on the control variables, which are mostly firm's accounting variables measured annually.

Thus, we convert our monthly RRI data to annual frequency by focusing on peak RRI during the year (this assures that we capture the peak coverage of an issue in the media). We rely on peak RRI rather than the first time RRI crosses above 60 to account for the notion that when an ESG incident breaks out, the board and the major shareholders could prefer to wait and see whether the issue leads to widespread media coverage, reaching a larger portion of potential customers, investors, etc., before deciding on whether to replace the CEO.[8] Therefore, for each firm and year, we identify the month in which the RRI reaches its highest level. If this procedure yields multiple months with equally high RRIs, we choose the month with the highest jump. This annual conversion yields a sample of 1568 (firms) × 11 (years) = 17,248 firm-year observations. We then merge this sample with the CEO turnover sample and BoardEx, COMPUSTAT, CRSP, and FactSet datasets. In this process, we lose some observations; Table 1 Panel A describes the sample attrition in each step. Finally, we merge with country-level data from different sources. Our final sample is an unbalanced panel data set consisting of 11,094 firm-years for a total of 1194 firms listed on the S&P 500 (n = 6272) and Stoxx Europe 600 (n = 4822) indices for years 2007–2017.

Within this sample, we identify 770 firm-years for which a firm's risk exposure to ESG issues goes above normal levels. Of these 770 observations, 436 have high risk exposure and 334 have extreme risk (RRI ≥ 60). Most firm-years (over 93%) have normal levels of exposure. Table 1 Panel B provides information regarding the distribution of RRI among our sample firms, and Panel C shows the distribution of firm-years with extreme RRI by year. The proportion of event-years to non-events year (334 extreme RRI firm-years versus 10,760 normal RRI firm-years) in our panel data sample is very similar to that in Cline et al. (2018) (325 personal CEO scandals firm-years versus 15,625 non-indiscretion firm-years). Panel D shows average CEO turnover rates, average *Annual RRI*, the number of extreme RRI firm-years, etc., partitioned by country (based on a firm's headquarters).

4.1.2. Control variables

We include as control variables (in the $\boldsymbol{X}_{i,t}$ vector) several known determinants of CEO turnover identified by prior literature, measured in year *t*. We follow Beneish et al. (2017) and include an indicator variable for whether a CEO is close to retirement (CEO age ≥ 63 years), as CEO departures are more likely in such cases. We further include CEO age and tenure, as longer-tenured executives should have more proven skills and also be more entrenched (Jenter and Kanaan, 2015). Additionally, we include indicators for gender, CEO-Chairman dual position as a measure of CEO power over the board, and founder-CEOs (according to Leone and Liu (2010), founders are less likely to be fired following economic misconduct).

In vector $\boldsymbol{Z}_{i,t\text{-}1}$, we control for firm size (natural logarithm of total assets) and prior performance (ROA). Also, controlling for prior poor stock performance is important because it has been shown to negatively affect CEO retention (Jenter and Kanaan, 2015; Kaplan and Minton, 2006; Warner et al., 1988). We do this by including the market-adjusted stock performance (buy-and-hold returns) for the past 24 months relative to the peak RRI month (as in Beneish et al. (2017)). Furthermore, we control for institutional ownership, and for governance and board characteristics by including variables for board independence, board size, succession (factor of directors close to retirement age), and gender ratio.[9] All firm-level variables (except market-adjusted stock performance) are measured in year *t–1*.

To account for potential cross-country variation in CEO turnover rates (Defond and Hung, 2004), we include the following time-

[8] As shown in Appendix Table A.2, results are robust to tracking CEO turnover relative to the month in which the RRI first reaches 60 in a year.

[9] Higher board independence, and smaller and younger boards, are associated with firings of CEOs due to poor performance (Beneish et al., 2017). Liu (2018) reports that higher board gender ratio is related to a lower number of environmental violations, which could lead boards with a higher ratio of females serving on it to be more likely to replace the CEO following ESG misconduct.

Table 1
Sample construction, and firm reputational risk across time and countries.

PANEL A: SAMPLE CONSTRUCTION	(1) Firm-year obs.	(2) Number of firms
RepRisk sample (firm-year-month obs.)	206,976	1568
Only the month in which the risk exposure peaks in a year included	17,248	1568
After merging with CEO turnover sample	13,482	1419
After merging with Boardex	12,192	1310
After merging with COMPUSTAT and FactSet	12,009	1282
After merging with CRSP and COMPUSTAT stock price data	11,094	1194
After merging with country-level data	11,094	1194

PANEL B: RISK CLASS	(1) Value	(2) Firm-year observations	(3) % of obs.
"No reported issues"	-1	11	0.10%
"Low risk exposure"	0–24	5922	53.38%
"Medium risk exposure"	25–49	4391	39.58%
"High risk exposure"	50–59	436	3.93%
"Very high risk exposure"	60–74	321	2.89%
"Extremely high risk exposure"	75–100	13	0.12%

PANEL C: ESG ISSUES BY YEAR

Year	(1) Extreme RRI (≥60)	(2) Normal or high RRI (<60)	(3) % of firm–years with extreme RRI (≥60)	(4) Extremely high RRI (≥75)	(5) Very high RRI (60–74)	(6) High RRI (50–59)	(7) E issues	(8) S issues	(9) G issues
2007	12	961	1.23%	1	11	12	7	4	1
2008	21	952	2.16%	2	19	23	8	12	2
2009	12	981	1.21%	0	12	14	3	7	2
2010	15	1003	1.47%	2	13	27	4	5	7
2011	28	1018	2.68%	2	26	34	7	7	14
2012	38	1007	3.64%	0	38	40	9	11	18
2013	37	1025	3.48%	0	37	58	3	11	23
2014	68	994	6.40%	2	66	51	8	26	35
2015	46	936	4.68%	1	45	64	8	14	24
2016	25	952	2.56%	1	24	49	1	5	19
2017	32	931	3.32%	2	30	64	2	10	21
Sum	**334**	**10,760**	**3.01%**	**13**	**321**	**436**	**60**	**112**	**166**

PANEL D: BY COUNTRY (FIRM HEADQUARTERS)

Country	(1) Obs.	(2) Mean CEO turnover (by year)	(3) Mean CEO turnover ([−6, 12] monthly interval)	(4) Mean Annual RRI	(5) # of firm-years with Extreme RRI (≥60)	(6) *Environmental Performance Index*	(7) *Employment Laws index*	(8) *Voice and Accountability index*
Austria	80	0.100	0.163	17.3	0	78.3	0.50	94.7
Belgium	132	0.106	0.136	14.8	0	66.6	0.51	93.8
Czech Rep.	22	0.182	0.182	17.5	0	81.5	0.52	79.3
Denmark	148	0.122	0.182	13.9	0	76.9	0.57	97.1
Finland	153	0.118	0.170	13.0	0	75.7	0.74	96.6
France	723	0.104	0.147	19.7	19	71.1	0.74	91.3
Germany	645	0.112	0.161	24.5	40	80.5	0.70	94.1
Ireland	219	0.114	0.178	16.2	0	74.7	0.34	95.7
Italy	236	0.110	0.174	20.9	10	74.4	0.65	86.1
Luxembourg	40	0.125	0.125	9.5	0	83.3	na	99.5
Netherlands	157	0.102	0.140	16.0	0	77.8	0.73	97.6
Norway	72	0.111	0.153	29.3	2	78.0	0.69	100.0
Portugal	45	0.111	0.178	23.8	0	75.8	0.81	90.4
Spain	277	0.079	0.123	23.9	7	79.8	0.74	87.0
Sweden	244	0.139	0.205	17.3	5	78.1	0.74	98.6
Switzerland	473	0.135	0.216	20.0	24	87.7	0.45	98.1
UK	1351	0.113	0.154	16.8	44	77.4	0.28	92.8
US	6077	0.080	0.123	21.9	183	67.5	0.22	85.6

Panel A shows sample construction. Panel B shows the distribution of yearly values of the Reputational Risk Index (RRI) among firms included in our panel data sample ($n = 11{,}094$), 2007–2017. Panel C shows the distribution of firm-years with extreme risk exposure to ESG issues ($60 \leq RRI \leq 100$) in column 1, and of firm-years with normal or high levels of risk exposure ($-1 \leq RRI \leq 59$) in column 2. Column 3 shows the percentage of firm-years with extreme risk exposure by year. Columns 4, 5, and 6 present the distributions of firm-years with extremely high risk exposure ($75 \leq RRI \leq 100$), very high risk exposure ($60 \leq RRI \leq 74$), and high risk exposure ($50 \leq RRI \leq 59$), respectively. Columns 7, 8, and 9 show the distributions of firm-years with environmental (E), social (S), and governance (G) issues, respectively. Issues are divided into types based on which of the variables *Epercentage*, *Spercentage*, and *Gpercentage* (the variables show the proportions of E, S, and G risk incidents, respectively, that make up the current RRI) has the highest value in the month in which the annual RRI peaks. Groups are not mutually exclusive, i.e., if two or more types have equally high percentages, the indicator variables for both (or all three) types equal one. Panel D shows information for firm-year observations partitioned by country.

variant lagged (by one year) country-level variables in the vector $\boldsymbol{C}_{i,t-1}$: the natural logarithm of GDP per capita, the globalization index (KOF Swiss Federal Institute of Technology Zurich), the Regulatory Quality and the Corruption Control indices (World Bank), the Political Executive Constraints measure (PolityIV), and the Heritage Economic Freedom index. Our country-level controls are similar to those used in Liang and Renneboog (2017).

As shown in Table 2, firm-years with extreme RRI have, by construction, higher risk exposure: 63.5 versus 19.2 for firm-years with normal or high levels of risk exposure. The exposed firms are larger, and their past stock performance is also significantly lower. Additionally, firm-years with extreme RRI have on average larger boards, lower levels of institutional ownership, but interestingly higher ESG ratings. CEOs of firms with extreme RRI are significantly shorter-tenured than CEOs of firms with normal or high risk exposure. In terms of CEO characteristics like age, gender, close to retirement, and founder status, the two subsamples are very similar. Finally, the two subsamples are quite similar in terms of country-level variables.

5. Does ESG risk increase CEO turnover odds around the world?

In this section, we analyze the relationship between CEO turnover and ESG risk using our panel data sampled from 18 different countries. Note that the analyses presented here do not distinguish whether ESG risk leads to shareholder losses or not.

We begin by presenting some univariate results. In Table 2, we contrast firm-years with extreme risk exposure ($60 \leq RRI \leq 100$) to firm-years with normal or high levels of risk exposure ($RRI < 60$). Notably, the subsample means of the turnover indicator (*Turnover*) suggests that 18.9% of CEOs in firms with extreme RRI are replaced within the [−6, 12] monthly interval, whereas only 13.9% of CEOs in the sample of firms with normal or high RRI are replaced. The difference is 4.9 percentage points (or 36% higher; 18.9%/13.9%) and statistically significant ($p = 0.011$).

The correlation matrix is presented in Table IA.1 of the Internet Appendix. Notably, the indicator variable for extreme RRI is significantly and positively correlated with our *Turnover* indicator. The turnover indicator is also positively and significantly correlated with *Annual RRI*. Also, the indicator for CEO being close to retirement, as well as CEO's age and tenure, are positively and significantly correlated with *Turnover*, while the indicator for founder-CEOs is negatively correlated. Poor-performing CEOs are, as expected, more likely to be replaced, in general.

5.1. Multivariate results

Table 3 presents our main results for estimating Eq. (1) without industry fixed effects (under column 1), and with year, country, and industry fixed effects (column 2) for our panel data of firms worldwide. The coefficient for the variable *Extreme RRI* changes from 0.43 to 0.69 after including industry fixed effects and remains highly statistically significant. To gauge the economic significance of the main results, we interpret the coefficient estimate for *Extreme RRI* in column 2 as an average marginal effect and conclude that CEOs of firms with extreme RRI have on average a roughly 9.4 ($p_{marginal\ effect} = 0.004$) percentage points higher probability of losing their job (24.0% versus 14.6%).[10] Interpreting the coefficient estimate in column 2 as an odds ratio suggests that if a firm has an extreme RRI (=1) observation in a year, this multiplies the odds of CEO turnover by a factor of 2.00 (i.e., by 100%). A Hosmer-Lemeshow (Pearson goodness-of-fit) test indicates that the data in column 2 fit the model well ($p = 0.48$). The area under the ROC curve for this specification is 0.73. Including *Extreme RRI* significantly improves the model: a likelihood ratio test returns a Chi^2-value of 11.7 which translates to a p-value of 0.001 with one degree of freedom.

In column 3, we find that the coefficient estimate for the high risk exposure indicator (benchmark is firm-years with normal levels of risk exposure) is 0.35. In column 4, where we include also industry fixed effects, the coefficient estimate is 0.32 and not significant at conventional levels. This suggests that high RRI does not have any incremental impact on CEO turnover above and beyond what normal levels of risk exposure have. In column 5, we employ *Annual RRI* as the main independent variable and find that its coefficient estimate is 0.009 and significant at conventional levels. A one standard deviation (17.8) increase in *Annual RRI* multiplies the odds of a

[10] The marginal effect is measured as the average marginal effect (average adjusted predictions) for the indicator variable for *Extreme RRI*. It is attained by calculating the difference between the probability of CEO turnover if a firm would not have had extreme risk exposure (=0) in a year and the probability that the same CEO is replaced if the firm would have had extreme risk exposure (=1) for each observation, leaving all other variables unchanged, and then averaging these differences for the whole sample. In comparison, calculating marginal effects at the means, where the other independent variables are held at their means, yields a 9.3 ($p = 0.006$) points higher probability (21.1% versus 11.8%) for CEOs of firms with extreme risk exposure.

Table 2
Descriptive statistics and univariate analysis.

	Extreme RRI (≥60)			*Normal or high RRI* (<60)			*Difference in means*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Obs.	Mean	Median	Obs.	Mean	Median	Mean diff.	*t*-stat.
CEO turnover [−6, 12]	334	0.189	0	10,760	0.139	0	0.049**	2.54
RepRisk variables								
Annual RRI	334	63.45	63	10,760	19.21	23	45.37***	50.45
Relative RRI	316	2.11	2.03	10,001	0.88	0.95	1.23***	29.09
CEO-level variables								
CEO close to retirement (≥63 years)	329	0.112	0	10,416	0.138	0	−0.025	−1.31
CEO Age	329	56.15	56	10,416	55.79	56	0.35	1.00
CEO Tenure	327	5.42	5	10,662	6.95	5	−1.53***	−4.51
CEO Gender (Male = 1)	331	0.961	1	10,748	0.965	1	−0.004	−0.41
CEO is Chairman of the Board	328	0.564	1	10,713	0.485	0	0.079***	2.81
Founder-CEO	331	0.048	0	10,748	0.042	0	0.006	0.53
Firm-level variables								
Ln(Total assets in million USD)	334	11.97	11.94	10,759	9.28	9.10	2.69***	32.45
Return on Assets (%)	318	0.119	0.103	10,403	0.130	0.121	−1.07**	−2.28
Mkt-adj. stock performance in past 24 m	331	0.057	−0.020	10,305	0.168	0.113	−0.11***	−4.56
Scaled industry-adjusted return [−2, 0]	329	−0.573	−1.401	10,309	0.902	−0.241	−1.47***	−4.62
Institutional ownership (%)	326	54.00	59.44	10,608	63.74	71.45	−9.74***	−6.07
ESG Total Score (Refinitiv)	321	76.17	78.76	8255	58.66	60.01	17.51***	18.63
Governance characteristics								
Board independence (%)	332	0.718	0.786	10,572	0.681	0.750	3.71***	2.74
Board size	332	14.02	13	10,572	11.26	11	2.76***	13.72
Succession	332	0.303	0.300	10,572	0.323	0.300	−0.02***	−2.79
Gender ratio (% of female directors)	332	0.196	0.2	10,572	0.158	0.154	3.82***	6.38
Country-level variables								
GDP per capita	334	50,676.9	48,466.8	10,760	49,590.8	48,382.6	1086.1**	2.00
Globalization Index	334	84.07	81.68	10,760	83.89	81.68	0.18	0.91
Regulatory Quality	334	1.45	1.46	10,760	1.47	1.49	−0.02*	−1.70
Control of Corruption	334	1.47	1.38	10,760	1.49	1.40	−0.02	−0.99
Political Executive Constraints	334	6.94	7.00	10,760	6.93	7.00	0.01	0.62
Economic Freedom Index	334	75.16	76.00	10,760	75.65	76.20	−0.49*	−1.69

The table reports descriptive statistics for the panel sample ($n = 11{,}094$) for firm-years with extreme risk exposure to ESG issues ($60 \leq \text{RRI} \leq 100$) (columns 1–3), and for firm-years with normal or high risk exposure to ESG issues ($-1 \leq \text{RRI} \leq 59$) (columns 4–6). Year *t* refers to the calendar year in which a firm's risk exposure is measured. RepRisk and CEO-level variables are measured in year *t*, firm- and country-level variables are measured in year *t–1*, and market adjusted stock performance in the past 24 months. Turnovers are measured in the [−6, 12] monthly interval relative to the month in which RRI peaks in a year. All continuous variables are winsorized at the 1st and 99th percentiles. Descriptions of all variables are found in Appendix Table A.1. Column 7 reports the difference in means between the two groups, and column 8 reports two-sided *t*-statistics for tests of differences in means for the parametric *t*-test assuming equal variances. *, **, and *** indicate 10%, 5%, and 1% significance levels, respectively.

CEO being replaced by 1.17, all else equal. Finally, in column 6, we employ the *Relative RRI* (*Annual RRI* adjusted for country (50%) and industry (50%) average RRI) as the main variable of interest and find qualitatively similar results.

The coefficients for the control variables are mostly as expected. While older CEOs and the ones closer to retirement are significantly more likely to be replaced, founder-CEOs and CEOs who are Chairman are significantly less likely to be fired (consistent with Leone and Liu (2010) and Beneish et al. (2017)). Also, CEOs of poorly performing firms (measured as market-adjusted stock performance) are significantly more likely to be replaced (consistent with Beneish et al. (2017) and Jenter and Kanaan (2015)).

To visualize the relationship between the risk exposure variable and the probability of CEOs being replaced, we graph the marginal effects at representative values. We first divide the *Annual RRI* index variable into intervals. The length of each interval is five RRI units, except for the first interval in which we include firms with RRI values equal to −1 or 0, and the last interval in which we include also observations for which the RRI exceeds 80 (as only two observations ever exceed this value). We then estimate Eq. (1) using firms belonging to the first interval as the benchmark group and include indicators for the remaining groups. Finally, we calculate the average marginal effects for each group and plot the estimated CEO turnover probabilities in Fig. 2. Although the probabilities are on elevated levels for values above 50, CEO turnover odds start to increase rapidly for firms with extreme risk exposure ($\text{RRI} \geq 60$). This suggests a strong positive relationship at extreme RRI levels as well as a non-linear relationship between ESG risk and probability of CEO turnover. This change in slope is explored further in a regression kink design in Section 5.2.

Table 3
ESG risk and CEO turnover: Evidence from international firms.

Dependent variable: *Turnover[−6, 12]*	(1)	(2)	(3)	(4)	(5)	(6)
Extreme RRI	0.432**	0.691***				
	(2.36)	(3.38)				
High RRI			0.348**	0.320*		
			(2.14)	(1.80)		
Annual RRI					0.009***	
					(3.04)	
Relative RRI						0.168***
						(2.82)
CEO close to retirement	0.736***	0.791***	0.696***	0.744***	0.778***	0.836***
	(5.87)	(6.03)	(5.43)	(5.55)	(6.00)	(6.29)
CEO Age	0.057***	0.063***	0.059***	0.065***	0.063***	0.059***
	(5.99)	(6.08)	(6.08)	(6.17)	(6.05)	(5.38)
CEO Tenure	−0.005	−0.003	−0.005	−0.003	−0.003	−0.002
	(−0.70)	(−0.36)	(−0.74)	(−0.42)	(−0.35)	(−0.21)
CEO Gender	0.214	0.185	0.218	0.196	0.222	0.357
	(1.14)	(0.93)	(1.12)	(0.83)	(0.97)	(1.50)
CEO is Chairman of the Board	−0.106	−0.132	−0.098	−0.204**	−0.210**	−0.274***
	(−1.25)	(−1.51)	(−1.12)	(−2.09)	(−2.23)	(−2.85)
Founder-CEO	−0.615**	−0.663**	−0.648***	−0.684**	−0.653**	−0.748**
	(−2.50)	(−2.56)	(−2.66)	(−2.46)	(−2.38)	(−2.55)
Ln(Total Assets)	−0.040	−0.018	−0.051	−0.033	−0.054	−0.025
	(−1.23)	(−0.41)	(−1.46)	(−0.73)	(−1.14)	(−0.54)
Return on Assets (%)	0.005	−0.001	0.002	−0.002	−0.001	0.000
	(1.00)	(−0.09)	(0.50)	(−0.35)	(−0.19)	(0.07)
Market-adjusted stock performance in past 24 m	−0.557***	−0.603***	−0.560***	−0.615***	−0.596***	−0.618***
	(−5.90)	(−6.05)	(−5.83)	(−6.06)	(−5.99)	(−6.01)
Institutional ownership (%)	0.004	0.004	0.004*	0.005	0.004	0.004
	(1.62)	(1.59)	(1.73)	(1.61)	(1.60)	(1.52)
Board independence (%)	−0.001	−0.003	−0.001	−0.003	−0.004	−0.004
	(−0.33)	(−1.10)	(−0.47)	(−1.14)	(−1.20)	(−1.41)
Board size	0.014	0.009	0.012	0.006	0.008	0.018
	(0.88)	(0.52)	(0.75)	(0.32)	(0.46)	(0.92)
Succession	0.214	0.324	0.295	0.404	0.330	0.420
	(0.60)	(0.83)	(0.83)	(1.02)	(0.84)	(1.02)
Gender ratio (% of female directors)	0.010**	0.012**	0.011**	0.012**	0.011**	0.010*
	(2.28)	(2.36)	(2.46)	(2.46)	(2.25)	(1.87)
Ln(GDP per capita)	−0.224	−0.293	−0.251	−0.296	−0.274	−0.226
	(−0.40)	(−0.48)	(−0.43)	(−0.48)	(−0.45)	(−0.35)
Globalization index	−0.152	−0.170*	−0.154*	−0.171*	−0.173*	−0.195*
	(−1.63)	(−1.71)	(−1.66)	(−1.72)	(−1.73)	(−1.78)
Regulatory Quality	0.053	−0.019	0.031	−0.042	0.025	−0.198
	(0.12)	(−0.04)	(0.07)	(−0.09)	(0.06)	(−0.40)
Control of Corruption	−0.364	−0.379	−0.318	−0.331	−0.336	−0.533
	(−0.66)	(−0.66)	(−0.57)	(−0.57)	(−0.59)	(−0.91)
Political Executive Constraints	0.102	−0.024	0.136	0.023	−0.058	−0.472
	(0.14)	(−0.03)	(0.19)	(0.03)	(−0.07)	(−0.43)
Heritage Economic Freedom index	−0.031	−0.035	−0.028	−0.035	−0.034	−0.029
	(−1.07)	(−1.13)	(−0.97)	(−1.12)	(−1.11)	(−0.91)
Constant	11.732	16.596	11.738	16.473	17.005	21.118*
	(1.21)	(1.54)	(1.22)	(1.52)	(1.57)	(1.75)
Sample	All observations		High and normal RRI		All observations	
Observations	9770	9102	9477	8829	9102	8451
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	No	Yes	No	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2 (McFadden)	0.0666	0.0987	0.0668	0.1064	0.1053	0.1104

The table shows how ESG risk (RRI) affects CEO turnover in a sample of international firms. In the logistic regression (Eq. (1)), the dependent variable is CEO turnover in the monthly [−6, 12] interval (relative to a peak in RRI in year *t*). The main independent variable in columns 1–2 is an indicator for extreme RRI ($60 \leq RRI \leq 100$) in year *t*; in columns 3–4, it is an indicator for high RRI ($50 \leq RRI \leq 59$); in column 5, it is *Annual RRI* (a firm's peak RRI in a year); and in column 6, it is the *Relative RRI* (*Annual RRI* divided by equally-weighted average RRI in the firm's industry and country). Columns 1 and 3 include year and country fixed effects; remaining columns include year, country, and industry (based on four-digit SIC codes) fixed effects. Continuous variables are winsorized at the 1st and 99th percentiles. CEO controls are measured in year *t*, firm- and country-level controls in year *t-1*, and market-adjusted stock return in the past 24 months. *z*-statistics based on robust standard errors (clustered by firm to account for the panel data structure (Wooldridge, 2010)) are reported in parentheses below coefficients. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

Taken together, the results in this section provide evidence that CEOs around the world are indeed being replaced when ESG risk reaches extreme levels.

5.1.1. Alternative intervals for CEO turnover

In our main analysis, we follow Beneish et al. (2017) and track CEO turnovers in the [−6, 12] interval, whereby we start the interval six months prior to the peak in the annual RRI index (the peak in negative media attention). We use this approach as boards could be aware of ESG risks in the company and replace the CEO before the issue becomes public news (Beneish et al., 2017), or before the media attention peaks. However, to mitigate concerns about reverse causality, i.e., that a turnover leads to more media scrutiny about a company's ESG issues, we re-estimate Eq. (1) using narrower monthly turnover intervals: [−3,12], [−1,12], [0,12], and [−3, 6], respectively. As shown in Panel A of Table A.2 in the Appendix, results hold up when using these alternative intervals. Furthermore, results are robust (see Panel B of Table A.2) to measuring turnovers relative to the month in which the RRI first reaches 60 in a year (rather than the peak).

5.1.2. Alternative estimation methods

To check the robustness of our results, we employ several alternative estimation methods. First, in Panel C of Table A.2 in the Appendix, we include country-year and industry-year interacted fixed effects (under column 1), that control for potential country- or industry-specific events occurring in a given year (such as new regulation). This alternative specification leaves our conclusions from the baseline regression intact. Next alternative specification allows us to check whether our findings are driven by simultaneity bias. Firms that are more inclined to replace their CEO could also be more likely to end up in our ESG violation sample, or our results could be driven by industry- or size-related factors. To alleviate such concerns, we estimate a conditional logit model with firm fixed effects (column 2), a linear probability model (LPM) with firm and year fixed effects (column 3), and a LPM with random firm effects and year fixed effects (column 4). We find that the coefficient for *Extreme RRI* is positive and significant regardless of the estimation model. Second, in Panel D, we test whether our results might be driven by one type of ESG issues. We thus assign firms with extreme RRI into two groups: (i) E&S and (ii) G issues, respectively, based on the highest value for the variables *Epercentage*, *Spercentage*, and *Gpercentage* provided in the RepRisk data (we identify 171 issues as E&S and 166 as G). We find that both E&S issues as well as G issues lead to significantly higher turnover odds. It is worth pointing out that even if an issue is defined as a G issue, this seldom means that the firm has no risk exposure to E&S issues in that same month. RepRisk's classification of G simply means that the risk exposure is predominantly due to G concerns.

Third, Qin and Yang (2022) report that CSR reporting affects performance-induced CEO turnover sensitivity. We, thus, include a firm's ESG rating (lagged *Total Score* by Refinitiv's Asset4) as an additional control variable in the regressions reported under columns 1 and 2 in Table IA.3 of our Internet Appendix. Including this variable does not alter our qualitative conclusions. In our main analyses in Section 5.1 above, this variable is left out from the regressions as almost 2000 firm-years would be lost due to missing observations. Fourth, in columns 3–5 (of Table IA.3), we include lagged variables for *Extreme RRI*, lagged variables for *Annual RRI*, and the standard deviation of the monthly industry-adjusted stock returns for the past two years (stock risk), respectively, as additional controls and find that results hold. Finally, we report that the results in Table 3 are robust to (two-way) clustering standard errors by firm and year (z-statistic for *Extreme RRI* changes to 3.63 in column 2); to changing winsorizing to at the 5th and 95th percentiles; to not winsorizing at all; and to re-estimating Eq. (1) including industry fixed effects based on two-digit SIC codes (coefficient estimate for *Extreme RRI* is 0.52 with a z-statistic of 2.69).

5.2. Regression kink design

To further explore a potential non-linear (and causal) relationship between ESG risk and CEO turnover, and to understand at which point of the RRI index the CEO turnover odds start to increase, we employ a regression kink design (RKD) as in Card et al. (2015). We use *Turnover* as the dependent variable, the running variable is *Annual RRI*, and the treatment parameter is the RepRisk's cutoff for extreme RRI (RRI = 60). Instead of a sharp jump RD design, which is the most common RD estimation (Lee and Lemieux (2010)), we utilize the sharp RKD design, whose results are also shown to have a causal interpretation (see Card et al. (2015), p. 2456). The RKD is used to compare the change in the slope (the change in the derivative) at the cutoff, whereas the (jump) RD design is used to compare the change in the level (the jump) at the cutoff (Card et al., 2015). We use the RKD approach as we expect no significant jump in CEO turnover probability to occur at the exact cutoff for extreme risk exposure (RRI = 60) as, in practice, it is unlikely that boards would respond much differently to RRI values lying very close to, but on each side of, the cutoff. However, if ESG risk is consequential for CEO job longevity, we expect to observe a significant increase in CEO turnover probability, i.e., a kink in the slope, as the risk exposure (RRI) increases beyond 60.

It is worth pointing out that our RKD setup is not as clean as in some other cases (e.g., unemployment benefits policy (Landais, 2015)). Thus, to ensure that RRI $\geq$ 60 is synonymous with the occurrence of a severe ESG incident, we manually go through each observation of RRI that is above 60 and verify that there is indeed an incident (i.e., the ESG risk has materialized; see Section 6 for a more details) and it is not just noise in the media coverage. Furthermore, in Figs. IA.4 and IA.5 of the Internet Appendix, we test for and verify the two key assumptions of RKD estimation, which are that the RRI index is smooth (i.e., continuously differentiable) around the kink point, and that "the treatment assignment is continuous at the kink point" (see p. 2454 of Card et al. (2015)).

We begin by drawing RD plots in Fig. 3. The cutoff is RRI = 60. The sample period covers all 11,094 firm-years between 2007 and 2017. In plot (a), we use Integrated Mean Square Error (IMSE)-optimal evenly-spaced bins (expressed in units of RRI), and in plot (b) we use mimicking-variance evenly-spaced bins (Calonico et al., 2015). Year, industry, and country fixed effects are removed. As the

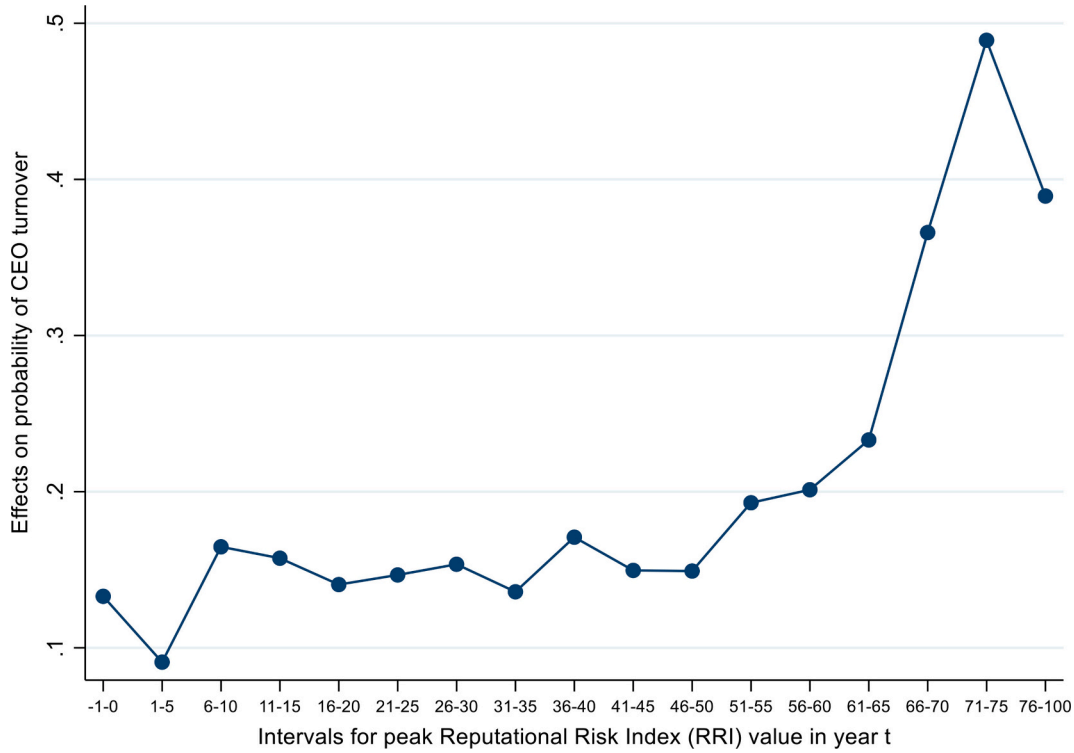

Fig. 2. Adjusted predictions at representative values.
The figure depicts adjusted predictions at representative values for the baseline model (Eq. (1); Table 3 column 2). The y-axis shows the adjusted predictions of CEO turnover (monthly [−6, 12] interval) around a yearly peak in RRI (*Extreme RRI* = 1). The x-axis shows the reputational risk exposure (RRI) divided into groups based on intervals. The first group (left-most) shows the estimated probability of CEO turnover for firm-years with RRI values equal to −1 or 0 in year *t*. This group ($n = 3645$) is used as the benchmark group in the logistic regression model. The intervals for the remaining groups are 5 units wide ([1–5], [6–10], etc.), except for the last group ([76–100]) which includes also values equal or greater to 80, as there are only 2 observations which ever exceed RRI = 80.

plots depict, on the left-hand side of the cutoff there is no visible trend in the CEO turnover probability, but there is a clear upward trend in the bins on the right-hand side of the cutoff, which appears to occur right after the extreme risk exposure levels are reached (RRI $\geq$ 60).

To analyze whether a kink in CEO turnover probability occurs around extreme risk exposure levels, in Table 4 we estimate several RKD design models with cutoff of RRI = 60. We follow Hartzmark and Sussman (2019) and report bias-corrected RKD estimates based on the robust variance estimator (Calonico et al., 2014). We present results for local linear regressions using a first-order polynomial for point estimation. Bandwidths are optimally chosen using the common mean square error (MSE) bandwidth selector (Calonico et al., 2014). As Hartzmark and Sussman (2019) point out, results from regression discontinuity (RD) designs may depend on a number of ad-hoc choices such as clustering of standard errors (changing clustering in RD designs alters bandwidths, and therefore estimates). Hence, we follow their approach and correct standard errors for heteroskedasticity using the nearest neighbor variance estimator in column 1, and cluster standard errors in the remaining columns. In column 2, we cluster standard errors by the running variable *Annual RRI* (as the running variable is discrete (Lee and Card, 2008)), in column 3 by industry, and in column 4 by firm. All columns include year, industry, and country fixed effects. As shown in Panel A, the estimates are positive and significant across all columns. This suggests that there is a kink in the CEO turnover rate which occurs around the RepRisk-defined cutoff for extreme RRI.

Next, we investigate alternative cutoffs using an RKD design with multiple cumulative cutoffs (Cattaneo et al., 2016). In Panel B, we report robust bias-corrected estimates for, besides the cutoff for extreme RRI, also the cutoffs for high RRI firms (RRI = 50) and two arbitrarily chosen cutoffs for RRI = 40 and RRI = 70, respectively. We find that none of the estimates for the RRI cutoffs of 50 and 40 are significant, and one out of four estimates for the RRI = 70 cutoff are significant, while the estimates for the RRI = 60 cutoff are all positive and significant. This indicates that the slope change in CEO turnover probability occurs somewhere around the cutoff for extreme RRI, and not at lower RRI values.

In the bandwidth sensitivity graph in Fig. IA.6 of the Internet Appendix, we find that the results are relatively robust to choosing shorter or longer bandwidths. Additionally, in Table IA.4 of the Internet Appendix, we focus on the conventional estimates, as well as the estimates for local quadratic models (second-order polynomials), and reach similar conclusions as in Table 4. Results are also

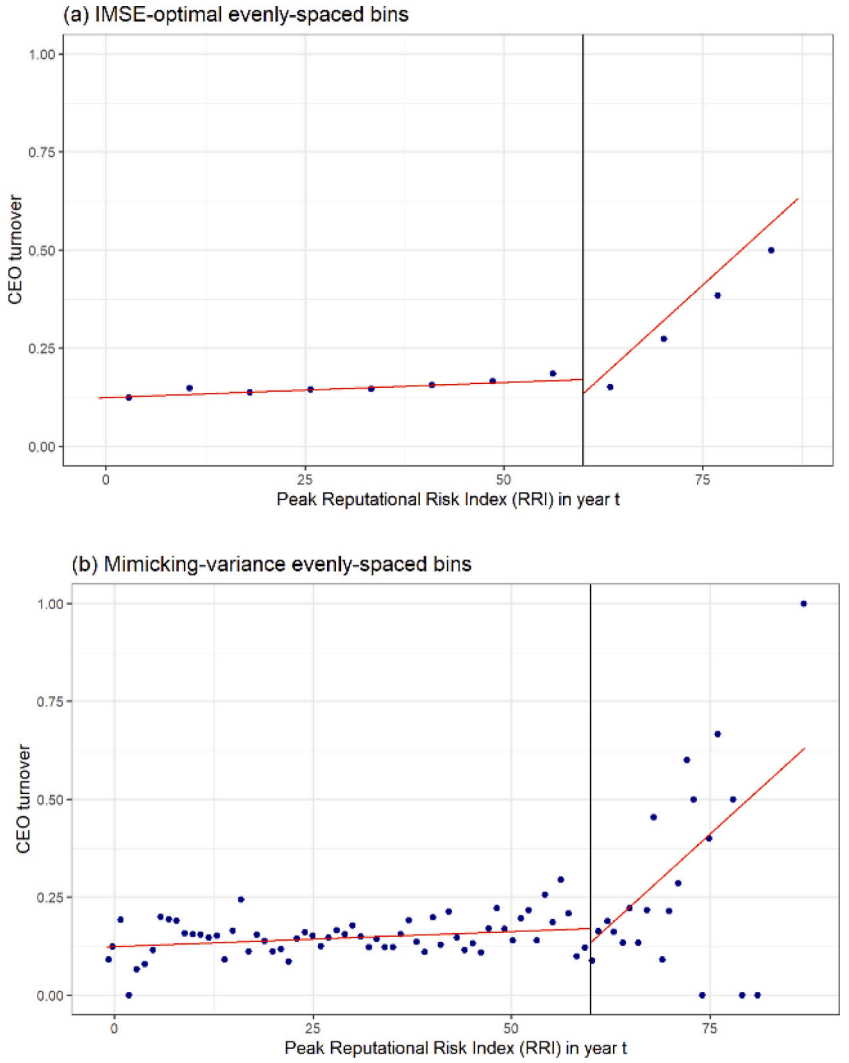

Fig. 3. Regression discontinuity (RD) design plots.
The figures depict RD design plots for CEO turnover in the [−6, 12] monthly interval ($Turnover_{i,t}$) (y-axis) against *Annual* $RRI_{i,t}$ (a firm's peak RRI in a year) (x-axis). The sample period covers all 11,094 firm-year observations between 2007 and 2017 (CEO turnover is tracked in the monthly [−6, 12] interval). In plot (a), bins are evenly-spaced and are Integrated Mean Square Error (IMSE)-optimal, and in plot (b) they are mimicking-variance evenly-spaced (Calonico et al., 2015). The cutoff is RRI = 60, we fit first-order polynomial curves, and the kernel function is uniform. Year, industry, and country fixed effects are removed when fitting the global polynomial regression, which may deliver plots that are visually incompatible with the local binned means (see the notes for *rdplot* command for R as shown in github (https://github.com/cran/rdrobust/blob/master/R/rdplot.R)).

robust to using different bandwidth selectors, as shown in Tables IA.5 and IA.6 of the Internet Appendix.[11] Finally, in Fig. IA.7 of the Internet Appendix, we perform a permutation test (following Ganong and Jäger (2018)), whereby we include a range of placebo intervals. We find that only a small portion of the placebo cutoffs are significant (*z*-statistics above 1.96 or below −1.96), and the RRI = 60 cutoff has the highest (positive) *z*-statistic of any cutoff.[12]

[11] In Table IA.5 of the Internet Appendix, we change the bandwidth selector to the one common MSE-optimal selector for the sum of regression estimates (Calonico et al., 2019). The robust-bias corrected estimates for the RRI = 60 cutoff using this selector range from 0.10 to 0.16, with six out of the eight estimates being significant at conventional levels. Again, none of the estimates for the cutoffs RRI = 40 and RRI = 50 are significant. We find qualitatively similar results in Tale IA.6 in the Internet Appendix, whereby we use the one common CER-optimal bandwidth selector.

[12] We use the *rdplot, rdrobust*, and *rdmulti* commands in Stata and R to estimate Fig. 3 and Table 4. The permutation test is done using the *rdpermute* command (Ganong and Jäger, 2018).

Table 4
Improving identification with regression kink design (RKD).

Dependent variable: *Turnover[−6, 12]*	(1)	(2)	(3)	(4)
		Local linear model (first-order polynomial)		
PANEL A: REGRESSION KINK DESIGN				
Robust bias-corrected estimates				
D(RRI ≥ 60)	0.172***	0.203***	0.201***	0.141***
	(3.08)	(5.67)	(3.67)	(2.92)
Sample	All observations			
Observations	11,094	11,094	11,094	11,094
Clustering	None	RRI	SIC4	Firm
Observations left of cutoff	209	209	150	209
Observations right of cutoff	219	216	198	216
Bandwidth (RRI units)	5.05	4.95	4.74	5.49
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes

Dependent variable: *Turnover[−6, 12]*	(1)	(2)	(3)	(4)
		Local linear model (first-order polynomial)		
PANEL B: MULTIPLE CUTOFFS				
Robust bias-corrected estimates				
D(RRI ≥ 70)	0.051	0.235***	0.159	0.191
	(0.45)	(4.00)	(1.41)	(1.57)
D(RRI ≥ 60)	0.179***	0.199***	0.200***	0.141***
	(3.19)	(5.69)	(3.63)	(2.91)
D(RRI ≥ 50)	−0.033	−0.039	−0.017	−0.030
	(−0.89)	(−1.20)	(−0.41)	(−0.74)
D(RRI ≥ 40)	−0.009	−0.008	−0.009	−0.009
	(−0.80)	(−0.83)	(−0.82)	(−0.80)
Sample	All observations			
Observations	11,094	11,094	11,094	11,094
Clustering	None	RRI	SIC4	Firm
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes

The table depicts results for sharp RKD design models, where the dependent variable is $Turnover_{i,t}$ and the running variable is $Annual\ RRI_{i,t}$. All columns include year, industry, and country fixed effects (not interacted). In Panel A, the cutoff is RRI = 60 (extreme RRI). We report robust bias-corrected RD estimates (Calonico et al., 2014). Panel B shows robust-bias corrected RD estimates for multiple cutoffs (Cattaneo et al. (2016)): RRI = 70, RRI = 60, RRI = 50 ("High RRI"), and RRI = 40). Bandwidths are chosen using the one common mean square error (MSE)-optimal bandwidth selector (Calonico et al., 2014). All columns show results for local linear regression (polynomial fit is of first-order). In column 1, standard errors are corrected for heteroskedasticity using the nearest-neighbor estimator, and in columns 2–4, they are corrected using the heteroskedasticity-robust plug-in residuals variance estimator without weights (Calonico et al., 2019). The type of clustering is reported in the table. *z*-statistics are shown in parentheses. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

6. Non-pecuniary versus pecuniary motives in CEO replacement decisions

The results so far show that in our international sample of firms, ESG risk increases CEO turnover odds. A natural follow-up question is whether these ESG-related CEO replacements occur only when the shareholders are hurt (i.e., there are pecuniary costs), or are there cases when the CEO turnover occurs due to media pressure that does not necessarily lead to stock price decline but creates public shaming of individuals (non-pecuniary motives for the CEO turnover). Evidence consistent with the former would suggest that boards treat stakeholder-related corporate misbehavior very similarly to shareholder-related financial misconduct (Karpoff et al., 2008a), i.e., they replace a CEO because of the negative impact an incident has on firm value. However, the non-pecuniary motives could impact CEO turnover likelihood when the media shames the misbehaving firm's directors, and their concern about their public images trigger a CEO replacement decision even in cases when the loss of shareholder value is negligible (Dyck and Zingales, 2002). So, next, we will analyze the role of non-pecuniary motives using several different approaches.

Table 5
Event study around extreme ESG risk events.

PANEL A: CARs FOR EXTREME RRI OBSERVATIONS

	(1) Obs.	(2) Mean	(3) Median	(4) Min	(5) Max	(6) % of events with negative CAR	(7) Mean when CAR≥0	(8) Mean when CAR<0
CAR[−1, 1]	287	−0.005**	−0.001	−0.278	0.145	53.3%	0.016	−0.024
CAR[−1, 3]	283	−0.005**	−0.003	−0.312	0.128	55.5%	0.022	−0.028
CAR[−5, 10]	289	−0.007*	−0.003	−0.455	0.346	51.9%	0.043	−0.047
CAR[−1, 30]	278	−0.011**	−0.015	−0.492	0.444	58.3%	0.066	−0.065
CAR[−1, 60]	278	−0.022***	−0.020	−0.342	0.346	56.8%	0.084	−0.098

PANEL B: ESTIMATES OF PECUNIARY COSTS

	(1) Obs.	(2) Mean absolute value of pecuniary costs (million USD)	(3) Standard deviation	(4) Minimum pecuniary costs (million USD)	(5) Maximum pecuniary costs (million USD)
CAR[−1, 1]	284	472.24	2151.16	0.00	25,846.07
CAR[−5, 10]	284	947.12	3361.63	0.00	30,845,04
CAR[−1, 30]	273	1410.31	5692.39	0.00	76,966.81

PANEL C: PECUNIARY COSTS AFFECT CEO TURNOVER

	(1)	(2)	(3)
Dependent variable:	*Turnover[−6, 12]*		
	CAR[−k, +k] interval used to estimate pecuniary costs:		
	CAR[−1, 1]	*CAR[−5, 10]*	*CAR[−1, 30]*
Pecuniary costs (in millions of dollars)	0.0003***	0.0002***	0.0002***
	(2.84)	(2.75)	(4.11)
Sample	Extreme RRI event study sample		
Observations	250	248	240
Controls and a constant included	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Pseudo-R^2 (McFadden)	0.5664	0.5516	0.5806

PANEL D: PECUNIARY COSTS SCALED BY SALES

	(1)	(2)	(3)
Dependent variable:	*Turnover[−6, 12]*		
	CAR[−k, +k] interval used to estimate pecuniary costs:		
	CAR[−1, 1]	*CAR[−5, 10]*	*CAR[−1, 30]*
Pecuniary costs (% of $sales_{t-1}$)	0.052*	0.059**	0.035***
	(1.66)	(2.06)	(2.70)
Sample	Extreme RRI event study sample		
Observations	246	250	244
Controls and a constant included	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Pseudo-R^2 (McFadden)	0.6476	0.6461	0.6508

The table presents mean cumulative abnormal returns (CARs) from conducting event study around extreme ESG risk events. CARs are calculated using the market-adjusted model, where the estimation window is [−231, −31]. Market returns are from Kenneth French database (US for US firms, European for European firms). Security returns are from COMPUSTAT and are calculated as total returns. The extreme ESG risk event days are identified using the date of the related news item (from RepRisk's daily news database) with the highest severity and reach for the corresponding

Extreme RRI observation (for further details see Section 6.1). Panel A shows summary statistics for CARs, and Panel B shows summary statistics for pecuniary costs around extreme ESG risk events. Panels C and D estimate the role of pecuniary costs in CEO turnover (a la Beneish et al. (2017)), whereby Eq. (1) is estimated using only the sample of firm-years with an ESG risk event in them. Estimated pecuniary costs (direct plus indirect) are calculated as the absolute value of CAR[−k, +k] multiplied by the market value of a company at the end of the previous year. If CAR[−k, +k] is positive, pecuniary costs are set to zero. Pecuniary costs are measured in millions of dollars, converted at year-end exchange rates. In Panel D, pecuniary costs are scaled by a company's sales (at the end of the previous year). *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

6.1. Event study methodology

As our first approach to assessing the importance of non-pecuniary motives, we conduct an event study around the events whereby the ESG risk has materialized. We start by constructing a sample of ESG events based on the extreme RRI readings. In a traditional event study approach, the event dates are more readily identified (such as the date the lawsuit was filed in the court). However, in our sample, sometimes there is no specific action from the company even though there is heavy media coverage, which makes it more cumbersome to identify exact event dates for each ESG issue. Furthermore, almost all companies in our sample have at least one ESG-related news article in a month, and many have several. Most of that coverage is considered normal and is usually inconsequential as the RRI index remains at a low level. To deal with these difficulties in identifying the exact ESG event date, we follow a strict procedure that we describe below. In addition, when calculating the stock reaction (cumulative abnormal returns (CARs)), we follow prior literature that faces similar problems (e.g., Krüger (2015)) whereby it is necessary to employ a wider event windows.

Each day, RepRisk collects all the news articles (in many different languages) on ESG topics about a firm and classifies them by type of stakeholder issue, severity, reach, and novelty, which provides an objective and quantitative way of assessing the impact of an issue. For example, the variable *Severity* (how many people were affected) ranges from 1 to 3, where 3 represents the highest level of severity; *Reach* is a measure of the influence or readership of the news source in which the article is published and ranges from 1 to 3, where 3 corresponds to highest reach; and *Novelty* measures the "newness" of an issue on a scale from 1 to 2, where 2 indicates news stories published for the first time in a country. To identify announcement dates for the events, we rely on both the RepRisk database, which includes information on monthly RRI values, and the RepRisk News Item database, which includes information on daily news articles on ESG issues. We implement the following selection procedure to identify our ESG events:

(i) RepRisk provides the RRI index only in monthly frequency even though the company tracks the news articles each day. To ascertain the start of an ESG incident that eventually reaches extreme RRI levels, we begin with the peak RRI readings in a year ($n = 334$) and track backwards to the month in that same calendar year when the RRI first broke the 60 threshold and stayed above the threshold until the month of peak RRI observation. We refer to the starting month of an ESG incident as "the event month."

(ii) Within this event month (from step (i)), we identify the starting date of each ESG event using the daily RepRisk News Item database. As there are many ESG news each day and most of them do not reach the levels with serious consequences for the firm, we search for the specific ESG topic that caused the RRI to jump to extreme levels. To do that, we collect information on all the news articles published for the first time in a country (i.e., we require *Novelty* = 2).

(iii) Among those daily articles identified in step (ii), we search for the news article with the highest severity (*Severity* = 3) and reach (*Reach* = *3*), in that order. If several news articles have equally high severity and reach, we include the earliest observation. The date of publication of that news article is considered as "the event date" when the first information of the incident appeared in the media.

Fig. 1 shows how we identify the month when the RRI first peaks (step (i)), and Fig. IA.1 Internet Appendix shows an example of the News Item database, and how event dates are identified (steps (ii) and (iii)). Using this procedure, we identified the following dates for the anecdotal examples used earlier in this paper: September 22nd, 2015 for Volkswagen, and April 30th, 2010 for BP. Both events have the highest possible severity and reach on the RepRisk scale.

To ensure that there was indeed an ESG event on the date we identified using the described procedure above, we manually screen media sources (we use Refinitiv Eikon News Monitor and Google News) around each of the 334 event dates. We find news articles for 82% of the events. The likely reason for why we do not find news articles for the remaining events is that they were published in another language (e.g., a local newspaper) than in English. While we are confined to searching for events only in English, RepRisk is able to screen news articles in 20+ languages. Because of this more granular screening procedure used by RepRisk, we rely on the full sample of events in our main analysis. However, as shown in the Internet Appendix, our main results are qualitatively the same when we exclude the events for which no news article in English is found.

Once we identify the event dates for each of the 334 cases when RRI reached extreme cases (see Panel C of Table 1), we then estimate the CAR of each event using the market model (see Mackinlay (1997)). The estimation period is −231 to −31 trading days before the event date. Market returns for US and European stock markets are from Kenneth French's database. Security returns are from COMPUSTAT North America (for US firms) and COMPUSTAT Global (for European firms), and are calculated as total returns. Due to missing data for daily returns of some stocks, we lose observations for some firms (the event study sample varies between 278 and 289 events depending on the CAR window employed).

6.1.1. Event study methodology with RRI: Results

Panel A of Table 5 presents the results from the event study conducted with the ESG events we identified above. We find that the cumulative average abnormal return (CAAR) for the daily [−1,1] window is −0.52%, which is statistically significantly different from zero ($p = 0.016$). Similarly, the mean CARs for alternative windows ([−1,3], [−5, 10], [−1,30], and [−1, 60], respectively) are also negative and significant.[13] This is an important finding, as it suggests that the negative ESG events we identify using the RepRisk database have on average a negative impact on shareholder value (i.e., the pecuniary costs of the event are large). It also strengthens the validity of our choice to use a news-based database (RRI) to measure negative ESG/CSR performance, as opposed to using more traditional ESG/CSR rating scores like the MSCI ESG or the Asset4 ESG indices, whereby identification of specific ESG event dates is quite difficult.

6.1.2. Pecuniary costs

Karpoff and Lott (1993) suggest that the abnormal stock price reaction to the revelation of a corporate misconduct captures both the direct (clean-up costs, legal penalties, etc.) and indirect (reputational costs imposed by the market) pecuniary costs associated with an event. Thus, we estimate the total pecuniary costs of the extreme RRI events in our sample by multiplying the absolute value of CAR [−k, +k] with the pre-event market value of a company (converted at year-end exchange rates to US dollars). If CAR[−k, +k] is positive, pecuniary costs are set to zero. We do not partition between direct and indirect pecuniary costs (as Cline et al. (2018) study does) since both types of costs have a negative impact on shareholders, and our focus is on investigating the effects of pecuniary costs versus non-pecuniary considerations on CEO turnover decisions. As shown in Panel B of Table 5, the maximum estimated pecuniary costs are large. For instance, using the CAR[−1, 30] window, we estimate that BP's total pecuniary costs following its oil spill in 2010 are around 73 billion US dollars.

To confirm the relevance of pecuniary costs, we run regressions similar to Beneish et al. (2017), whereby only the firm-years with a misconduct in them are kept in the sample. In Panels C and D of Table 5, we re-estimate Eq. (1) using only the sample of firm-years with an ESG risk event in them (i.e., all the firm-years that belong to the 334 ESG events in our sample for which we are able to calculate the CARs). Standard errors are clustered by firm. We focus on three CAR event windows: a short-term window (CAR[−1, 1]), a medium-term window (CAR[−5, 10]), and a long-term window (CAR[−1, 30], respectively). As shown in Panel C, CEO turnover odds increase significantly with the size of the pecuniary costs. We find similar results in Panel D, where the dependent variable is the pecuniary costs scaled by the sales of a company at the end of the previous year. The odds ratios suggest that a percentage point increase in pecuniary costs relative to sales is expected to multiply CEO turnover odds by a factor of 1.04–1.06 (depending on which CAR interval is used). These findings suggest that boards are more sensitive to ESG incidents that hurt the shareholder wealth (in addition to the stakeholders) than they are to incidents that hurt solely the stakeholders. This result is consistent with the notion that boards have a strong focus on their fiduciary duty towards the shareholders.

In the above analyses of Table 5 we focus only on the firm-years with an ESG events in them. However, focusing only on the observations with extreme RRI events has some drawbacks. First, it does not allow us to test our second hypothesis that relates to the role of non-pecuniary costs. One of the goals of this paper is to assess whether extreme RRI events that do not hurt the shareholders (i.e., the ESG events characterized by non-pecuniary considerations of the board) would indeed increase the likelihood of a CEO turnover (relative to non-event firm-years). Second, it reduces the sample size considerably compared to using the panel data sample. Therefore, we apply a similar approach as in Cline et al. (2018) and Hazarika et al. (2012) and combine the event study sample (which includes information on CARs and pecuniary costs of the events) with the panel data sample.

6.2. Are CEOs replaced for non-pecuniary reasons?

In this subsection, we test our second hypothesis which states that non-pecuniary considerations do matter in CEO turnover decisions around an ESG event. We use the combined event study (see Section 6.1) and panel data samples (see Section 4.1.1). We first split the extreme RRI indicator (that is turned on during the 334 firm-years when we observe an ESG event) into two new indicators: Extreme RRI events for which the CAR is negative versus extreme RRI events for which CARs are non-negative ("positive"). The former group represents ESG events for which there are some pecuniary costs and shareholders are hurt. The latter represents the ESG events whereby there are no shareholder losses, but they have some non-pecuniary implications for corporate insiders because the media highlighted these incidences. Non-event firm-years take the value of zero for all the indicators.

Results are presented in Table 6, where we re-estimate Eq. (1) including the newly constructed indicators. The interaction of *Extreme RRI * Negative CAR indicator* enters positively and significantly, irrespective of which of the three CAR windows ([−1, 1], [−5, 10], or [−1, 30]) we use. This is consistent with prior literature documenting that (other types of) corporate misconduct that hurts the shareholders has an adverse effect on CEO job longevity (e.g., Karpoff et al., 2008a). However, the other interaction variable *Extreme RRI * Positive CAR indicator* also enters positively and significantly across all columns. This suggests that when comparing to the non-event firm-years (the baseline), CEOs are significantly more likely to be replaced even when the shareholders are not hurt by the ESG-related misbehavior. Put differently, the shaming by the media and the public prompts the board to act even in cases when there are no pecuniary costs involved (CAR is positive), which is a finding consistent with Dyck and Zingales (2002). This corroborates our

[13] These abnormal returns are similar to those reported in Krüger (2015) and in Liu et al. (2020) for the negative CSR/ESG events in their samples. For instance, in a sample of US firms experiencing a negative CSR/ESG events, Krüger (2015) reports a − 0.88% CAAR for the [−5, 5] event window and a − 1.31% return for the [−10,10] window.

Table 6
Are CEOs replaced for non-pecuniary reasons?

	(1)	(2)	(3)
Dependent variable:	*Turnover[−6, 12]*		
	Main independent variable:		
	CAR[−1, 1]	*CAR[−5, 10]*	*CAR[−1, 30]*
Extreme RRI * Positive CAR indicator	0.635**	0.517*	0.548*
	(2.01)	(1.86)	(1.74)
Extreme RRI * Negative CAR indicator	0.720***	0.749***	0.727***
	(2.89)	(2.70)	(3.04)
CEO close to retirement	0.778***	0.778***	0.784***
	(5.94)	(5.95)	(5.99)
CEO Age	0.064***	0.064***	0.063***
	(6.17)	(6.14)	(6.12)
CEO Tenure	0.010	0.010	0.010
	(1.16)	(1.18)	(1.14)
CEO Gender	0.195	0.226	0.226
	(0.85)	(0.96)	(0.96)
CEO is Chairman of the Board	−0.205**	−0.208**	−0.202**
	(−2.16)	(−2.19)	(−2.13)
Founder-CEO	−0.629**	−0.628**	−0.619**
	(−2.27)	(−2.26)	(−2.22)
Ln(Total Assets)	−0.015	−0.015	−0.015
	(−0.35)	(−0.35)	(−0.35)
Return on Assets (%)	−0.001	−0.001	−0.001
	(−0.21)	(−0.16)	(−0.19)
Market-adjusted stock performance in past 24 m	−0.595***	−0.598***	−0.597***
	(−5.98)	(−6.00)	(−5.99)
Institutional ownership (%)	0.004	0.004	0.004
	(1.51)	(1.62)	(1.59)
Board independence (%)	−0.004	−0.003	−0.003
	(−1.20)	(−1.16)	(−1.16)
Board size	0.010	0.010	0.011
	(0.54)	(0.54)	(0.60)
Succession	0.319	0.324	0.318
	(0.82)	(0.83)	(0.81)
Gender ratio (% of female directors)	0.012**	0.012**	0.012**
	(2.43)	(2.44)	(2.42)
Ln(GDP per capita)	−0.300	−0.298	−0.316
	(−0.50)	(−0.49)	(−0.52)
Globalization index	−0.183*	−0.182*	−0.183*
	(−1.85)	(−1.84)	(−1.85)
Regulatory Quality	0.000	0.011	−0.003
	(0.00)	(0.02)	(−0.01)
Control of Corruption	−0.410	−0.405	−0.438
	(−0.71)	(−0.70)	(−0.76)
Political Executive Constraints	−0.001	−0.014	−0.009
	(−0.00)	(−0.02)	(−0.01)
Heritage Economic Freedom index	−0.034	−0.034	−0.033
	(−1.11)	(−1.10)	(−1.07)
Constant	17.609	17.500	17.735*
	(1.64)	(1.63)	(1.65)
Sample	All observations (event study and panel data samples combined)		
Observations	9065	9063	9056
Year fixed effects	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Wald test for equality of coefficient estimates:	$\chi^2 = 0.05$	$\chi^2 = 0.45$	$\chi^2 = 0.28$
(Extreme RRI * Positive CAR) – (Extreme RRI * Negative CAR) = 0	($p = 0.82$)	($p = 0.50$)	($p = 0.59$)
Pseudo-R^2 (McFadden)	0.1058	0.1055	0.1055

The table shows that CEOs are replaced for non-pecuniary reasons when the media pressure (RRI) reaches extreme levels around the ESG risk events described in Table 5. We essentially estimate Eq. (1) using the combined panel data (Table 3) and event study (Table 5) samples. The dependent variable is $Turnover_{i,t}$. The main independent variables are indicators for Extreme RRI split into two groups: events with pecuniary costs (negative CAR indicator) and events with non-pecuniary motives (positive CAR indicator), respectively. All columns include year, country, and industry fixed effects. Continuous variables are winsorized at the 1st and 99th percentiles. *z*-statistics based on robust standard errors (clustered by firm) are reported in parentheses below coefficients. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

Table 7
Can the size of pecuniary costs alone explain CEO turnover?

	(1)	(2)	(3)
Dependent variable:	*Turnover [−6, 12] = 1*		
	Main independent variable:		
	CAR[−1, 1]	*CAR[−5, 10]*	*CAR[−1, 30]*
Extreme RRI	0.543**	0.535**	0.518**
	(2.38)	(2.30)	(2.24)
Extreme RRI * Pecuniary costs (% of $sales_{t-1}$)	0.034**	0.019*	0.013**
	(2.32)	(1.74)	(2.19)
CEO close to retirement	0.777***	0.780***	0.782***
	(5.93)	(5.95)	(5.96)
CEO Age	0.064***	0.064***	0.064***
	(6.19)	(6.17)	(6.15)
CEO Tenure	0.009	0.009	0.009
	(1.13)	(1.13)	(1.12)
CEO Gender	0.187	0.196	0.195
	(0.81)	(0.85)	(0.84)
CEO is Chairman of the Board	−0.203**	−0.206**	−0.199**
	(−2.14)	(−2.18)	(−2.10)
Founder-CEO	−0.628**	−0.625**	−0.625**
	(−2.27)	(−2.25)	(−2.26)
Ln(Total Assets)	−0.017	−0.017	−0.018
	(−0.38)	(−0.38)	(−0.40)
Return on Assets (%)	−0.001	−0.001	−0.002
	(−0.24)	(−0.18)	(−0.24)
Market-adjusted stock performance in past 24 m	−0.596***	−0.599***	−0.596***
	(−5.98)	(−6.00)	(−5.98)
Institutional ownership (%)	0.004	0.004	0.004
	(1.47)	(1.50)	(1.50)
Board independence (%)	−0.004	−0.003	−0.003
	(−1.18)	(−1.15)	(−1.14)
Board size	0.009	0.009	0.010
	(0.47)	(0.51)	(0.54)
Succession	0.316	0.321	0.312
	(0.81)	(0.82)	(0.80)
Gender ratio (% of female directors)	0.012**	0.012**	0.012**
	(2.48)	(2.46)	(2.43)
Ln(GDP per capita)	−0.287	−0.297	−0.299
	(−0.47)	(−0.49)	(−0.49)
Globalization index	−0.189*	−0.187*	−0.187*
	(−1.91)	(−1.89)	(−1.89)
Regulatory Quality	−0.006	−0.002	−0.012
	(−0.01)	(−0.00)	(−0.03)
Control of Corruption	−0.414	−0.405	−0.445
	(−0.72)	(−0.70)	(−0.78)
Political Executive Constraints	0.004	−0.011	−0.009
	(0.00)	(−0.01)	(−0.01)
Heritage Economic Freedom index	−0.033	−0.032	−0.032
	(−1.07)	(−1.06)	(−1.04)
Constant	17.882*	17.884*	17.898*
	(1.67)	(1.67)	(1.67)
Sample	All observations (event study and panel data samples combined)		
Observations	9061	9062	9057
Year fixed effects	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Pseudo-R^2 (McFadden)	0.1062	0.1057	0.1059

The table demonstrates that while the boards are sensitive to the magnitude of the pecuniary costs (as % of $sales_{t-1}$), they still look at other non-pecuniary considerations when replacing the CEO. As in Table 6, we again estimate Eq. (1) using the combined panel data (Table 3) and event study (Table 5) samples but instead of indicators for positive versus negative CAR ESG risk events, we just include the magnitude of the pecuniary (direct + indirect) cost. We calculate the pecuniary costs as the absolute value of CAR[−k, +k] multiplied by the market value of a company at the end of the previous year (scaled by sales at the end of the previous year). Pecuniary costs are calculated only for extreme ESG risk events. If CAR[−k, +k] is positive, or if there is no event for a firm in a year, pecuniary costs are set to zero. All columns include year, country, and industry fixed effects. Continuous variables are winsorized at the 1st and 99th percentiles. *z*-statistics based on robust standard errors (clustered by firm) are reported in parentheses below coefficients. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

hypothesis 2 and shows that the corporate boards can act even if there are no shareholder losses; the non-pecuniary considerations of the board can affect the CEO turnover decision following ESG incidents.

Furthermore, comparing the magnitudes of the coefficient estimates for the ESG events with negative CARs to the ESG events with positive CARs, we find that they are higher for the events with negative CARs across all columns (they vary between 0.72 and 0.75 for the negative CAR events, while they range from 0.52 to 0.64 for the positive CAR events). This reinforces the results from Table 5 that boards are more sensitive to ESG issues that lead to stock price declines. It is however worth pointing out that the coefficients estimates are not significantly different from each other as a Wald test of equality of coefficients fails to reject the null hypothesis that the coefficient estimates are equal.

6.2.1. *Can the magnitude of pecuniary costs alone explain CEO turnover decisions?*

In Table 7, we conduct another test of hypothesis 2 using our estimates of the pecuniary costs from the event study (Section 6.1.2). More specifically, we re-estimate Eq. (1) using the combined event study and panel data sample but include also a variable that captures the estimated pecuniary costs scaled by a firm's sales at the end of the previous year. The variable is calculated only for negative CAR events (there are pecuniary costs), and equals zero for the events with positive CARs (there are no pecuniary costs), and for non-event years (see Section 6.1.2).

Column 1 in Table 7 presents the results when pecuniary costs are calculated using the *CAR[−1, 1]* variable. Columns 2 and 3 show the results when using *CAR[−5, 10]* and *CAR[−1, 30]*, respectively. We find that higher pecuniary costs lead to an increase in CEO turnover, all else equal. However, notably, even after controlling for the magnitude of the pecuniary costs, *Extreme RRI* enters positively and significantly into all three regressions. The coefficient estimate for this variable suggests that when pecuniary costs of an event equal zero (i.e., there are only non-pecuniary considerations involved), CEOs are still more likely to be replaced compared to non-event years. Judging from the magnitude of the coefficient for *Pecuniary costs (% of sales)* in Model 1, for each percentage point increase in pecuniary costs in proportion to sales, CEO turnover odds are multiplied by a factor of 1.781 (exp(0.543 + 0.034)).[14]

6.3. *Are well-performing CEOs replaced for ESG incidents?*

Boards assign tremendous importance to firm performance when evaluating a CEO (see Jenter and Kanaan, 2015; Jenter and Lewellen, 2021; and others). However, Hazarika et al. (2012) find that CEO turnover odds following earnings management increase even for well-performing CEOs. In the Internet Appendix Tables IA.7 and IA.8, we test whether the ESG-related CEO turnovers we observe occur mostly when the CEO is underperforming. More specifically, an ESG event which leads to intense negative media coverage could provide an opportunity for the board to replace an underperforming CEO. Conversely, boards could be reluctant to replace a well-performing ("star") CEO for a stakeholder-related issue.

The results in Table IA.7 in Internet Appendix show that both poorly performing CEOs and the star CEOs are significantly more likely to be replaced following extreme risk exposure to ESG issues. In Table IA.8 of the Internet Appendix, we partition between turnovers caused by poor performance and turnovers which occur when performance is strong, using the methodology in Jenter and Lewellen (2021). We find that CEOs of firms with strong performance and extreme RRI in a year have a roughly 5.5 percentage points higher likelihood (marginal effect) of being replaced than CEOs of non-events firms. This indicates that boards are willing to discipline CEOs for ESG incidents even when performance remains strong. For firms with poor performance and extreme RRI events (in columns 2–4), the marginal effect of *Extreme RRI* is greater than that in column 1, which suggests that the effect of an ESG incident on CEO turnover is greater when performance is poor than when it is strong. However, the insignificant interaction term in column 4 suggests that prior poor performance does not have an incremental effect on CEO turnover beyond the corporate misbehavior itself, consistent with findings in Jenter and Lewellen (2021) (they note that "boards do not attribute poor performance more strongly to CEOs after [shareholder-related] misconduct").

6.4. *Cross-country variation in non-pecuniary motives*

Next, we investigate whether cross-sectional variation in stakeholder-orientation across countries can affect the CEO turnover odds following extreme RRI events. We again use our combined event study and panel data sample of firms worldwide.

In Table 8, we test our Hypothesis 3 that non-pecuniary motives in CEO replacement decisions can vary across countries depending on their level of stakeholder-friendliness. We again employ the indicators from Table 6 but now we focus on whether a firm is headquartered in a high versus low E/S/G norms country. As a proxy for environmental (E) norms, we use the Environmental Performance Index (EPI) by Yale University. This measure has been used before by Dyck et al. (2019) to classify countries according to their environmental sensitivity. We rely on data from the 2014 EPI release which covers years 2002–2014, or most of our sampling period. Second, we divide (by median) countries into high versus low social (S) norms countries using the Employment Laws index by Botero et al. (2004) (here, we again follow Dyck et al. (2019)). Third, Dyck and Zingales (2002) note that the diffusion of the press influences the extent to which the media can affect public opinion following corporate misbehavior, on the one hand, and a country's responsiveness to environmental issues, on the other. As a proxy for governance (G) and the diffusion of the press, we employ the World Governance Indicator (WGI) *Voice and accountability* by Kaufmann (2004). This variable measures the degree to which citizens

[14] The pecuniary costs variable is essentially an interaction term between *Extreme RRI* and *Pecuniary costs (% of sales)* as the pecuniary costs can only be positive when there is an event (*Extreme RRI* = 1). *Extreme RRI* and *Pecuniary costs (% of sales)* both equal zero when there is no event.

Table 8
Cross-country variation in non-pecuniary motives for CEO turnover.

Dependent variable: *Turnover* [−6, 12]	(1) Country environmental norms	(2) Country social norms	(3) Country governance norms	(4) Non-US (high stakeholder-orientation) vs. US (low)
Extreme RRI * Positive CAR indicator				
High stakeholder norms	0.854**	0.853**	0.860**	0.852**
	(2.22)	(2.21)	(2.23)	(2.21)
Low stakeholder norms	0.193	0.195	0.192	0.195
	(0.54)	(0.54)	(0.54)	(0.54)
Extreme RRI * Negative CAR indicator				
High stakeholder norms	0.715**	0.714**	0.719**	0.683*
	(1.97)	(1.97)	(1.98)	(1.83)
Low stakeholder norms	0.801**	0.805**	0.801**	0.842**
	(2.21)	(2.22)	(2.21)	(2.42)
Sample	All observations (event study and panel data samples combined)			
Observations	9063	9041	9063	9063
Controls and a constant included	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Pseudo-R^2	0.0979	0.0983	0.0979	0.0980

The table shows that when media pressure (RRI) reaches extreme levels around an ESG risk event (described in Table 5), non-pecuniary reasons instigate CEO turnover only in more stakeholder-oriented (high E/S/G norms) countries. We estimate Eq. (1), where the dependent variable is $Turnover_{i,t}$ but where we split the variables *Extreme RRI * Positive CAR indicator* and *Extreme RRI * Negative CAR indicator*, respectively, into high vs. low E/S/G norms countries based on the location of a firm's headquarters. CARs are calculated using the event study methodology described in Section 6.1, and are for the [−5, 10] daily window. Column 1 shows results for high vs. low environmental norms countries (high countries score above the median on the Environmental Performance index by Yale university); column 2 for high vs. low (by median) social norms countries (Employment Laws index by Botero et al. (2004)); column 3 for countries with high vs. low (by median) freedom of expression and a free media (Voice and Accountability index by Worldwide Governance Indicators (World Bank)); and column 4 for non-US (European Stoxx 600 firms) vs. US (a shareholder-oriented common-law firms (La Porta et al. (2000); S&P 500 firms). All columns include year and industry fixed effects. The same controls as in Table 3, and a constant, are included but not reported to save space. Robust (clustered by firm) *z*-statistics are reported below estimated coefficients. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

participate in selecting their government, as well as freedom of expression, association, and the media. As yearly changes for this variable are small (the correlation between 2007 and 2017 values in our sample is 0.96), we rely on information for year 2007, i.e., the start of our time period. For all three measures, higher values proxy for higher E/S/G norms, respectively.

All columns in Table 8 include the same controls as in Eq. (1) as well as industry and year fixed effects. Standard errors are clustered by firm. We exclude country fixed effects as we examine differences in non-pecuniary motives across countries, which may not change much over time. However, results are qualitatively the same if we include country fixed effects in our estimations (see Table IA.9 in the Internet Appendix). CARs are estimated as in Section 6 and are for the [−5, 10] window.

Column 1 of Table 8 shows results for countries with high environmental norms (these include Switzerland, Sweden, the Netherlands, etc.) versus low environmental norms (US, Belgium). We find that in both low and high E norms countries the CEOs are disciplined for ESG events with negative CARs (there are pecuniary costs). This is consistent with boards in these countries having a strong focus on their fiduciary duty to discipline the CEO when the shareholder value is lost. More importantly, however, splitting the positive CAR indicator into high versus low E norms countries reveals that only CEOs of firms located in high E norms countries are systematically disciplined for ESG events with positive CARs (there are no shareholder losses, only non-pecuniary considerations associated with media coverage). The coefficient estimate for the high E norms indicator when CAR is positive is 0.85 and significant (odds ratio indicates a 135% higher likelihood of a CEO being replaced compared to CEOs of non-event firm-years), while it is only 0.19 and not significant for the low E norms and positive CAR indicator. We find similar results in columns 2 and 3, whereby we split the CAR indicators by S and G norms countries, respectively. Again, we observe that only in the high S and G norms countries are CEOs disciplined for extreme RRI events when CARs are positive.

In column 4, we split the sample by US (S&P500) versus non-US (Europe Stoxx 600) firms. We find a strong US versus Europe effect. Turnover odds of CEOs of US firms, a shareholder-oriented common-law country (La Porta et al., 2000), increase significantly only when an ESG event hurts the shareholders. In contrast, in the more stakeholder-oriented European civil-law countries, where societies tend to place higher demands on firms to act socially responsibly (Liang and Renneboog, 2017; Tirole, 2001), CEO turnover odds increase significantly also following events with positive CARs.

In Internet Appendix Table IA.10, we re-estimate Table 8 using a subsample analysis, whereby we divide our combined event and panel data sample into high versus low E/S/G norms countries (and US versus non-US), respectively. We again find that in high E/S/G norms countries, and in non-US (European) countries, CEO turnover likelihood increases significantly following extreme RRI events

with negative but also with positive (only non-pecuniary considerations) CARs. In contrast, in low E/S/G norms countries, and in the US, the effect is significant only for events that hurt shareholder wealth.[15]

Overall, the findings in this section corroborate our hypothesis 3 that shaming by stakeholders and the media seems to have a distinct effect on its own only in the more stakeholder-oriented countries. This suggests that the increased sensitivity of the boards from those countries to the negative media coverage of the ESG issues can play a larger role in advocating stakeholder rights and disciplining managerial behavior.

6.5. *Ex post materiality of an ESG event*

The investor reaction to the revelation of an ESG incident is likely to be the best estimate of the materiality of a misconduct as it represents investors' expectations of the direct legal penalties and clean-up costs as well as the reputational (indirect) costs associated with an event (Karpoff and Lott, 1993). Nonetheless, a criticism of our results is that investors are not able to correctly assess the long-term materiality costs of an ESG event. This would imply that our CARs underestimate the negative consequences of ESG issues for involved firms. Such materiality effects could be a consequence of an unanticipated reaction by a firm's key stakeholders, such as consumers or corporate customers, to an incident. For instance, when consumers, and especially socially responsible consumers, observe the negative media attention to an incident, this could lead to reduced sales (Bénabou and Tirole, 2010). Also, an ESG incident could lead to higher borrowing costs for misbehaving firms (Chava, 2014), or to a fewer number of new contracts with corporate customers (Darendeli et al., 2022).

We, therefore, check for several other factors that should capture the long-term ex post materiality of an ESG incident. More specifically, we re-estimate Eq. (1) but include on the right-hand side additional proxies for the *materiality* of the ESG event. First, we include three accounting-based variables: Sales growth, the change in market share (the market share is the company's sales relative to the total sales in the same industry (SIC2) in a year), and the change in profit margin (calculated as the operating return on sales). All three variables capture changes in operational performance of the firm, and are measured in the [−1, 3] yearly interval to capture long-running materiality effects before and after a peak in the RRI in year *t*.

We also analyze several other long-term variables. To capture the changes to the corporate board that could be associated with ESG-related misbehavior, we include the average director turnover rate over the [−1, 3] period, calculated using the attrition rate variable in BoardEx (see Table A.1 in the Appendix). Also, prior literature reports that firms with higher institutional ownership (IO) have higher E&S ratings (Chen et al., 2020; Dyck et al., 2019). Gantchev et al. (2022) report selloffs by institutional investors following ESG risk incidents (they also use the RRI index to capture ESG risk). Therefore, an ESG issue's materiality could also be proxied through the institutional investors' selling pressure. To control for this, we include the change in institutional ownership from twelve months prior through twelve months after a peak in the yearly RRI. Data on monthly institutional ownership are from FactSet. We also include the scaled industry-adjusted return for the [−1, 3] interval (constructed as in Section 6.3) to control for future and current stock performance relative to firm's peers.

Results are reported in Table 9. Models 1–6 show results for including the materiality variables individually. We find that the declines in sales growth, market share, and profit margin (measured ex post) are associated with a significant increase in CEO turnover likelihood in year *t*. Similarly, higher director turnover is associated with a significant increase in CEO turnover odds. The change in institutional ownership is positive but only marginally significant. However, notably, *Extreme RRI* enters positively and significantly across all six columns. We find similar results in Model 7, where we include all six materiality variables in the same regression.

In Model 8, we expand this analysis by combining all six types of materiality categories (we call this "*Combined materiality*"). We essentially use a principal component analysis to extract the common factor in the six materiality variables, i.e., we extract the first principal component containing most of the common variance (0.20). The variables that load heavily on this component are sales growth (+0.61), change in market share (+0.46), change in profit margin (+0.46), as well as scaled industry-adjusted stock returns (+0.43). Results are similar to those reported in Model 7: *Extreme RRI* enters positively and significantly, while the principal component enters negatively and significantly. Changing the yearly interval to [−1, 1] rather than [−1, 3], and the monthly interval for the change in institutional ownership variable to [−3 m, +3 m] (rather than [−12 m, +12 m]), yields similar results. The main difference in the results is that the scaled industry-adjusted variable now enters negatively and highly significantly. The *Extreme RRI* indicator, however, remains positive and significant across all columns (results are presented in the Internet Appendix).

Taken together, these findings suggest that controlling for the ex-post materiality of the ESG event does not change our inference: CEOs are still being replaced for ESG incidents as long as the ESG risk rises and the media coverage is intense.

7. Conclusions

Employing a sample of manually collected CEO turnovers from 18 different countries, we examine the relationship between negative news about a firm's ESG risk and the job longevity of its CEO. Prior studies document that financial misbehavior that harms investors results in CEOs being fired (Desai et al., 2006; Hazarika et al., 2012; Karpoff et al., 2008a). Recent studies report that CEOs can also be fired for ignominious behavior such as sexual scandals (Cline et al., 2018). In this paper, we examine whether CEO turnover

[15] In the Internet Appendix Table IA.11, we contrast firms based on cultural values (Hofstede et al., 1991). We find that in more collectivistic (low Individualism scores), long-term oriented, and more uncertainty avoidant societies, CEOs are more likely to be replaced for non-pecuniary reasons following ESG incidents.

Table 9
CEOs are replaced for non-pecuniary reasons: Evidence from long-term materiality effects.

Dependent variable: *Turnover* [−6, 12]	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Extreme RRI	0.608***	0.575***	0.586***	0.681***	0.689***	0.671***	0.650***	0.598***
	(2.76)	(2.61)	(2.74)	(3.35)	(3.37)	(3.23)	(2.95)	(2.72)
Sales growth [−1, 3]	−0.308***						−0.219**	
	(−3.02)						(−2.41)	
Δ(Market share) [−1, 3]		−2.049**					−0.962	
		(−2.05)					(−0.96)	
Δ(Profit margin) [−1, 3]			−1.151*				−0.710	
			(−1.89)				(−1.13)	
Average director turnover rate [−1, 3]				7.245***			6.757***	
				(8.04)			(6.63)	
Δ(Institutional ownership)$_{-m12,\ m12}$					0.008*		0.014***	
					(1.85)		(2.59)	
Scaled industry-adjusted stock return [−1, 3]						0.001	−0.005	
						(0.09)	(−0.33)	
Combined materiality (principal component)								−0.172***
								(−3.09)
Sample	All observations (event study and panel data samples combined)							
Observations	7558	7551	7544	8665	8705	8925	6845	6845
Correlation between *Annual RRI* and materiality variable	−0.04***	0.01	−0.04***	−0.01	−0.05***	−0.01	-	−0.06***
Controls and a constant included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.1159	0.1132	0.115	0.1188	0.1079	0.1061	0.1290	0.1169

The table shows that even when accounting for long-term materiality effects, CEOs are replaced for Extreme RRI incidents. We estimate Eq. (1), where the dependent variable is $Turnover_{i,t}$ but include on the right-hand side several proxies for long-term materiality. Sales growth is the percentage change in sales measured over the [−1, 3] yearly window; *Δ(Market share) [−1, 3]* is the change in market share, calculated as a company's sales relative to the total sales in the same industry (SIC2), over the [−1, 3] yearly window; *Δ(Profit margin) [−1, 3]* is the change in operating return on sales over the yearly [−1, 3] interval; the average director turnover rate is the average attrition rate (BoardEx variable "attrition"; the number of directors that have left as a proportion of average number of directors from the previous year) over the interval [−1, 3]; $\Delta(Institutional\ ownership)_{-m12,\ m12}$ is the change in institutional ownership between months −12 through +12 around an event (data is from FactSet); and *Scaled industry-adjusted prior stock return [−1, 3]* is the industry-adjusted return divided by the standard deviation of returns. *Combined materiality* is the first principal component of the seven materiality variables. In columns 1–6, we include the materiality variables individually, in column 7 we include all six materiality variables, and in column 8 we include the principal component. Definitions for all variables are in Appendix Table A.1. All continuous variables are winsorized at 1st and 99th percentiles. All columns include year, industry, and country fixed effects as well as the same controls as in Table 3 and a constant (these are not reported to save space). *z*-statistics based on robust standard errors (clustered by firm) are reported in parentheses below coefficients. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

likelihood increases following media coverage of certain ESG issues (heightened ESG risk) that harm mainly the stakeholders of a firm (customers, employees, communities, polluttees, etc.). We report that CEOs around the world are held accountable for ESG risk. This connection is both statistically and economically significant: multivariate tests indicate that CEOs are roughly nine percentage points more likely (24.0% versus 14.6%) to lose their position when their firms face extreme ESG risk. Results from a regression kink design points towards a non-linear relationship between ESG risk and CEO turnover; there is a significant change in the slope (a kink) of the turnover probability after the extreme media exposure is reached.

We also assess the role of board's non-pecuniary motives for instigating CEO turnovers. We find that media coverage of an ESG issue has two components, pecuniary (shareholder loss) and non-pecuniary (media shaming), and both of them increase the likelihood of a turnover. This suggests that non-monetary considerations (board's conscientiousness, media shaming of board members, etc.; see Dupont and Karpoff (2020)) are at play in some of the CEO turnover decisions.

Inherent differences between countries in terms of their sensitivity to ESG (Liang and Renneboog, 2017) do appear to matter, as well. We find that the materiality of an ESG incident is associated with higher CEO turnover odds in all countries irrespective of their stakeholder-friendliness, however the effect goes beyond materiality in countries with high E/S/G norms to include an additional shaming effect on the boards (pressure put by public media).

Overall, our findings suggest that in many countries, CEOs are replaced for ESG-related corporate misbehavior, and that this accountability extends to non-pecuniary considerations of the board in some firms.

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CRediT authorship contribution statement

Gonul Colak: Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Timo P. Korkeamäki:** Conceptualization, Resources, Supervision, Writing – original draft, Writing – review & editing. **Niclas Oskar Meyer:** Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

None.

Data availability

Data subject to third party restrictions. The research relies upon licensed data from the following sources: RepRisk, COMPUSTAT, CRSP, FactSet, Execucomp, and WRDS. Data on European CEOs are hand-collected. Upon request, the authors will fully cooperate with investigators seeking to conduct a replication of the study by providing a description of how data sets were employed to create the final data set and variables, together with the codes for replicating the results in the study.

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Appendix A

Appendix Table A.1
Description of variables.

Variable Name	Variable Description	Source
REPRISK VARIABLES		
Annual RRI	*The highest RepRisk Reputational Risk Exposure (RRI) index level in a calendar year. RRI is a firm's risk exposure (negative media attention) to* ESG*/stakeholder issues. If the Annual RRI is equally high in two or more months in a year, we choose the month with the highest jump. If jumps are equally high, we choose the first month timewise. The variable is an integer variable ranging from − 1 to 100. A value of − 1 indicates no risk incidents, values of 0–24 indicate low, 25–49 medium, 50–59 high, 60–74 very high, and 75–100 extremely high risk exposure.*	RepRisk
Extreme RRI	*An indicator variable which equals one if a firm's Annual RRI is between 60 and 100, and zero otherwise.*	RepRisk
High RRI	*An indicator variable which equals one if a firm's Annual RRI is between 50 and 59, and zero otherwise.*	RepRisk
Relative RRI	*A firm's Annual RRI divided by the average RRI of firms in the same industry (50%) and country (50%) in that same year.*	RepRisk
Epercentage, Spercentage, Gpercentage	*The proportion of Environment (Social) (Governance) incidents to all incidents that make up the Annual RRI. E issues are defined as extreme RRI incidents for which the Epercentage is higher, or equal, to the Spercentage and Gpercentage, respectively. S and G issues are defined in the same way.*	RepRisk

(*continued on next page*)

Appendix Table A.1 (*continued*)

Variable Name	Variable Description	Source
Top Issue	*Shows which ESG category a firm is most exposed to in a given month;* e.g., *Top 1 Issue: "Corruption, Bribery, Extortion, and Money Laundering".*	RepRisk
Severity	*Shows the severity breakdown (1, 2, or 3) of an issue; 1 represents the lowest, and 3 the highest (many people affected) severity.*	RepRisk News Item
Reach	*Shows the reach breakdown (1, 2, or 3) of an issue (Top 1, Top 2,* etc.*); 1 represents low influence sources and 3 high influence sources (such as Financial Times, New York Times, BBC, and others).*	RepRisk News Item
Novelty	*Shows whether an issue is published for the first times in the news in a country (1 = No; 2 = Yes).*	RepRisk News Item
CEO VARIABLES		
Turnover	*An indicator variable for CEO turnover (1 = CEO turnover, 0 otherwise). Turnover equals 1 if a CEO is replaced within the [−6, 12] monthly interval relative to a peak in the RRI index in a year. The choice of the interval in which we track CEO turnovers follows*Beneish et al. (2017)*. We identify CEO turnovers using ExecuComp (for US firms), as well as CapitalIQ and Orbis (for European firms). We manually go through each turnover, collect the data of the turnover announcement, and check whether the turnover occurred because of a merger, acquisition, spinoff, or similar reasons, in which case the indicator variable takes the value of 0. To attain this information, we rely on public sources (internet sources, annual reports,* etc.*).*	ExecuComp, CapitalIQ, Orbis, manually-collected data from public sources
Turnovers caused by poor performance and turnovers when performance is strong	*Following*Jenter and Lewellen (2021)*, we classify turnovers into (i) turnovers caused by poor performance ("performance-induced") and (ii) turnovers which occur when performance is strong ("other turnover"). We use their two-probit model to estimate two independent probit models from the full panel data sample (n = 11,094). Turnovers caused by poor performance are classified as those turnovers for which the probability of a turnover being performance-induced exceeds 50% (*Jenter and Lewellen (2021, p. 590)*). Remaining turnovers are classified as turnovers when performance is strong.*	(Jenter and Lewellen, 2021)
CEO close to retirement	*An indicator variable that equals one if a CEO is 63 years or older, and zero otherwise* (Beneish et al., 2017)*. Data for European CEOs are from CapitalIQ and Orbis, and from ExecuComp for US CEOs.*	CapitalIQ, Orbis, ExecuComp
CEO Age	*The age of the CEO in years.*	CapitalIQ, Orbis, ExecuComp
CEO Tenure	*The time (in years) that a person has served as CEO of a company. For US CEOs, we use the variable "Date became CEO" (or "Date Joined Company" for former CEOs). For European CEOs, we use data from Orbis and CapitalIQ to calculate tenure.*	CapitalIQ, Orbis, ExecuComp
CEO Gender (Male = 1)	*The gender of the CEO (1 = male, 0 = female).*	CapitalIQ, Orbis, ExecuComp
CEO is Chairman of the Board	*An indicator variable for whether a CEO is the Chairman of the Board. For CEOs of US firms, we use the ExecuComp variable "Titleann". For CEOs of European firms, we manually collect this data.*	CapitalIQ, Orbis, ExecuComp
Founder-CEO	*An indicator variable for whether the CEO is the founder or co-founder. For CEOs of US firms, we use the ExecuComp variable "Titleann". For CEOs of European firms, we manually collect this data.*	CapitalIQ, Orbis, ExecuComp
FIRM-SPECIFIC VARIABLES		
CAR[−k, +k]	*Extreme RRI events are identified using the procedure described in*Section 6.1*. We estimate the CAR of each event using the market model. The estimation period is − 231 to − 31 trading days before the event date. Market returns for US and European stock markets are from Kenneth French's database. Security returns are from COMPUSTAT North America (for US firms) and COMPUSTAT Global (for European firms) and are calculated as total returns.*	COMPUSTAT; Kenneth French's database
Return on Assets (%)	*Return on assets, defined as operating income before depreciation (OIBDP) divided by total assets (AT).*	COMPUSTAT
Ln(Total assets)	*The natural logarithm of total assets (AT); in US dollars (converted using year-end exchange rates).*	COMPUSTAT
Exchange Rates	*Foreign exchange rates (at year-end). Exchange rates are used to convert variables reported in other currencies than US dollars to US dollars.*	Federal Reserve, H10 (WRDS)
Market-adjusted stock performance in past 24 months	*The market-adjusted total stock return for the past 24 months prior to a peak in the Annual RRI. Returns for European firms are calculated as:* $\frac{\left(\frac{PRCCD}{AJEXDI}\right)TRFD_m - \left(\frac{PRCCD}{AJEXDI}\right)TRFD_{m-1}}{\left(\frac{PRCCD}{AJEXDI}\right)TRFD_{m-1}}$*. For US firms, the return is the variable "Ret" in the CRSP database. Market returns for European firms are for the Stoxx Europe 600 Total market index (COMPUSTAT, 150369), while they are the returns for the S&P 500 index for US firms ("Sprtrn" in CRSP).*	CRSP, COMPUSTAT
Pecuniary costs (% of $sales_{t-1}$)	*Estimated pecuniary costs are calculated only for extreme ESG risk events, and are the absolute value of CAR[−k, +k] multiplied by the market value of a company at the end of the previous year, and scaled by sales at the end of the previous year. If CAR[−k, +k] is positive, or if there is no event for a firm in a year, pecuniary costs are set to zero.*	COMPUSTAT

(*continued on next page*)

Appendix Table A.1 (*continued*)

Variable Name	Variable Description	Source
Scaled industry-adjusted returns [−2,0]	*Industry (average; by SIC2)-adjusted monthly stock returns divided by the standard deviation of the monthly returns for the same company in the three-year yearly [−2, 0] window, following*Jenter and Lewellen (2021).	CRSP, COMPUSTAT
Institutional ownership (%)	*The percentage of outstanding shares held by institutional owners in a calendar year (year-end).*	FactSet
Board independence (%)	*The proportion of independent directors to all directors on the firm's board at the annual report date.*	BoardEx
Board size	*The number of directors serving on the firm's board at the annual report date.*	BoardEx
Gender ratio (% of female directors)	*The proportion of female directors to all directors serving on the firm's board at the annual report date.*	BoardEx
Succession	*A factor indicating how many directors are close to retirement at the annual report date.*	BoardEx
ESG Total Score	*A company's ESG performance. The variable ranges from 0 to 100; higher values correspond to higher ESG.*	Refinitiv Asset4 ESG
Sales growth [−1, 3]	*Sales growth between years − 1 and + 3 relative to year t.*	COMPUSTAT
Δ(Market share) [−1, 3]	*The change in market share between years − 1 and + 3 relative to year t. Market share is calculated as a company's sales relative to the total sales in the same industry (SIC2) in year.*	COMPUSTAT
Δ(Profit margin) [−1, 3]	*Change in operating return on sales over the yearly [−1, 3] interval.*	COMPUSTAT
Average director turnover rate [−1, 3]	*The average attrition rate (BoardEx variable "attrition") over the [−1, 3] yearly interval. The attrition rate is the number of directors that have left a company in a year as a proportion of the average number of directors from the previous year.*	BoardEx
Δ(Institutional ownership)$_{-m12,\ m12}$	*Change in institutional ownership between months − 12 through + 12 around an event (based on monthly data).*	FactSet
COUNTRY VARIABLES		
Legal origin	*The legal origin of a country (English common-law, French civil-law, German civil-law, or Scandinavian civil-law) based on where the company's headquarters are (COMPUSTAT's "loc" variable).*	(Liang and Renneboog, 2017)
Heritage Economic Freedom index	*Measures the degree to which a country's economy is considered "free" (monetary, investment, business, trade freedom,* etc.*). Higher values proxy for freer economies.*	www.heritage.org
Control of Corruption	*A measure of the extent to which public power is exercised for private gain, corruption, and the "capture" of the state by elites and private interests" (https://info.worldbank.org/governance/wgi/Home/FAQ). Higher values correspond to lower corruption.*	World Governance Indicator (WGI)
Regulatory Quality	*A measure of a government's efficiency in implementing policies and regulations that promote the development of the private sector. Higher values proxy for higher regulatory quality.*	WGI
Ln(GDP per capita)	*The natural logarithm of the Gross Domestic Product (GDP)* per capita *expressed in US (2015) dollars.*	World Bank
Political Executive Constraints	*Variable XCONST from PolityIV database (www.systemic-peace.org). The variable measures "the extent of institutionalized constraints on the decision-making power of CEOs".*	PolityIV
Globalization Index	*A measure of the economic, social and political dimensions of globalization (https://kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html). Higher values correspond to more globalized economies.*	ETH Zürich KOF Swiss Economic Institute
Environmental Performance Index (EPI)	*State of sustainability in a country calculated using 40 indicators related to climate change performance, environmental health, and ecosystem vitality (Wolf, M. J., Emerson, J. W., Esty, D. C., de Sherbinin, A., Wendling, Z. A.,* et al. *(2022). 2022 Environmental Performance Index. New Haven, CT: Yale Center for Environmental Law & Policy. epi.yale.edu). Higher values indicate higher country-level environmental performance.*	Yale University (https://epi.yale.edu/)
Employment Laws Index	*The index proxies for how well labor forces and employees are protected by laws in a country. Higher scores correspond to higher protection.*	(Botero et al., 2004)
Voice and Accountability	*The variable ranks countries by the degree to which citizens can participate in selecting their government, the freedom of expression, association, and the media. Higher values represent more freedom and participation.*	WGI

Appendix Table A.2
Alternative CEO turnover intervals and estimation methods.

PANEL A: ALTERNATIVE CEO TURNOVER INTERVALS (RELATIVE TO MONTH OF PEAK RRI IN A YEAR)

Dependent variable:	(1) CEO turnover [−6, 12]	(2) CEO turnover [−3, 12]	(3) CEO turnover [−1, 12]	(4) CEO turnover [0, 12]	(5) CEO turnover [−3, 6]
Extreme RRI	0.691***	0.691***	0.657**	0.654***	0.704***
	(3.38)	(3.24)	(2.52)	(2.59)	(2.84)
Sample	All observations				
Observations	9102	9030	8960	8979	9622
Controls and a constant included	Yes	Yes	Yes	Yes	Yes

(*continued on next page*)

Appendix Table A.2 (*continued*)

PANEL A: ALTERNATIVE CEO TURNOVER INTERVALS (RELATIVE TO MONTH OF PEAK RRI IN A YEAR)

Dependent variable:	(1) CEO turnover [−6, 12]	(2) CEO turnover [−3, 12]	(3) CEO turnover [−1, 12]	(4) CEO turnover [0, 12]	(5) CEO turnover [−3, 6]
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.0987	0.1057	0.1047	0.1053	0.0966

PANEL B: ALTERNATIVE INTERVALS (RELATIVE TO MONTH WHEN RRI FIRST CROSSES 60 IN A YEAR)

Dependent variable:	(1) CEO turnover [−6, 12]	(2) CEO turnover [−3, 12]	(3) CEO turnover [−1, 12]	(4) CEO turnover [0, 12]	(5) CEO turnover [−3, 6]
Extreme RRI	0.806***	0.744***	0.758***	0.805***	0.526***
	(3.99)	(3.46)	(3.30)	(3.35)	(3.05)
Sample	All observations				
Observations	9102	9011	8989	8960	8595
Controls and a constant included	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.1057	0.1051	0.1048	0.1068	0.0980

PANEL C: ALTERNATIVE ESTIMATIONS METHODS

Dependent variable: *Turnover*	(1) Logit with country-year and industry-year fixed effects	(2) Conditional logit model with firm fixed effects	(3) LPM (OLS panel data model with firm fixed effects)	(4) LPM (OLS panel data model with random effects)
Extreme RRI	0.540**	0.490**	0.065**	0.064**
	(2.57)	(2.01)	(2.15)	(2.46)
Sample	All observations			
Observations	8397	6438	9770	9770
Number of firm fixed effects	-	670	1138	1138
Controls and a constant included	Yes	Yes	Yes	Yes
Year fixed effects	No	Yes	Yes	Yes
Industry-year fixed effects	Yes	No	No	No
Country-year fixed effects	Yes	No	No	No
Firm fixed (or random) effects	No	Yes	Yes	Yes (random)
Pseudo-R^2 (R^{2-}within for LPM)	0.1334	0.2125	0.1107	0.0926

PANEL D: BY ESG ISSUE TYPE

Dependent variable: *Turnover*	(1) E&S issues	(2) G issues	(3) E&S issues	(4) G issues
Extreme RRI	0.756***	0.669**		
	(2.89)	(2.20)		
High RRI			0.225	0.274
			(1.03)	(1.08)
Sample	All observations		High and normal RRI	
Observations	8974	8957	8948	8860
Number of extreme RRI issues	170	164	0	0
Number of high RRI issues	281	159	281	159
Controls and a constant included	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Pseudo-R^2 (McFadden)	0.1057	0.1059	0.1026	0.1087

Panel A shows results for employing alternative CEO turnover intervals; Panel B for turnover measured relative to the month in which the RRI first crosses 60 in a year for the firm-years with extreme RRI (rather than the peak month). In Panel C, we estimate Eq. (1) using alternative estimation methods (logit with country-year and industry-year fixed effects, conditional logit model, and linear probability models (LPM)). Panel D shows results for environmental and social (E&S) issues vs. governance (G) issues. E&S issues vs. G issues are based on the variables *Epercentage*, *Spercentage*, and *Gpercentage.* The variables indicate the proportion of E, S, and G related risk incidents, respectively, relative to all risk incidents that make up the current RRI. Grouping is based on which of the variables has the highest percentage, e.g., if *Epercentage* has the highest value, the issue belongs to the group E&S. Continuous variables are winsorized at the 1st and 99th percentiles. *z*-statistics based on robust standard errors (clustered by firm) are reported in parentheses below coefficients. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

Appendix B. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jcorpfin.2023.102523.

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