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Minding the gap: Asymmetric effects of pay dispersion on stakeholder engagement in corporate environmental (Ir) responsibility

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Abstract

How does pay dispersion affect corporate environmental performance? Building on the tournament effect and equity perspective, we theorize that vertical pay dispersion and horizontal pay dispersion can impinge on corporate environmental performance. We develop the theoretical argument that vertical pay dispersion is negatively related to corporate environmental responsibility (CER) and positively related to corporate environmental irresponsibility (CEIR) due to the tournament competition among executives, and that horizontal pay dispersion is negatively related to CER and positively related to CEIR due to the unjust sense among executives. We then delve into the asymmetric effects of vertical pay dispersion and horizontal pay dispersion on CER and CEIR. We argue that the asymmetric effects result from the difference in social comparison. We find strong empirical support for our predictions. Implications for the development of the literature on pay dispersion and corporate environmental performance are discussed.

KEYWORDS

asymmetric effect, corporate environmental irresponsibility, corporate environmental responsibility, equity perspective, horizontal pay dispersion, social comparison, tournament effect, vertical pay dispersion

1 | INTRODUCTION

Corporate social performance has received increasing attention from practitioners and academic scholars over the past decades. While scholars have regarded and operationalized corporate social performance as a multidimensional concept, recently, considerable attention has been paid to corporate environmental performance (e.g., Duanmu, Bu, & Pittman, 2018; Heikkurinen, 2010; Kim, Wan, Wang, & Yang, 2019; Schilke, 2018). In 2019, Fortune issued a list of "Sustainability All-Stars" comprising firms (e.g., Philips NV, IBM, Intel, and Wal-Mart) with the highest scores in the Sustainability Leadership Monitor based on their environmental innovation, resource use, and emissions reduction. Fortune also held the Fortune Global Sustainability Forum,[1] which suggested that environmental performance is explicitly crucial for corporate businesses.[2] For instance, Wal-Mart

tracks the greenhouse gas output and other factors of food produced per ton to reduce emissions in the food chain.

Corporate environmental performance is attracting remarkable attention from academic scholars across different disciplines, such as strategic management, marketing, finance, and organizational behavior (e.g., Cho, Cho, & Lee, 2019; Cho Earnhart & Lizal, 2006; Wahba, 2008; Yang, Li, Yu, Zeng, & Sun, 2019). Studies document that corporate environmental performance is affected by government ownership, administrative hierarchical distance, and external monitoring (e.g., Babiak & Trendafilova, 2011; Duanmu et al., 2018; Kim et al., 2019; Schilke, 2018; Wang, Wijen, & Heugens, 2018). Given that corporate environmental strategy is one of the most important decisions that top executives make, numerous studies also present how executive characteristics, such as CEO educational background (e.g., MBA and law degree) and CEO tenure, affect corporate

environmental practices and generate important insights. Recent research focuses on how CEO incentives affect corporate environmental practices. Various studies shift attention to the influence of CEO compensation on corporate environmental performance (e.g., Cordeiro & Sarkis, 2008; Harris & Bromiley, 2007; McGuire, Dow, & Argheyd, 2003; Stanwick & Stanwick, 2001). However, these studies examine only the *absolute* level of top executives' compensation. Scant attention is paid to how *relative* executive compensation affects corporate environmental practices, which is a serious omission, as relative compensation can affect corporate strategic behavior saliently (Pfeffer & Langton, 1993). The literature on the coalition and upper echelon perspective notes that top executives, comprising CEOs and non-CEOs, are "vital coalition" members who jointly impinge on corporate strategic choices, behaviors, and financial performance (Hambrick & Mason, 1984; Peterson, Smith, Martorana, & Owens, 2003). These executives have a large involvement in the decision-making process. Therefore, the concept of relative compensation should be incorporated to explain motivations behind corporate environmental performance, which would enable us to contribute new theoretical insights to the extant literature.

In terms of corporate environmental performance, our study focuses on CER and CEIR.[3] CER refers to voluntary corporate environmental actions designed to improve social conditions (Mackey, Mackey, & Barney, 2007), whereas CEIR pertains to a set of corporate environmental actions that negatively affect the legitimate claims of identifiable social stakeholders in the long run (Strike, Gao, & Bansal, 2006). Examining CER and CEIR separately rather than regarding them as opposite sides of the same construct is necessary. As suggested by Strike, Gao, & Bansal (Strike et al., 2006), responsible actions are not merely the flip side of irresponsible actions, and a firm may engage in responsible and irresponsible actions simultaneously (e.g., Tang, Qian, Chen, & Shen, 2015).

Moreover, we investigate the effects of pay dispersion among coalition members on corporate environmental engagement. Following previous studies, our research considers the influence of two types of pay dispersions, namely, vertical pay dispersion and horizontal pay dispersion (Chin & Semadeni, 2017; Connelly, Haynes, Tihanyi, Gamache, & Devers, 2016). On this basis, our study explores the following research questions:

1. How do vertical and horizontal pay dispersion affect CE(I)R?
2. Whether and how vertical and horizontal pay dispersion affect CE(I)R differently, that is, what are the asymmetric effects of vertical and horizontal pay dispersion on CE(I)R?

We theorize that vertical and horizontal pay dispersion have a negative association with CER and a positive association with CEIR but mechanisms vary. We argue that vertical pay dispersion may induce tournament competition among executives (Connelly, Tihanyi, Crook, & Gangloff, 2014; Henderson & Fredrickson, 2001; Lazear & Rosen, 1981), thereby resulting in executives' negative environmental efforts. Based on the literature on horizontal pay dispersion, we argue that horizontal pay dispersion will create an unjust atmosphere among executives and may result in the neglect of the interest of

environmental stakeholders. Therefore, both types of pay dispersions lead to increased CEIR and reduced CER.

We further advance our theoretical argument by exploring the asymmetric effects of vertical and horizontal pay dispersion. We argue that vertical pay dispersion will trigger social comparison between CEOs and non-CEOs, that is, vertical social comparison, and horizontal pay dispersion will trigger such comparison among non-CEOs, that is, horizontal social comparison. The key factor differentiating vertical social comparison from horizontal social comparison is the comparison referent. The intensity of social comparison is positively associated with similarities between a focal actor and corresponding referents (Fredrickson, Davis-Blake, & Sanders, 2010). Horizontal referents refer to non-CEOs, whereas vertical referents refer to CEOs. Given the large hierarchy distance between CEOs and non-CEOs (Graffin, Wade, Porac, & McNamee, 2008), vertical social comparison is less powerful than horizontal social comparison. Therefore, we posit that the negative effect of vertical pay dispersion on CER is weaker than that of horizontal pay dispersion. Moreover, the positive effect of vertical pay dispersion on CEIR is weaker than that of horizontal pay dispersion. The theoretical model is shown in Figure 1.

We find substantial support for our hypotheses using a dataset of 2,169 firms over 19 years. Our study provides several notable theoretical contributions. First, our study advances research on corporate environmental performance by linking it to managerial pay dispersion among coalition members. While previous studies show that compensation incentives may trigger adverse effects, we argue that relative compensation offers incentives affecting corporate environmental engagements and demonstrate empirically that relative compensation exerts vertical and horizontal influences on corporate environmental practices. Second, our study deepens understanding on the outcomes of pay dispersion by documenting moral consequences. Prior studies disproportionally focus on the financial outcomes of pay dispersion (e.g., Connelly et al., 2016). Moreover, we conduct a comprehensive analysis on CER and CEIR, thereby further substantiating our arguments and findings. In addition, we enrich the pay dispersion literature by revealing the asymmetric effects of vertical and horizontal pay dispersion owing to heterogeneity among social comparison referents. Finally, this study provides practical implications for compensation structure design among coalition members. Our findings suggest the need to consider the potential side effect of excessive pay dispersion among executives. As suggested in our study, the side effect is manifested as environmental irresponsibility, as pay dispersion may induce negative emotions or efforts among executives.

2 | THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

2.1 | Corporate executives and corporate environmental performance

Corporate environmental performance reflects the extent to which a firm responds actively to the demands of environmental stakeholders
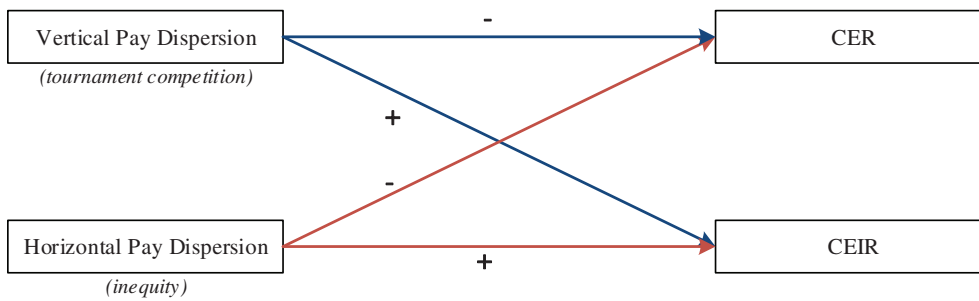
FIGURE 1 Theoretical model. *Note*: We use different colors to show the asymmetric effect of vertical pay dispersion and horizontal pay dispersion on CE(I)R. Specifically, the relationship lines in orange red indicates a larger effect on CE(I)R than that in blue [Colour figure can be viewed at wileyonlinelibrary.com]

(Escrig-Olmedo, Muñoz-Torres, Fernández-Izquierdo, & Rivera-Lirio,- 2017). Scholars decompose this construct into positive and negative aspects, that is, CER and CEIR. CER represents responsible stakeholder engagement in the environmental domain, whereas CEIR represents irresponsible stakeholder engagement in the same domain. As documented in the literature, responsible stakeholder engagement is not merely the flip side of irresponsible stakeholder engagement. Therefore, distinguishing between CER and CEIR can offer more heterogeneous information and novel insights than focusing solely on either CER or CEIR. The Kinder, Lydenberg, and Domini (KLD) database also offers a satisfactory illustration, in which one item belongs to CER, which is called "regulatory compliance," but no counterpart item belongs to CEIR. Moreover, Oikonomou, Brooks, and Pavelin (2014) indicated the possibility that a firm may engage in mixed socially responsible actions and emphasized the need to address responsible and irresponsible stakeholder engagements separately. Thus, consistent with practices in previous studies, CER and CEIR are distinct constructs and subject to different dynamics (Lange & Washburn, 2012; Mattingly & Berman, 2006).

Prior research demonstrates long-standing interest in the drivers of CER and CEIR, such as executives' traits, government demands, and other institutional pressures and conditions (Brammer & Pavelin, 2008; De Villiers, Naiker, & Van Staden, 2011; Qi, Zeng, Li, & Tam, 2012; Wang et al., 2018). Lewis, Walls, & Dowell (2014) found that newly appointed CEOs and CEOs with MBA degrees are likely to voluntarily disclose environmental information. Meanwhile, Berrone, Cruz, Gomez-Mejia, and Larraza-Kintana (2010) claimed that firms managed by CEOs with substantial family ownership will increase environmentally responsible behaviors. By contrast, Kassinis and Vafeas (2002) indicated that firms with considerable inside ownership will engage in increased environmentally irresponsible behaviors, whereas firms with substantial outside ownership will decrease environmental pollution, thereby avoiding environmental lawsuits.

Executives' characteristics can influence firms' environmental initiatives. A recent research development involves the shift to managerial incentives. Scholars have paid increasing attention to how corporate strategic behaviors are intertwined with managerial economic incentives. For instance, executives with high compensation may encounter increasing pressure to improve firm performance. This compensation economic incentive may result in unethical behaviors, such as financial misrepresentation (Harris & Bromiley, 2007). Stanwick and Stanwick (2001) demonstrated that a CEO's total

compensation is negatively associated with corporate environmental reputation. Using a sample of 374 firms in the United States, McGuire et al. (2003) found that CEOs with high salary and long-term incentives may exhibit poor social performance. However, extant studies rarely examine the influence of pay dispersion among coalition members (i.e., top executives) on corporate environmental practices. To fill this gap, our study attempts to conduct a systematic analysis on the effects of vertical and horizontal pay dispersion on stakeholder engagement in CER and CEIR.

2.2 | Corporate pay dispersion and social comparison

CEOs, who act as representatives of a company, are responsible mainly for corporate strategic decisions. Non-CEOs in top management teams (TMTs) aim to assist CEOs implement business plans in their own field that drive a company's smooth operations. Given the differences in function and significance between CEOs and non-CEOs, modern corporations have formed a pyramid compensation structure, in which CEOs are the highest-paid executives, and non-CEOs are the next highest-paid employees (Henderson & Fredrickson, 2001). For executives, compensation represents status or hierarchy ranking and a measure of comparative success in the organizational structure (Graffin et al., 2008).

According to the upper echelon perspective (Hambrick & Mason, 1984), CEOs and non-CEOs serve as important coalition members, who jointly affect corporate choices and behaviors. Social comparison is prevalent among top executives (Fredrickson et al., 2010). Based on social comparison theory, individuals are inclined to compare themselves with referents having similar attributes, such as demographic characteristics, abilities, or position (Festinger, 1954). This theory is widely used to investigate the influence of pay dispersion on corporate strategic behaviors and financial performance (Chizema, Liu, Lu, & Gao, 2015). For instance, Bloom and Michel (2002) determined that pay dispersion among TMT members leads to increased executive turnover, which decreases firm performance. First, top executives are coalition members who pass through similar organizational filters, such as selection and promotion processes (March & March, 1981). Moreover, they are likely to share similar working experiences, education, ambitions, and personalities (Menz, 2012; Zhu & Chen, 2015). Most important, corporate top

executives are highly achievement oriented, power seeking, and status driven, as corporations operate based on a meritocratic social system (Finkelstein & Hambrick, 1988). Thus, such executives have a considerable tendency to make social comparisons with one another in terms of compensation (Lazear, 1989).

The two types of pay dispersions, namely, vertical and horizontal pay dispersion, have gained appreciable theoretical and empirical attention through the years principally from research on human resource management, strategic management, and organizational behavior (Bloom, 1999; Connelly et al., 2014; Pfeffer & Langton, 1993). Previous studies show that vertical pay dispersion will trigger tournament competition between CEOs and non-CEOs given the social comparison between them, thereby motivating executives to become obsessed with productivity enhancement (e.g., Connelly et al., 2016). Horizontal pay dispersion may facilitate aggressive social comparison among non-CEOs and result in an unjust atmosphere (e.g., Fredrickson et al., 2010). However, though prior research suggests that vertical and horizontal pay dispersion can promote social comparison among executives, the literature is devoid of the asymmetric effects of vertical and horizontal social comparison. Addressing this gap is important, as the two types of social comparisons are distinct in valence and lead to different stimuli for corporate executives. Therefore, based on the baseline model, we reveal the asymmetric effects of vertical and horizontal pay dispersion on stakeholder engagement in CER and CEIR.

2.3 | Vertical pay dispersion and CE(I)R

We propose that firms with large vertical pay dispersion will decrease their environmental performance, as reflected in reduced environmentally responsible activities and increased environmentally irresponsible activities. We explain this reasoning by drawing on the tournament effect (Connelly et al., 2014; Kini & Williams, 2012). We argue that vertical pay dispersion will induce an organizational atmosphere emphasizing tournament competition, with a strong orientation in financial returns and work productivity. Specifically, tournament competition motivates executives to exert considerable effort and commit themselves to work hard to be promoted (Connelly et al., 2016; Lazear & Rosen, 1981).

Under tournament competition, the dominant view in the literature is that tournament competition will likely trigger executives' negative efforts and executives are less interested in positive efforts (Dye, 1984). For instance, executives may engage in unethical behaviors for their own interests, such as reporting false information or engaging in detrimental behaviors toward stakeholders (Mishina, Dykes, Block, & Pollock, 2010; O'Connor Jr, Priem, Coombs, & Gilley, 2006; Wowak, Mannor, & Wowak, 2015).

In our research context, the aforementioned arguments imply that environmental stakeholders, as salient stockholders, are likely to be neglected under the adverse impact of tournament competition. This condition is because environmental investment is characterized by substantial resource consumption and the issue related to investment effectiveness ambiguity (Albertini, 2013; Cordeiro & Sarkis, 1997;

Deckop, Merriman, & Gupta, 2006). For instance, although firms with environmental proactive activities, such as green campaigns, may send positive signals to investors in the long run, such activities may generate costs, which can harm short-term financial performance (Cordeiro & Sarkis, 1997; Wang & Choi, 2013). By contrast, corporate irresponsible behaviors can reduce a firm's compliance costs, thereby granting instant financial benefits that can help executives win in the tournament competition (Qian, Lu, & Yu, 2019; Shi, Connelly, & Sanders, 2016). This argument is consistent with prior research, such as Mishina, Dyker, Block, & Pollock (2010). Therefore, under the influence of tournament competition, expecting environmental irresponsibility to be preferable to environmental responsibility for executives is reasonable. Accordingly, we propose that a firm with high vertical pay dispersion can induce tournament competition among executives, which in turn may trigger negative environmental efforts, that is, reduced CER and increased CEIR.

Hypothesis 1a *A negative relationship exists between vertical pay dispersion and CER.*

Hypothesis 1b *A positive relationship exists between vertical pay dispersion and CEIR.*

2.4 | Horizontal pay dispersion and CE(I)R

According to the equity perspective, horizontal pay dispersion may affect the organizational equity atmosphere (Adams, 1963; Gupta, Conroy, & Delery, 2012). Research on social psychology suggests that individuals tend to overestimate their own abilities while underestimating others' contributions (Duval & Silvia, 2002; Moore & Small, 2007). This type of human "self-enhancement" tendency is salient among non-CEOs owing to their similar hierarchy positions (Chatterjee & Hambrick, 2007; Hayward & Hambrick, 1997; Hiller & Hambrick, 2005). Horizontal pay dispersion may influence non-CEOs to compare themselves with their fellows and increase negative emotions, such as injustice, inequity, and jealousy (Barnard, 1938; Siegel & Hambrick, 2005). For instance, Fredrickson et al. (2010) emphasized that team members tend to compare the ratio of their inputs (e.g., efforts) and outcomes (e.g., compensation) with that of their colleagues, thereby resulting in perceived imbalance.

We argue that such negative emotions often lead to motivations among executives to engage in reduced ethical behaviors and increased unethical behaviors. On the one hand, as non-CEOs' perceived injustice, inequity, and jealousy increase, they may become increasingly tempted to focus on their own interests regardless of ethical behaviors that can benefit their firm in the long term (Finkelstein, Cannella, Hambrick, & Cannella, 2009). Engagement in environmentally responsible corporate behaviors is financially costly, and the effect is ambiguity, not to mention that at the lack of attention or focus on the relevant ethical issues (Qian et al., 2019). In this sense, executives may reduce their engagement in responsible behaviors. On the other hand, executives may engage in detrimental behaviors

related to CEIR when encountering unfavorable experiences to lessen negative emotions (Becker & Huselid, 1992; Connelly et al., 2016). Firms hire top executives to take charge of their business (Hambrick, 1994). When executives perceive negative emotions, they will engage in increased reckless (Becker & Huselid, 1992) and uncooperative behavior (Lazear, 1989), which may increase the likelihood of engaging in environmentally irresponsible behaviors. For instance, they will not be inclined to observe early signs of failure in environmental protection projects and cooperate to resolve environmental-related issues, such as hazardous waste emissions, environmental guidance degradation, and so on (Marquis & Bird, 2018).

Therefore, we propose that a firm with high horizontal pay dispersion can induce negative emotions among executives, which lead to reduced CER and increased CEIR.

Hypothesis 2a *A negative relationship exists between horizontal pay dispersion and CER.*

Hypothesis 2b *A positive relationship exists between horizontal pay dispersion and CEIR.*

2.5 | Asymmetric effects of vertical versus horizontal pay dispersion on CE(I)R

Although the two types of pay dispersions (i.e., vertical pay dispersion and horizontal pay dispersion) affect CER and CEIR, we propose that their influences are asymmetric. In the following section, we explain theoretically the reasoning behind the asymmetric influences. As key coalition members, executives are important decision makers in a firm and share numerous commonalities. However, their hierarchy status and corresponding positions differ. For instance, CEOs are in a much higher hierarchy position than non-CEOs (Graffin et al., 2008). Including social comparison theory in our research context, we suggest that vertical and horizontal pay dispersion result in social comparison as long as heterogeneity is present in the ratio of input to output (Festinger, 1954).

Preference for similarities may be one of the most fundamental and far-reaching psychological attributes and manifests in during comparison and evaluation (Goodman, 1974; Levine & Moreland, 1987). Similar referents could provide objective and precise information on individuals' judgment on whether or not they are good (Kulik & Ambrose, 1992). Therefore, executives are inclined to compare themselves with referents having similar attributes, such as gender, age, and industry characteristics (Fredrickson et al., 2010; Kulik & Ambrose, 1992; Wade, O'Reilly III, & Pollock, 2006). For instance, CEOs of similar-sized firms in the same industry are likely to be aware of and closely compare themselves with one another because they experience similar external environments (Shi, Hoskisson, & Zhang, 2017). In our research context, hierarchy positions among non-CEOs (existing in horizontal pay dispersion) are more similar than those between CEOs and non-CEOs (existing in vertical pay dispersion). Correspondingly, resource amounts and portfolios among non-CEOs are more similar than those between CEOs and non-CEOs (March & March, 1981). Accordingly, the needs of vertical and horizontal social comparison differ in valence and can lead to different stimuli for corporate executives. Social comparison due to horizontal pay dispersion should be more influential than that induced by vertical pay dispersion. Therefore, we suggest that the effect of horizontal pay dispersion on CE(I)R is larger than that of vertical pay dispersion.

Hypothesis 3a *The negative effect of horizontal pay dispersion on CER is stronger than that of vertical pay dispersion.*

Hypothesis 3b *The positive effect of horizontal pay dispersion on CEIR is stronger than that of vertical pay dispersion.*

3 | METHODS

3.1 | Sample and data

Our hypotheses were tested with a sample of U.S. publicly listed firms. From the ExecuComp database, we obtained information on executives' compensation. We also collected several control variables from the same dataset, such as CEO tenure, CEO age, CEO gender, and female director data. In addition, we obtained CER and CEIR data from the database developed by Kinder, Lydenburg, and Domini (i.e., the KLD database), which is considered as the best available information for compiling a comprehensive measure of corporate environmental performance (Hillman & Keim, 2001; Wang & Choi, 2013). Finally, we obtained data related to firm-level control variables from the COMPUSTAT database. These datasets were retrieved from the WRDS research platform, which is managed by the Wharton School, University of Pennsylvania. After observations with missing data were excluded, the final sample consisted of 2,169 firms and 13,811 firm-year observations.

3.2 | Measures

3.2.1 | CER and CEIR

Following prior research (e.g., Melo & Garrido-Morgado, 2012), we measured CER and CEIR based on the environmental dimension data from the KLD database (see Appendix for details). The environmental dimension involved different components of corporate environmental performance and consisted of strength and concern items. "Strengths" included eight items, such as beneficial products and services, pollution prevention, recycling, clean energy etc., and "concerns" contained seven items, including hazardous waste, regulatory problems, ozone-depleting chemicals etc. Each item indicated whether or not a firm met certain criteria. For instance, the "recycling" item was coded 1 if a company was either a substantial user of recycled materials as raw materials in its manufacturing process or a major factor in the

recycling industry, and 0 otherwise. In line with prior research, we measured the CER and CEIR variables by summing up the scores of the strength items and the scores of the concerns items, respectively.

3.2.2 | Vertical and horizontal pay dispersion

Vertical pay dispersion was measured as the log difference between a CEO's pay and the average pay of non-CEOs (Chin & Semadeni, 2017; Hart, David, Shao, Fox, & Westermann-Behaylo, 2015). We calculated pay as the sum of short- and long-term compensation. Short-term compensation was measured as the sum of annual salary and bonuses, and long-term compensation was measured as the sum of the Black–Scholes value of stock options and restricted stock grants. *Horizontal pay dispersion* indicated the coefficient of variation of pay for the non-CEOs (Fredrickson et al., 2010; Hart et al., 2015) and was measured as the standard deviation divided by the arithmetic mean of their pay. Pay referred to the sum of short- and long-term pay.

3.2.3 | Control variables

We controlled for a list of firm-level factors that affected CER and CEIR. First, the decision to engage in CER and CEIR activities may depend on a firm's prior financial situation. Thus, we controlled for several financial-related variables, including *firm performance, firm slack, firm size, debt ratio, sales growth*, and *book-to-market ratio*. *Firm performance* was measured as the ratio of net income to total assets, which has been argued to affect stakeholder engagement (Callan & Thomas, 2009). *Firm slack* was introduced to consider the excess cash of each firm, which was measured as a firm's cash holdings scaled by total assets, as it is another crucial factor indicating corporate financial resources (Zhang et al., 2018). *Firm size* was measured as the natural logarithm of total assets. Large firms may engage in increased CER because they possess substantial financial resources and are under considerable supervision from multiple stakeholders. *Debt ratio* was measured as the ratio of long-term debt to equity. *Sales growth* was measured as the change rate of the current year's sale compared with the prior year's sale. *Book-to-market ratio* was calculated as the ratio of the book value to the market value of a firm. We also controlled for five governance-related variables, that is, *CEO tenure, CEO age, CEO duality, CEO gender*, and *female director ratio*, which could influence engagement in CE(I)R (e.g., De Villiers et al., 2011). We controlled for *CEO tenure*, which was measured as the working duration of a CEO. Moreover, we controlled for *CEO age* given that older CEOs are inclined to engage in environmentally responsible practices. *CEO duality* was measured as 1 if the CEO and board director are the same person, and 0 otherwise. *CEO gender* equaled 1 if the CEO is female. *Female director ratio* was controlled for because firms with more female directors than male directors are likely to engage in environmental-related practices. We likewise controlled for *market competition*, which has been argued to affect corporate stakeholder strategy, because stakeholder engagement is regarded as a

competitive strategy (e.g., Bagnoli & Watts, 2003; Conrad, 2005; Fisman, Heal, & Nair, 2006). *Market competition* was measured as the natural logarithm transformation of one minus the four-firm concentration ratio scaled by the same ratio (Palmer & Wiseman, 1999; Tang et al., 2015). The four-firm concentration ratio was operationalized as the total sales of four firms with the largest sales at a two-digit level in an industry divided by the total sales of that industry. *R&D expenses* were also controlled for, as firms with high R&D intensity are more likely to engage in corporate social responsibility (Padgett & Galan, 2010). The independent and control variables and moderators were lagged for one year to mitigate endogeneity concerns.

Firm- and year-fixed effects were used to control for the effects of unobservable time-invariant firm characteristics and macroeconomic trends. The fixed-effects regression model allowed us to deploy fully the data in the panel structure (Bettis, Gambardella, Helfat, & Mitchell, 2014). In addition, we conducted Hausman's (1978) specification tests to confirm whether fixed- or random-effects models should be used to test the hypotheses. The results presented a significant correlation between errors and regressors ($p < 0.05$), thereby suggesting that the fixed-effects models were more appropriate for statistical analysis than the random-effects models. This study conducted all statistical analyses with Stata 16.0 to explain the panel structure of the data.

4 | RESULTS

Table 1 presents the descriptive statistics and correlations between the variables. The correlation between horizontal pay dispersion and CEIR is positive and significant and the correlation between horizontal pay dispersion and CER is negative and significant. The correlation between vertical pay dispersion and CEIR is positive and significant. The findings provide preliminary evidence for the argument that horizontal pay dispersion is associated with reduced CER and increased CEIR. We check whether a potential multicollinearity problem exists by computing variance inflation factors (VIFs). The mean VIF value is 2.41. All relevant values are substantially below the threshold point of 10 in the regression models. Thus, multicollinearity is not a major concern in this study (Cohen, Cohen, West, & Aiken, 2003).

Table 2 presents the testing results of Hypotheses 1 to 3. The values of all variables are unstandardized. Models 1 and 2 include all the control variables. Model 3 shows a negative and significant relationship between vertical pay dispersion and CER ($\beta = -.131$, $p < .001$). Model 4 reveals a positive and significant relationship between horizontal pay dispersion and CEIR ($\beta = .017$, $p < .001$). Thus, Hypotheses 1a and 1b are supported. Models 5 and 6 demonstrate a negative relationship between vertical pay dispersion and CER ($\beta = -.358$, $p < .001$) and a positive relationship between vertical pay dispersion and CEIR ($\beta = .076$, $p < .001$). Thus, Hypotheses 2a and 2b are supported.

To test Hypotheses 3a and 3b, we conduct an *F*-test to check for the asymmetric effect of vertical and horizontal pay dispersion on CER and CEIR. While analyzing the asymmetric effects of the

TABLE 1 Descriptive statistics and correlation

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. CER	0.297	0.708	1																
2. CEIR	0.278	0.744	0.300*	1															
3. Vertical pay dispersion[a]	−0.268	1.247	0.021	0.171*	1														
4. Horizontal pay dispersion	0.357	0.236	−0.084*	0.046*	0.435*	1													
5. Firm performance	0.050	0.0739	0.036*	−0.011	0.060*	0.002	1												
6. Firm slack	0.141	0.164	−0.077*	−0.182*	−0.108*	−0.024	0.094*	1											
7. Firm asset[a]	7.867	1.678	0.327*	0.325*	0.370*	0.080*	−0.101*	−0.363*	1										
8. Debt ratio	0.218	0.178	0.080*	0.141*	0.110*	0.042*	−0.211*	−0.373*	0.268*	1									
9. Sales growth	0.105	0.217	−0.088*	−0.024	0.065*	0.067*	0.204*	0.080*	−0.060*	−0.048*	1								
10. Book-to-market ratio	0.519	0.352	−0.051*	−0.002	−0.172*	−0.071*	−0.387*	−0.188*	0.105*	−0.019	−0.183*	1							
11. CEO tenure	8.012	7.188	−0.084*	−0.084*	−0.046*	−0.011	0.039*	0.065*	−0.097*	−0.063*	0.050*	0.018	1						
12. CEO age	55.61	6.955	0.046*	0.086*	0.050*	−0.002	0.005	−0.126*	0.118*	0.065*	−0.055*	0.056*	0.431*	1					
13. CEO duality	0.592	0.492	0.067*	0.129*	0.220*	0.066*	0.019	−0.127*	0.2076*	0.064*	−0.017	−0.022	0.273*	0.301*	1				
14. CEO gender	0.023	0.149	0.004	−0.025	−0.046*	−0.011	−0.003	0.037*	−0.036*	0.004	−0.014	0.007	−0.042*	−0.044*	−0.028	1			
15. Female director ratio	0.077	0.128	−0.010	−0.061*	−0.036*	−0.032*	0.011	0.060*	−0.031*	−0.000	−0.031*	0.007	−0.021	−0.009	−0.017	0.076*	1		
16. Market competition	0.346	0.236	−0.042*	−0.007	−0.011	0.006	−0.130*	−0.006	0.187*	0.077*	0.010	0.074*	0.027	−0.017	−0.006	0.005	0.008	1	
17. R&D expenses	89.18	298.9	0.374*	0.225*	0.198*	0.056*	0.070*	0.086*	0.288*	−0.03	−0.008	−0.159*	−0.055*	0.006	0.0372*	−0.002	−0.038*	0.008	1

Note: N = 13,811.

[a]Logarithm. SEs are in parentheses. The variables of vertical pay dispersion and horizontal pay dispersion shown in this table are not standardized so that the model specification consistency among variables can be ensured.

*The correlations are significant at the 0.05 level (two-tailed).

TABLE 2 Regression analysis of pay dispersion on CE(I)R

Dependent variable	Model 1 CER	Model 2 CEIR	Model 3 CER	Model 4 CEIR	Model 5 CER	Model 6 CEIR	Model 7 CER	Model 8 CEIR
Firm performance	0.219***	0.077***	0.176***	0.083***	0.183***	0.085***	0.162***	0.087***
	(0.014)	(0.010)	(0.014)	(0.010)	(0.014)	(0.010)	(0.014)	(0.010)
Firm slack	0.235*	−0.113	0.233*	−0.113	0.203*	−0.106	0.217*	−0.108
	(0.099)	(0.070)	(0.097)	(0.070)	(0.098)	(0.070)	(0.097)	(0.070)
Firm size[a]	0.424***	0.004	0.427***	0.004	0.390***	0.011	0.409***	0.009
	(0.071)	(0.050)	(0.069)	(0.050)	(0.070)	(0.050)	(0.069)	(0.050)
Debt ratio	0.004	−0.004	−0.051	0.003	0.012	−0.006	−0.041	−0.000
	(0.064)	(0.045)	(0.062)	(0.045)	(0.063)	(0.045)	(0.062)	(0.045)
Sales growth	−0.202***	0.008	−0.152***	0.001	−0.180***	0.003	−0.146***	−0.000
	(0.025)	(0.018)	(0.025)	(0.018)	(0.025)	(0.018)	(0.025)	(0.018)
Book-to-market ratio	0.026	−0.016	−0.025	−0.009	0.021	−0.015	−0.022	−0.010
	(0.023)	(0.016)	(0.023)	(0.016)	(0.023)	(0.016)	(0.023)	(0.016)
CEO tenure	0.002	−0.002+	0.002	−0.002+	0.002	−0.002+	0.002	−0.002+
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
CEO age	0.001	0.001	−0.000	0.001	0.001	0.001	−0.000	0.001
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
CEO duality	−0.034*	0.008	0.002	0.003	−0.027	0.006	0.003	0.003
	(0.017)	(0.012)	(0.017)	(0.012)	(0.017)	(0.012)	(0.016)	(0.012)
CEO gender	0.276***	−0.094*	0.220***	−0.086*	0.274***	−0.093*	0.225***	−0.088*
	(0.056)	(0.039)	(0.055)	(0.039)	(0.055)	(0.039)	(0.054)	(0.039)
Female director ratio	0.328***	−0.090*	0.269***	−0.082+	0.290***	−0.082+	0.256***	−0.078+
	(0.060)	(0.042)	(0.059)	(0.042)	(0.060)	(0.042)	(0.059)	(0.042)
Market competition	−0.248*	−0.226***	−0.059	−0.251***	−0.152	−0.246***	−0.029	−0.260***
	(0.097)	(0.068)	(0.096)	(0.069)	(0.097)	(0.069)	(0.095)	(0.069)
R&D expenses	0.001***	−0.000	0.001***	−0.000	0.001***	−0.000	0.001***	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Vertical pay dispersion[a]			−0.131***	0.017***			−0.117***	0.013**
			(0.006)	(0.004)			(0.006)	(0.004)
Horizontal pay dispersion					−0.358***	0.076***	−0.187***	0.057**
					(0.025)	(0.018)	(0.026)	(0.019)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−1.554***	−0.273**	−1.226***	−0.316**	−1.172***	−0.354***	−1.061***	−0.366***
	(0.139)	(0.098)	(0.137)	(0.098)	(0.140)	(0.099)	(0.138)	(0.099)
R^2	0.190	0.100	0.204	0.105	0.202	0.103	0.205	0.105
N	13,811	13,811	13,811	13,811	13,811	13,811	13,811	13,811

*Note: SEs are in parentheses. ***, **, *, and + indicate the significance levels below 0.1, 1, 5, and 10%, respectively (two-tailed).*
[a]Logarithm. The variables of vertical pay dispersion and horizontal pay dispersion shown in this table are not standardized so that the model specification consistency among variables can be ensured. Only when comparing the effects of vertical pay dispersion and horizontal pay dispersion, we standardized them to run the F-test.

influence of vertical and horizontal pay dispersion, we standardized the values of vertical and horizontal pay dispersion to make them comparable. The results show that the effect of horizontal pay dispersion on CER is much larger than that of vertical pay dispersion ($p < .001$). Thus, Hypothesis 3a is supported. However, no significant

difference exists between horizontal pay dispersion and vertical pay dispersion on CEIR ($p > .1$). Thus, Hypothesis 3b is not supported.

Moreover, we perform additional tests to ensure the robustness of our results. Following previous research (Devers, Cannella Jr, Reilly, & Yoder, 2007; Hart et al., 2015), short-term compensation

well captures the sum of annual salary and bonuses, and long-term compensation is regarded as the sum of Black–Scholes values of stock options and restricted stock grants, which are regarded as an alternative measure of compensation. Thus, we utilized short- and long-term compensation separately to measure pay dispersion. We rerun all the models in Tables 3 and 4. The results are largely consistent with those in previous model specifications, which suggest that our models are not sensitive to the alternative measure of pay dispersion.

TABLE 3 Robust test of short pay dispersion

Dependent variable	Model 1 CER	Model 2 CEIR	Model 3 CER	Model 4 CEIR	Model 5 CER	Model 6 CEIR	Model 7 CER	Model 8 CEIR
Firm performance	0.219***	0.077***	0.222***	0.077***	0.212***	0.080***	0.216***	0.079***
	(0.014)	(0.010)	(0.014)	(0.010)	(0.014)	(0.010)	(0.014)	(0.010)
Firm slack	0.235*	−0.113	0.296**	−0.122+	0.231*	−0.112	0.291**	−0.120+
	(0.099)	(0.070)	(0.098)	(0.070)	(0.099)	(0.070)	(0.098)	(0.070)
Firm size[a]	0.424***	0.004	0.423***	0.004	0.411***	0.009	0.414***	0.009
	(0.071)	(0.050)	(0.070)	(0.050)	(0.071)	(0.050)	(0.070)	(0.050)
Debt ratio	0.004	−0.004	−0.052	0.003	0.009	−0.007	−0.046	0.001
	(0.064)	(0.045)	(0.063)	(0.045)	(0.064)	(0.045)	(0.063)	(0.045)
Sales growth	−0.202***	0.008	−0.171***	0.004	−0.198***	0.006	−0.169***	0.003
	(0.025)	(0.018)	(0.025)	(0.018)	(0.025)	(0.018)	(0.025)	(0.018)
Book-to-market ratio	0.026	−0.016	−0.004	−0.012	0.025	−0.016	−0.004	−0.012
	(0.023)	(0.016)	(0.023)	(0.016)	(0.023)	(0.016)	(0.023)	(0.016)
CEO tenure	0.002	−0.002+	0.003+	−0.002*	0.002	−0.002+	0.003+	−0.002+
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
CEO age	0.001	0.001	0.002	0.001	0.001	0.001	0.002	0.001
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
CEO duality	−0.034*	0.008	−0.014	0.005	−0.037*	0.009	−0.017	0.006
	(0.017)	(0.012)	(0.017)	(0.012)	(0.017)	(0.012)	(0.017)	(0.012)
CEO gender	0.276***	−0.094*	0.248***	−0.090*	0.278***	−0.095*	0.250***	−0.091*
	(0.056)	(0.039)	(0.055)	(0.039)	(0.056)	(0.039)	(0.055)	(0.039)
Female director ratio	0.328***	−0.090*	0.315***	−0.089*	0.320***	−0.087*	0.309***	−0.086*
	(0.060)	(0.042)	(0.060)	(0.042)	(0.060)	(0.042)	(0.060)	(0.042)
Market competition	−0.248*	−0.226***	−0.199*	−0.233***	−0.238*	−0.230***	−0.193*	−0.236***
	(0.097)	(0.068)	(0.097)	(0.068)	(0.097)	(0.068)	(0.097)	(0.068)
R&D expenses	0.001***	−0.000	0.001***	−0.000	0.001***	−0.000	0.001***	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Vertical pay dispersion[a]			−0.123***	0.017**			−0.120***	0.016*
			(0.009)	(0.006)			(0.009)	(0.006)
Horizontal pay dispersion					−0.192***	0.077**	−0.148***	0.071**
					(0.034)	(0.024)	(0.034)	(0.024)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−1.554***	−0.273**	−1.706***	−0.251*	−1.451***	−0.314**	−1.622***	−0.291**
	(0.139)	(0.098)	(0.138)	(0.098)	(0.140)	(0.099)	(0.140)	(0.099)
R^2	0.190	0.100	0.194	0.104	0.194	0.101	0.200	0.105
N	13,811	13,811	13,811	13,811	13,811	13,811	13,811	13,811

*Note: SE*s are in parentheses. ***, **, *, and + indicate the significance levels below 0.1, 1, 5, and 10%, respectively (two-tailed).
[a]Logarithm. The variables of vertical pay dispersion and horizontal pay dispersion shown in this table are not standardized so that the model specification consistency among variables can be ensured. Only when comparing the effects of vertical pay dispersion and horizontal pay dispersion, we standardized them to run the F-test.

TABLE 4 Robust test of long-pay dispersion

Dependent variable	Model 1 CER	Model 2 CEIR	Model 3 CER	Model 4 CEIR	Model 5 CER	Model 6 CEIR	Model 7 CER	Model 8 CEIR
Firm performance	0.037*	0.156***	0.048**	0.149***	0.029+	0.152***	0.039*	0.145***
	(0.016)	(0.019)	(0.017)	(0.019)	(0.016)	(0.019)	(0.017)	(0.019)
Firm slack	0.180	0.015	0.182	0.014	0.175	0.013	0.177	0.012
	(0.117)	(0.134)	(0.117)	(0.134)	(0.117)	(0.134)	(0.117)	(0.134)
Firm size[a]	0.308***	0.042	0.315***	0.037	0.303***	0.039	0.309***	0.034
	(0.082)	(0.094)	(0.082)	(0.094)	(0.082)	(0.094)	(0.082)	(0.094)
Debt ratio	0.009	−0.175*	0.003	−0.171*	0.021	−0.170*	0.015	−0.165*
	(0.070)	(0.080)	(0.070)	(0.080)	(0.070)	(0.080)	(0.070)	(0.080)
Sales growth	0.014	0.040	0.014	0.040	0.019	0.042	0.018	0.042
	(0.025)	(0.029)	(0.025)	(0.029)	(0.025)	(0.029)	(0.025)	(0.029)
Book-to-market ratio	0.043	−0.068+	0.035	−0.063+	0.049	−0.065+	0.042	−0.060+
	(0.031)	(0.035)	(0.031)	(0.035)	(0.031)	(0.035)	(0.031)	(0.035)
CEO tenure	0.003+	−0.000	0.003	0.000	0.003	−0.000	0.003	−0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
CEO age	−0.003+	−0.000	−0.004*	−0.000	−0.003+	−0.000	−0.003+	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
CEO duality	0.002	−0.023	0.003	−0.024	0.001	−0.024	0.002	−0.025
	(0.019)	(0.021)	(0.019)	(0.021)	(0.019)	(0.021)	(0.019)	(0.021)
CEO gender	0.034	−0.094	0.043	−0.100	0.034	−0.094	0.042	−0.100
	(0.083)	(0.095)	(0.083)	(0.095)	(0.083)	(0.095)	(0.083)	(0.095)
Female director ratio	−0.034	0.139	−0.027	0.135	−0.039	0.137	−0.032	0.132
	(0.076)	(0.087)	(0.076)	(0.087)	(0.076)	(0.087)	(0.076)	(0.087)
Market competition	−0.104	−0.211+	−0.117	−0.203	−0.098	−0.209+	−0.110	−0.199
	(0.108)	(0.123)	(0.108)	(0.123)	(0.108)	(0.123)	(0.108)	(0.123)
R&D expenses	0.000***	0.000	0.000***	0.000	0.000***	0.000	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Vertical pay dispersion[a]			−0.015**	0.010			−0.014*	0.010
			(0.006)	(0.006)			(0.006)	(0.006)
Horizontal pay dispersion					−0.051***	−0.022	−0.048***	−0.024
					(0.014)	(0.016)	(0.014)	(0.016)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.012	−0.751***	−0.051	−0.709***	0.095	−0.715***	0.034	−0.668***
	(0.164)	(0.188)	(0.166)	(0.190)	(0.165)	(0.189)	(0.167)	(0.192)
R^2	0.049	0.094	0.056	0.092	0.048	0.093	0.055	0.091
N	5,303	5,303	5,303	5,303	5,303	5,303	5,303	5,303

Note: Standard errors in parentheses. ***, **, *, and + indicate the significance levels below 0.1, 1, 5, and 10%, respectively (two-tailed).
[a]Logarithm. The variables of vertical pay dispersion and horizontal pay dispersion shown in this table are not standardized so that the model specification consistency among variables can be ensured. Only when comparing the effects of vertical pay dispersion and horizontal pay dispersion, we standardized them to run the F-test.

5 | DISCUSSIONS

Given the growing importance of the coalition of TMT members, numerous studies have expectedly explored how CEOs and non-CEOs jointly affect corporate behaviors. However, how pay dispersion among TMT members affects corporate environmental performance is unclear. This study provides answers. With a sample of 2,169 firms from 1994 to 2012, we find that vertical and horizontal pay dispersion can reduce a firm's environmentally responsible activities (i.e., CER) and increase its environmentally irresponsible activities (i.e., CEIR).

The influences of vertical and horizontal pay dispersion are asymmetric. The influence of horizontal pay dispersion on CER is much larger than that of vertical pay dispersion owing to the similarity preference in the comparison process, which leads to increased horizontal comparison rather than vertical comparison.

Our findings have important theoretical contributions to the relevant literature. First, this study contributes to the research on corporate environmental performance by linking it to the pay dispersion literature. Prior research examining the antecedents of corporate environmental performance focuses mainly on the compensation of CEOs. However, such research investigates the absolute level of compensation but ignores the relative level of compensation within the TMT. TMT pay dispersion can well capture relative compensation, as it reflects executives' pay compared with CEOs and fellow team members. This comparison can lead to tournament competition and unjust atmosphere among team members, which can influence corporate environmental practices.

Second, this study enriches the pay dispersion literature by considering its moral consequences. Prior research investigates the influences of vertical and horizontal pay dispersion on corporate financial performance but provides debatable results. Financial performance is important. However, environmental performance cannot be neglected, because a satisfactory corporate environmental performance lays the foundation for financial performance (Russo & Fouts, 1997). We uncover the influence of two distinct types of pay dispersions on various dimensions of environmental performance as well as respective mechanisms by applying the tournament effect and equity perspective. This study can contribute to the pay dispersion literature further by revealing the asymmetric influence of vertical and horizontal pay dispersion.

Practical implications for managerial practice on TMT pay dispersion design and corporate environmental performance are as follows. First, a compensation committee should be aware that though a large vertical pay dispersion can motivate managers to increase their productivity, such a dispersion could result in undesirable irresponsible environmental activities. Horizontal pay dispersion could also generate perceptions of injustice and inequality among non-CEOs. Considering the threats of vertical and horizontal pay dispersion on corporate environmental performance, a board should establish a rational compensation design for TMTs. Specifically, given that the valence in social comparison would be much stronger for horizontal pay dispersion than for vertical pay dispersion, board members should also pay special attention to vertical pay dispersion.

Moreover, improving corporate environmental performance may be difficult, because such initiatives may require the collective efforts of coalition TMT members. Accordingly, the results of our study suggest that board members must consider the function of non-CEOs in affecting corporate strategic behaviors, especially CER and CEIR. Specifically, restraining non-CEOs' negative motivations could be helpful to enhance corporate environmental performance.

5.1 | Limitations and future research

This study has several limitations, thereby requiring future research to advance its key arguments. First, this study assumes that tournament competition among executives and an unjust atmosphere are mechanisms linking pay dispersion and corporate environmental performance. Owing to data constraints, we do not directly measure the mechanisms underlying pay dispersion and corporate environmental performance. Future research should consider measuring such mechanisms and exert effort to confirm the theoretical propositions of this research. For instance, existing research employs surveys and experiments to capture executives' psychology, thereby providing feasible methods for capturing these two mechanisms directly.

Second, this study tests merely the asymmetric effects of vertical and horizontal pay dispersion and fails to consider moderators on their preference for similarity comparison. Further research can try to examine several internal firm-level and external environmental factors that can influence the extent of pay dispersion on corporate environmental performance.

Furthermore, our results are based mainly on U.S. publicly listed firms. Future research may consider testing these arguments on alternative data from other emerging and developed countries. Moreover, our data are limited to publicly listed firms, which represent a large proportion of the U.S. capital market. Our findings can be applied only to the unique cultural and social environment of listed American companies. Thus, future research can attempt to confirm these results in other types of firms, such as family firms or privately owned enterprises (Battisti & Perry, 2011).

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ENDNOTES

[1] https://fortuneconferences.com/global-sustainability-forum-2019/.

[2] https://fortune.com/2015/09/24/sustainability-practices-in-business-intel-unilever-wal-mart-dupont/.

[3] Following prior studies (e.g., Fu, Tang, & Chen, 2020), we use the term "CE(I)R" when referring to a firm's engagement in environmentally responsible and irresponsible corporate practices.

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APPENDIX A

ENVIRONMENT DIMENSION FROM KLD DATABASE

Environment	
Strengths	**Description**
Beneficial products and services	The company derives substantial revenues from innovative remediation products, environmental services, or products that promote the efficient use of energy, or it has developed innovative products with environmental benefits.
Pollution prevention	The company has notably strong pollution prevention programs including both emissions reductions and toxic-use reduction programs.
Recycling	The company either is a substantial user of recycled materials as raw materials in its manufacturing processes, or a major factor in the recycling industry.
Clean energy	The company has taken significant measures to reduce its impact on climate change and air pollution through the use of renewable energy and clean fuels or through energy efficiency. The company has demonstrated a commitment to promoting climate-friendly policies and practices outside its own operations.
Communications	The company is a signatory to the CERES principles, publishes a notably substantive environmental report, or has notably effective internal communications systems in place for environmental best practices.
Property, plant, and equipment	The company maintains its property, plant, and equipment with above average environmental performance for its industry.
Management systems	The company has demonstrated a superior commitment to management systems through ISO 14001 certification and other voluntary programs.
Other strength	The company has demonstrated a superior commitment to management systems, voluntary programs, or other environmentally proactive activities.
Concerns	**Description**
Hazardous waste	The company's liabilities for hazardous waste sites exceed $50 million, or the company has recently paid substantial fines or civil penalties for waste management violations.
Regulatory problems	The company has recently paid substantial fines or civil penalties for violations of air, water, or other environmental regulations, or it has a pattern of regulatory controversies under the clean air act, clean water act, or other major environmental regulations.
Ozone depleting chemicals	The company is among the top manufacturers of ozone depleting chemicals, such as HCFCs, methyl chloroform, methylene chloride, or bromines.
Substantial emissions	The company's legal emissions of toxic chemicals (as defined by and reported to the EPA) from individual plants into the air and water are among the highest of the companies followed by KLD.
Agricultural chemicals	The company is a substantial producer of agricultural chemicals (i.e., pesticides or chemical fertilizers).
Climate change	The company derives substantial revenues from the sale of coal or oil and its derivative fuel products, or the company derives substantial revenues indirectly from the combustion of coal or oil and its derivative fuel products. Such companies include electric utilities, transportation companies with fleets of vehicles, auto and truck manufacturers, and other transportation equipment companies.
Other concern	The company has been involved in an environmental controversy that is not covered by other KLD ratings.