

# THE IMPACT OF CEO POWER ON DIFFERENT MEASURES OF ENVIRONMENTAL DISCLOSURE: EVIDENCE FROM U.S. FIRMS

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## Abstract

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The purpose of this paper is to investigate if the detriment to environmental (E) disclosures as a result of a chief executive officer's (CEO) power is different for outcome versus intention-oriented disclosure characteristics. This paper creates four measures to capture the diverse nature of E disclosures that vary in the degree of accountability and comparability they provide: a) qualitative, b) quantitative, c) effectiveness, and d) effort. Seemingly unrelated regression is used on a sample of over 2,200 U.S. publicly traded companies. Findings suggest that the relationship between CEO power and E disclosures is not uniform. Powerful CEOs suppression of the most comparable outcome-based environmental disclosures (effectiveness) is greater than the suppression of other environmental disclosures. This is a particularly relevant relationship given shifts in corporate priorities as demonstrated by the proliferation of impact investing, the growth in E reporting, and the CEO's stated commitment to maximizing stakeholder wealth that was discussed at the August 2019 Business Roundtable.

**Keywords:** ESG Disclosure, Environmental Disclosure, CEO Power, Accountability, Agency Theory, CSR

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## 1. INTRODUCTION

The responsibility of corporate boards in the United States as it relates to promoting environmental reporting is at an inflection point as stockholder and stakeholder interests begin to intersect. CEOs also claim to grasp that businesses' environmental impact intersects with both shareholder and stakeholder value. At the August 2019 Business

Roundtable leading U.S. CEOs recognized their responsibility for externalities of business operations to society like climate change (The Economist, 2019). However, in the years preceding this commitment, these firms failed to "walk the talk" (Raghunandan & Rajgopal, 2020). This observed disconnect is not surprising given that voluntarily providing the most accountable environmental (E) disclosures is not in CEOs' best interests as it implies

a relinquishing of power (Dillard & Vinnari, 2019), additional costs, and poses a personal risk with unknown consequences. In this unregulated environment, the incentives for providing the highest quality E disclosures are unclear. Despite traditional board monitoring mechanisms, powerful CEOs can exert their influence and act to protect their power by withholding resources required to provide the most accountable environmental disclosures. Now, more than ever, boards must be more informed about the E disclosures that provide the most accountability and to recognize the threat that CEOs with concentrated power poses to the quality of non-financial voluntary disclosure.

Boards of directors are charged with monitoring corporate risk. The World Economic Forum reports that environmental concerns dominated the results of the Global Risk Perception Survey for the years 2017-2019 (World Economic Forum, 2019). Nearly all institutional investors evaluate nonfinancial performance like environmental performance based on corporate disclosures (EY, 2020). However, to effectively monitor this risk, companies need to provide useful disclosures. EY reports that while 54% of companies acknowledge climate change as a material issue, the disclosures provided are vague, not quantitative, and detached from financial impacts (EY, 2020). Increasingly, investors request evidence of good performance rather than just good intention (Serafeim, 2020). Larry Fink, Chief Executive Officer (CEO) of Blackrock expressed that “climate risk is investment risk” and they would begin pressing companies for better disclosures (Fink, 2020, para. 5).

More companies are reporting environmental data. Over 90% of the world’s largest 250 companies provide ESG disclosures (Blasco, King, McKenzie, & Karn, 2017) and 43% of S&P 500 companies voluntarily have this information audited (PwC, 2016). Further, 75% of the 300 largest asset management firms have adopted sustainable investing and as a result, U.S. assets under sustainable investing criteria have increased by 220% since 2012 to \$12 trillion (Institute for Sustainable Investing, 2019). These voluntary choices demonstrate the growing importance of ESG reporting. Despite this remarkable increase in relevance to capital markets, an information gap remains. Investors report that they use ESG information, but they are not satisfied with what is being provided (PwC, 2019). Investors and other stakeholders seek evidence that companies are evolving beyond demonstrating the intention of demonstrating results (Serafeim, 2020).

As the economy shifts to recognize that maximizing stakeholder value is not incompatible with maximizing shareholder value, effective measurement of stakeholder value becomes paramount. Particularly in the United States, firm management can control the contents of ESG reports because they are mostly voluntary and unstandardized and therefore not subject to typical financial reporting internal controls. The lax reporting environment in the United States contributes to variation across the content, presentation, and demonstration of accountability provided by E reports. Such variation presents a challenge when attempting to track company progress on maximizing stakeholder value through E initiatives.

Grewal and Serafeim (2020) make several calls for future research and this study integrates two key topics. First, they criticize existing ESG disclosure literature for its failure to make the distinction between inputs and outputs. Second, they acknowledge the latitude managers have exhibited in ESG reporting decisions and call for researchers to study how this leeway is exploited to provide new insights about managerial motivations. This study makes an even more granular distinction between input and output disclosures and examines how powerful CEOs’ motivations for self-preservation differentially impact these disclosures. The extent of power a CEO holds may particularly exacerbate the latitude they are provided in E reporting decisions. This research analyzed the relationship between CEO power and different measures of E disclosures.

Given CEOs’ promises to reduce their environmental footprint, this research studied how the association between CEO power and environmental disclosure differs by disclosure characteristics. Muttakin, Khan, and Mihret (2018) and Rashid, Shams, Bose, and Khan (2020) demonstrated that CEO power is a detriment to environmental disclosure. However, other research also indicates that not all E reporting is equally relevant (Plumlee, Brown, Hayes, & Marshall, 2015). Further, investors identify an ESG information gap (Macmillan & Eccles, 2019; PwC, 2019). One purpose of this study was to advance the CEO power and E disclosure literature by examining which types of E disclosures are most impaired by powerful CEOs.

This study distinguishes four E disclosure characteristics that differ between their communication of intention versus outcome and their comparability and employs them to understand how these disclosures relate to CEO power. This research introduces the characteristics of effectiveness and effort within environmental reports. To illustrate, a company that provides the water used per unit of production is providing an effectiveness disclosure, whereas a company that only reports the total water use is providing an effort disclosure. Effectiveness disclosures are outcome measures of performance in ratio form whereas effort disclosures only represent the intentions the company makes to achieve certain goals<sup>1</sup>. Further, since effectiveness measures are ratios or percentages, they are more comparable than effort measures across firms and time which is in line with stated investor preferences (Diouf & Boiral, 2017; EY, 2017; PwC, 2019)<sup>2</sup>.

This study reasons that because they are rational self-interested individuals in an agency relationship, CEOs have less incentive to voluntarily provide the E disclosures that provide the most accountability to minimize their personal risk and costs. However, only powerful CEOs can exert their influence to limit these disclosures. Providing the most useful E disclosure may be perceived as risky

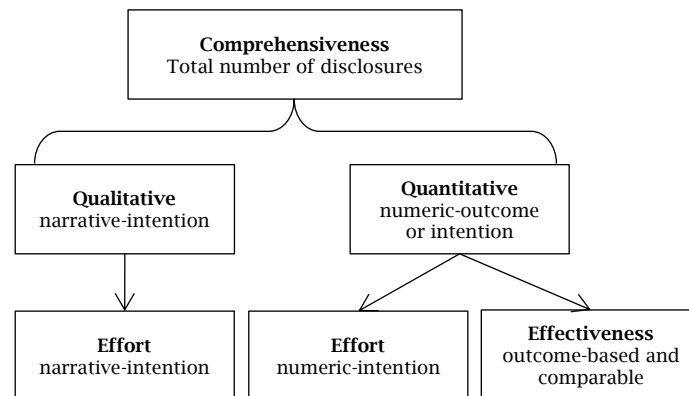
<sup>1</sup> Effort disclosures may be quantitative or qualitative in nature, but effectiveness disclosures are all quantitative. All disclosures that are qualitative in nature are considered to be effort disclosures. For example, a disclosure about climate change policy is both a qualitative and an effort disclosure.

<sup>2</sup> An emerging stream of research challenges the move to quantify environmental information for companies suggesting it may result in “fake precisionism” (Power, 2004), misguide accountability mechanisms (Dillard & Vinnari, 2019), and “promote commensuration of incomparables” (Järvinen, Laine, Hyvönen, & Kantola, 2020). However, this research focuses on what investors have communicated they desire, rather than an evaluation of the efficacy of the disclosures themselves.

to a CEO due to the uncertainty in how this information will be used to evaluate them. Therefore, this research sought to answer the question “Does CEO power influence E disclosures that measure outcomes differently than disclosures that measure intention?”. This study responds to two of Velte’s (2019) recommendations. First, the CEO power index includes proxies like tenure and the number of directorships. Second, a set of disclosure indexes were created rather than relying on external disclosure ratings. Specifically, each disclosure was

disaggregated into four categories of disclosures that are compared to one another: a) qualitative, b) quantitative, c) effectiveness, d) effort, whereas previous research looks at disclosures in total, referred to as comprehensiveness in this paper. This research provides a more precise method to disentangle E disclosures characteristics as they differ in what they measure (outcome versus intention) and comparability (ratio versus non-ratio). Figure 1 depicts the relationships between these characteristics.

**Figure 1.** Diagram of dependent variables – Environmental disclosure characteristics



This study provides evidence that powerful CEOs may inhibit E disclosures, including the types that provide the most accountability (effectiveness and quantitative). The results of this research reveal that the multiple characteristics of disclosures are not all equally affected by CEO power. Importantly, this study examines quantitative disclosures at a more granular level than previous research and identifies a subset of quantitative disclosures that most closely resemble investor’s stated preferences for E disclosures (numeric, verifiable, and comparable) and provide the most precise measures of outcomes. This study shows this new characteristic *effectiveness* may be the most neglected of the environmental disclosures in the face of rising CEO power. This finding is concerning because this characteristic communicates comparable outcomes.

The remainder of this paper is organized as follows: the next section presents a literature review and theoretical underpinnings to develop the hypotheses. In the third section, the research method is presented, followed by the results section. Finally, the last sections discuss these results and provide concluding remarks.

## 2. LITERATURE REVIEW AND HYPOTHESES

### 2.1. CEO power

Power has been defined as influencing change (French & Raven, 1959), the capacity to “exert an individual’s will” (Finkelstein, 1992, p. 506), the ability to act successfully despite resistance (Weber, 1978), and the capacity to control organizational decisions and outcomes (Mintzberg, 1983). Finkelstein’s definition appropriately captures the complexity of a powerful CEO’s role in the agency relationship. In his seminal paper,

Finkelstein identified four key elements of CEO power: structural, expert, ownership, and prestige or network power<sup>3</sup> which have commonly been adopted in the CEO power literature.

The title of CEO comes with high authority within a company and CEO power can be manifested in several ways. For example, a CEO can use their structural power to pull rank during disputes. Similarly, a CEO with an ownership percentage higher than others gains a position of strength in the agent-principal relationship (Finkelstein, 1992). However, power is relative and thus a CEO’s power can only be considered as it relates to the position of other managers and owners. For example, a CEO with multiple board positions has concentrated decision-making authority who may out-weigh an individual board member’s decision-making authority.

### 2.2. CEO power and environmental disclosures

#### 2.2.1. Comprehensiveness

Agency theory contends that as the power of the CEO (the agent) increases, the ability of the board (the principal) to effectively manage the agency conflict is diminished (Fama & Jensen, 1983). Previous literature established the negative consequences of CEO power on E disclosures (Khan, Muttakin, & Siddiqui, 2013; Lewis, Walls, & Dowell, 2014; McBrayer, 2018; Muttakin et al., 2018).

<sup>3</sup> Structural power refers to the formal positions within an organization which relates to their standing in the organization. Ownership power is particular to the agency relationship in an organization and thus suggests that holding shares of the company yields some level of power. Expert power refers to the functional experience and ability to cope with multiple situations and events and can be improved with time and exposure to multiple functional areas. Prestige power refers to a manager’s social networking ability (Lisic, Neal, Zhang, & Zhang, 2016) that enables them to cope with exogenous factors that impact the company (Finkelstein, 1992).

Muttakin et al. (2018) examined the relationship between CEO power and E disclosures in Bangladeshi companies using a four-item CEO power index and disclosure of environmental policies. They found that CEO power and the interaction of CEO power and board capital were negatively associated with E disclosure levels. This suggests that the CEO's position of power poses a challenge to the effectiveness of board control in preventing the agent from pursuing their self-interests. This study uses the measure of comprehensiveness to replicate those findings. In this study, comprehensiveness represents the total number of relevant environmental disclosures the company provides divided by the total relevant disclosures. Relevance is captured by disclosures that would or would not impact the particular industry of the respective company. CEOs with more power may feel less need to voluntarily provide more information. Further, their level of power enables them to act in a manner that preserves their personal interests. Accordingly, providing less voluntary information may help sustain the CEO's position of power. Formally stated the first hypothesis is the following:

*H1: CEO power is inversely associated with the comprehensiveness of environmental disclosures.*

However, recent research has demonstrated that a high number of disclosures do not necessarily translate to better performance (Christensen, Serafeim, & Sikochi, 2019; Grewal & Serafeim, 2020) and that quantity does not mean quality (Helfaya, Whittington, & Alawattage, 2018). Muttakin et al. (2018) made no distinction between the different measures of disclosures (i.e., quantitative, qualitative, outcome, input); Muttakin et al. (2018) acknowledged this to be a limitation. Summarily, these studies reasoned that CEO power interferes with the monitoring role of directors in the agency relationship that empowers the CEO to act in their personal interests<sup>4</sup>. Given, the replication that CEO power is inversely associated with overall E disclosures, barring any evidence to the contrary, logic follows that each individual component of E disclosure is also inversely associated with CEO power.

*H2: CEO power is inversely associated with all underlying characteristics of environmental disclosure.*

### 2.2.2. Intention versus outcome-oriented disclosures

Based on investors' preferences for disclosures, this study ranks each of the disclosure characteristics according to the accountability they provide to investors. This study contends that effectiveness disclosures provide the most accountability because they are numeric, verifiable, and comparable across companies and time, as desired by investors (Diouf & Boiral, 2017; EY, 2017). This is followed by quantitative (numeric and verifiable), effort (partially numeric and verifiable), and lastly qualitative (non-numeric). The rank order remains the same when comparing the cost and effort required to prepare these disclosures with effectiveness disclosures being the costliest in terms of money

and time. Quantitative E disclosures (which include effectiveness disclosures) tend to cost both more money and are more useful than qualitative disclosures (Cormier, Aerts, Ledoux, & Magnan, 2009; Hummel & Schlick, 2016; Plumlee et al., 2015; Serafeim, 2020). Bearing these rankings in mind, the following hypotheses were formulated to answer the question "Does CEO power relate to E disclosures that measure outcomes differently than disclosures that measure intention?". Environmental factors that were considered include climate change, waste management, and energy and resource efficiency.

A powerful CEO can resist board control and oversight, and therefore, more readily act according to protect their personal interests than a CEO with average power. CEOs may choose to not reveal all the information unless they trust that the board will not use this information against them (Caton, Goh, & Ke, 2019). As rational, self-interested people, CEOs are motivated to minimize their personal risk and protect their position of power. Their power partially comes from the information advantages they have over the shareholders, which includes access to E information. Dillard and Vinnari (2019) contended that providing information implies a relinquishing of power and the information provider's acceptance of responsibility to the related constituencies. Furthermore, the agency conflict described in agency theory would predict that powerful CEOs may be less likely to volunteer the most useful E disclosure because they are less likely to feel the need to validate themselves in this way and are more willing to take the risk of violating the agency contract (Lewellyn & Muller-Kahle, 2012). Therefore, agency theory predicts that powerful CEOs will be less likely to volunteer disclosures that measure outcomes rather than the intention to protect their power. The following hypotheses explore these comparisons:

*H3: CEO power is more of a detriment to quantitative than qualitative environmental disclosures.*

*H4: CEO power is more of a detriment to effectiveness than effort environmental disclosures.*

*H5: CEO power is more of a detriment to effectiveness than quantitative environmental disclosures.*

## 3. RESEARCH DESIGN

### 3.1. Sample

The sample was from publicly traded companies in the United States in 2016 for which Bloomberg tracks E disclosures<sup>5</sup>. Environmental disclosures are not relevant to all industries. To avoid biased results for some companies that did not provide an environmental disclosure that is irrelevant to their industry, this study relied on Bloomberg's methodology for determining relevance. Bloomberg provides a shortlist of disclosures identified as particularly impactful by industry. All of these are

<sup>4</sup> While other studies provide results conflicting with the notion of a negative relationship between CEO power and ESG (Fabrizi, Mallin, & Michelon, 2014; Li, Gong, Zhang, & Koh, 2018; Haniffa & Cooke, 2005; Jizi, Salama, Dixon, & Stratling 2014; Walls & Berrone, 2017), these studies focus on singular proxies for CEO power, rather than the multidimensional nature of the construct.

<sup>5</sup> Bloomberg tracks ESG disclosures provided by over 11,300 companies worldwide. Bloomberg ESG disclosure data has been used in several academic studies including Eccles, Serafeim, and Krzus (2011), Utz and Wimmer (2014), Jain, Jain, and Rezaee (2016), Qiu, Shaukat, and Tharyan (2016), Li et al. (2018), and Michelon, Ridrigue, and Trevisan (2020). The E data are collected from company sourced documents. The individual Bloomberg disclosure indicators were used to compute multiple E characteristic scores rather than the environmental disclosure score provided by Bloomberg.

in ratio form, and therefore would be classified as effectiveness disclosures (e.g., the ratio of greenhouse gas emissions to revenues). This study assumed that if the ratio of greenhouse gas emissions to revenues is an impactful disclosure, any disclosure that included data on greenhouse gases would be relevant. This methodology allowed for both the separation of multiple environmental disclosure characteristics and the inclusion of all industries except for real estate (for which, Bloomberg does not consider environmental disclosures as impactful). The sample selection process resulted in 2,210 companies. Table 1 presents the sample selection process.

**Table 1.** Sample selection

|   |        |
|---|--------|
| Total firms from Bloomberg ESG Index            | 11,672 |
| Non-US firms                                    | 8,093  |
| Exclude real estate                             | 186    |
| Missing E performance (CSRHub)                  | 536    |
| Missing Environmental Health & Safety Committee | 24     |
| Other missing control variables                 | 623    |
| Total firms                                     | 2,210  |

*Notes: Primary data source is Bloomberg ESG. The level of analysis is firm-year observations. Other missing control variables include board size, board independence, and return on assets.*

Table 2 presents the industry distribution organized by the GIC sector code. The distribution across industry sectors range from 2.57% to 18.71% of total firms. A control for industry fixed effects is included in each OLS regression or seemingly unrelated regression analysis (SUR).

**Table 2.** Sample composition

| <i>Industry by GIC sector</i> | <i>Number</i> | <i>Percent</i> |
|-------------------------------|---------------|----------------|
| Energy                        | 116           | 5.2%           |
| Materials                     | 107           | 4.8%           |
| Industrials                   | 361           | 16.3%          |
| Discretionary                 | 307           | 13.9%          |
| Consumer staples              | 96            | 4.3%           |
| Healthcare                    | 332           | 15.0%          |
| Financial                     | 414           | 18.7%          |
| Technology                    | 321           | 14.5%          |
| Communication                 | 92            | 4.2%           |
| Utilities                     | 64            | 2.9%           |
| Total                         | 2210          | 100.00%        |

### 3.2. Dependent variables – Environmental disclosure characteristics

This study examined each individual disclosure and converted this to a binary variable with 1 indicating that the disclosure was provided and 0 indicating it was not provided. Each disclosure was then disaggregated by four characteristics that were compared to each other: a) qualitative, b) quantitative, c) effectiveness, d) effort. Comprehensiveness represented the total number of relevant disclosures. If the disclosure was classified according to the characteristic and the company provided an entry, then a 1 was assigned, otherwise, a 0 was assigned. Then, given the disclosure is relevant for that company's industry, each company's individual disclosure characteristic scores were calculated. Specifically, each company's qualitative total, quantitative total, effectiveness total, effort total, and overall comprehensiveness total for

environmental disclosures were computed by summing the dummy codes of each category of disclosure characteristics.

Each characteristic total is normalized by dividing it by the total possible disclosures for each respective characteristic. The normalization was used rather than a raw number to allow for the comparison of characteristics with the CEO power variable. A summary of the characteristics by industry is presented in the Appendix. A total of 53 of the environmental disclosures were included based on the determination of relevance to the respective industries. Disaggregation of these characteristics helps differentiate between varying degrees of the usefulness of E disclosure to users. A description of each characteristic is described in the following manner:

1. *Comprehensiveness*: this characteristic of E disclosure captures the extent or breadth of a firm's environmental disclosure practices by accumulating the total number of environmental disclosures with equal weighting. This characteristic is analogous to Muttakin et al.'s (2018) disclosure measure. Comprehensiveness disclosures were represented in the model by the ratio of the number of relevant disclosures provided by a firm to the total relevant disclosures captured by Bloomberg. This measure was used to replicate previous literature's findings.

2. *Qualitative*: also referred to as intention-based, or narrative disclosures, this term includes environmental disclosures such as a climate change policy. For example, Johnson and Johnson disclose that the company has "a responsibility to help abate climate change" and they are committed to "establish strategies and programs to reduce the carbon footprint of their operations, supply chain, and products" (jnj.com). This type of disclosure would be captured by Bloomberg as disclosure of climate change policy which would be converted to a dummy code in this study that increases the qualitative score of the company. The extent of qualitative disclosures was represented in the model by the ratio of the number of qualitative disclosures provided by a firm to the total possible qualitative disclosures.

3. *Quantitative*: also referred to as numeric disclosures, measures a mix of intentions and outcomes. Environmental disclosure examples include greenhouse gas (GHG) emissions, total water used, or percent of water recycled. This type of disclosure is considered to be more precise than qualitative disclosures. Each disclosure is either qualitative or quantitative. Disclosures cannot be both quantitative and qualitative. For example, if Adidas reported in their Green Company Performance Analysis that their 2016 carbon emissions were 52,548 tons, Bloomberg would report this number as their total carbon emissions disclosure. This study would convert this to a dummy code that increases the total quantitative disclosures provided by the company. The extent of quantitative disclosures was represented by the ratio of the number of quantitative disclosures provided by a firm to the total possible quantitative disclosures.

4. *Effectiveness*: this characteristic of E disclosure was developed for this study and is exclusive to quantitative disclosures. It provides

a comparable outcome-based measure. These disclosures are generally expressed as percentages, rates, or ratios making them comparable across companies and time. For example, if Adidas reported that waste per employee (t/employee) was 0.153 in 2016 in their Green Company Performance Analysis report, this ratio would be captured by Bloomberg as the waste per employee disclosure. This study converted that to a dichotomous variable of one which increases the effectiveness score. Other examples include the percent of water recycled and water per unit of production.

5. *Effort*: this characteristic of E disclosure was developed for this study but may be either quantitative or qualitative. It captures a firm's intention or "inputs" to an environmentally conscious agenda. Effort disclosures may be either qualitative, such as an energy efficiency policy, or quantitative such as the number of environmental fines. The extent of effort disclosures is represented in the model by the ratio of the number of effort disclosures provided by a firm to the total possible effort disclosures. Each disclosure can only be the characteristic of effectiveness or effort, not both.

The categorization of the characteristics was independently coded by the author and a Ph.D. student, independent of this project. All disclosures were coded by both parties. The agreement on the characteristics ranged from 99% to 100%.

### 3.3. Independent variable – CEO power

*CEO power* proxies are also captured by Bloomberg. Following Lisic et al. (2016), Henderson, Masli, Richardson, and Sanchez (2010), and Muttakin et al. (2018), this study recognizes the multiple dimensions of *CEO power* consistent with the framework proposed by Finkelstein's (1992) validated construct of top management power. Accordingly, an index of four proxies was created that represented the four different dimensions of top management power (Finkelstein, 1992). The number of board positions that the CEO holds in the firm represents the structural power of a CEO. The number of years or CEO tenure represents expert power. The percentage shares outstanding held by the CEO represents ownership power. Finally, the number of executive positions the CEO holds at other firms represents prestige power. All four proxies are continuous variables dichotomized by their median values. A *CEO power* index is then calculated by adding all four variables dichotomized based on their median values, with a larger number representing a higher level of *CEO power*. This calculation is consistent with the CEO index used in other studies by Henderson et al. (2010), Lisic et al. (2016), Muttakin et al. (2018), and Veprauskaitė and Adams (2013). Table 3 presents a listing and description of all variables.

Table 3. Variable descriptions

| Variable name  | Description   |
|--|---|
| <i>Dependent variables</i>   |   |
| Effectiveness  | Number of Effectiveness disclosures provided by firm/total possible effectiveness disclosures.  |
| Effort   | Number of Effort disclosures provided by firm/total possible effort disclosures.  |
| Qualitative  | Number of qualitative disclosures provided by firm/total possible qualitative disclosures.  |
| Quantitative   | Number of quantitative disclosures provided by firm/total possible quantitative disclosures.  |
| Comprehensiveness  | Total number of disclosures provided by firm/total possible disclosures.  |
| <i>Independent variables</i>   |   |
| Number of board positions held by CEO (Structural power)                               | CEO holds a high number of positions as determined by median = 1, 0 otherwise (Finkelstein, 1992).  |
| Tenure (Expert power)  | CEO has been in the position as of FYE2016 for a high number of years as determined by median = 1, 0 otherwise (Finkelstein, 1992; Lisic et al., 2016).                       |
| Shares held by CEO (Ownership power)   | CEO holds a high % of shares outstanding, as determined by the median = 1, 0 otherwise (Finkelstein, 1992; Lisic et al., 2016).   |
| Number of executive positions CEO holds at other companies (Network or Prestige power) | CEO holds a high number of executive positions at other companies as determined by the median = 1, 0 otherwise (Finkelstein, 1992; Lisic et al., 2016).                       |
| CEO power  | Sum of each dummy coded element of CEO power 1) Structural power, 2) Expert power, 3) Ownership power, 4) Network/Prestige power.   |
| Industry (Ind dummies)   | GICS Industry Sector Dummy codes (11).  |
| E performance (E perf)   | High rating of performance on E as determined by median values (Al-Tuwaijri, Christensen, & Hughes, 2004; Clarkson, Li, Richardson, & Vasvari, 2008; Hummel & Schlick, 2016). |
| Board size (BD size)   | Number of directors on the board (Muttakin et al., 2018; van Essen, Otten, & Carberry, 2015; Abernethy, Kuang, & Qin, 2015; Lisic et al., 2016).                              |
| Board independence (Board ind)   | % of independent directors (Muttakin et al., 2018; van Essen et al., 2015; Abernethy et al., 2015; Lisic et al., 2016).   |
| Env Health & Safety Committee  | Dichotomous variable with 1 indicating the board has an environmental, health, and safety committee (Birindelli, Dell'Atti, Iannuzzi, & Savioli, 2018).                       |
| Profitability (ROA)  | Log of firm FYE 2016 Return on Assets squared (Muttakin et al., 2018; Clarkson et al., 2008).   |
| Firm size (Firm size)  | Log of revenues of firm FYE 2016 (Muttakin et al., 2018; Clarkson et al., 2008; Lang & Lundholm, 1993).   |

### 3.4. Model specification

Linear regression models were used to replicate prior findings that CEO power is inversely related to

E disclosure (*H1*) and to test whether CEO power is associated with the underlying characteristics of E disclosure (*H2*). A separate regression model is estimated for each of the disclosure characteristics.

Other variables from extant literature are included to control for other determinants of E disclosure. The equation for each of the regressions with an

E disclosure characteristic as the dependent variable (*H1* and *H2*) is:

$$\text{Disclosure Characteristic} = \beta_0 + \beta_1 \text{Industry dummies} + \beta_2 \text{ROA} + \beta_3 \text{BoardSZ} + \beta_4 \text{E or S Perf} + \beta_5 \text{Firm size} + \beta_6 \text{BoardInd} + \beta_7 \text{CEOPOWER} + \beta_8 \text{EnvHlth\&SafetyCom} + \varepsilon \quad (1)$$

To test the three hypotheses (*H3*, *H4*, and *H5*) that compare the association of CEO power with two different E qualities simultaneously, seemingly unrelated regression equations (SUR) were used. SUR is a form of simultaneous regression modeling using maximum likelihood that allows for multiple equations to be estimated simultaneously while

providing a *p-value* to indicate whether a particular coefficient is different between the equations. The equations for each competing characteristic of E disclosures were run simultaneously, comparing the coefficients for CEO power. The equations for each of these regressions were:

$$\text{Disclosure Characteristic1} = \beta_0 + \beta_1 \text{Industry dummies} + \beta_2 \text{ROA} + \beta_3 \text{BoardSZ} + \beta_4 \text{E or S Perf} + \beta_5 \text{Firm size} + \beta_6 \text{BoardInd} + \beta_7 \text{CEOPOWER} + \beta_8 \text{EnvHlth\&SafetyCom} + \varepsilon \quad (1.1)$$

$$\text{Disclosure Characteristic2} = \beta_0 + \beta_1 \text{Industry dummies} + \beta_2 \text{ROA} + \beta_3 \text{BoardSZ} + \beta_4 \text{E or S Perf} + \beta_5 \text{Firm size} + \beta_6 \text{BoardInd} + \beta_7 \text{CEOPOWER} + \beta_8 \text{EnvHlth\&SafetyCom} + \varepsilon \quad (1.2)$$

A *p-value* will indicate whether the coefficients for CEO power in each of the equations are different.

Multicollinearity was tested based on correlation matrices (maximum Pearson's R coefficients were .538) and variance inflation factors (VIF). No variables had VIF over 10.0 suggesting that multicollinearity is not a problem in interpreting the regression results (Cody & Smith, 2006).

### 3.5. Control variables

This study follows prior literature and controls for board size, board independence, profitability, firm size, industry (GICS sector), and E performance. Board characteristics such as size and independence of directors are included as they have been influential both on ESG disclosure (Haniffa & Cooke, 2005) and CEO power (Abernethy et al., 2015). Board size was positively associated with CSR disclosure in Muttakin et al. (2018) and is an important consideration when examining CEO power (Lisic et al., 2016). This may be due to a firm's desire to connect with its environment and society by increasing the number of people on its board and therefore links with the community (Pfeffer & Salancik, 1978). Board independence (percentage of independent directors) has been associated with strong governance and monitoring and therefore may help to counter the negative effects of CEO power on the agency conflict (Pathan, 2009). Independent directors are thought to represent the interests of minority stakeholders interested in more disclosure (Haniffa & Cooke, 2005). Lastly, research suggests a specific committee that oversees sustainability or environmental initiatives and reporting are a useful corporate governance tool to improve compliance, reporting, and outcomes related to these initiatives (Birindelli et al., 2018; García-Sánchez, Gómez-Miranda, David, & Rodríguez-Ariza, 2019). To account for this influence a dichotomous variable indicating if the firm has an environmental, healthy, and safety committee was included in the model.

Firm controls include profitability, size, and industry. Profitability (measured with return on assets) may also give companies more incentive to

show their contribution to society and thus may positively influence environmental disclosure qualities. Firm size (measured with revenues) may influence the resources available for E disclosure (Clarkson, Fang, Li, & Richardson, 2013; Guidry & Patten, 2012). Motivations for environmental disclosure may vary by industry, and therefore, 11 industry dummy variables based on GICS industry sectors are included to capture industry effects.

Most importantly, and different than Muttakin et al. (2018), the model captures E performance to recognize the link between E performance and E disclosure (Al-Tuwaijri et al., 2004; Clarkson et al., 2008; Patten, 2002; Li et al., 2018). E performance refers to the impact the company has on the environment. This is captured using each firm's environmental scores from CSRHub, a comprehensive ESG rating and information database covering 18,500 entities. Each performance score was dichotomized based on the median value with 1 representing high performers and 0 representing low performers<sup>6</sup>. All measures were collected for the fiscal year 2016.

## 4. RESULTS

### 4.1. Univariate results

Table 4 presents the descriptive statistics for the variables used in the regressions. The average CEO power index is 1.089 which is higher than Muttakin et al. (2018) and lower than Lisic et al. (2016). The mean values for the qualitative and effort disclosure scores are higher than the quantitative and effectiveness disclosures scores. This indicated that on average, firms provided more E disclosures that are only intention-oriented (qualitative or effort) rather than quantitative disclosures or measures of effectiveness with their E performance. Approximately half the firms are high E performers as indicated by the means of *Env\_Perf* (environmental performance) close to 0.50. The average board size

<sup>6</sup> Scatterplots reveal a nonlinear relationship between raw E performance and the E disclosure characteristics, thus necessitating this transformation. Analysis was also performed with and without E performance indicators with no meaningful differences in results.

is 8.99 and average board independence is 78.81%. The presence of an environmental, health and safety committee is relatively uncommon as only 132 firms in the sample indicate the presence of this

committee. The average log of return on assets squared is 1.30 and the average revenue is \$4,795,115,864.

**Table 4.** Descriptive statistics

| Variable                                 | Usable observations | Mean   | Median | Standard deviation | Min    | Max    |
|--|---------------------|--------|--------|--------------------|--------|--------|
| <b>Dependent variables (%):</b>          |                     |        |        |                    |        |        |
| <i>Env_Qual</i>                          | 2,234               | 12.983 | 0      | 1.793              | 0      | 100    |
| <i>Env_Quant</i>                         | 2,234               | 8.170  | 0      | 6.044              | 0      | 82.05  |
| <i>Env_Effect</i>                        | 2,234               | 8.550  | 0      | 3.645              | 0      | 90.00  |
| <i>Env_Effort</i>                        | 2,234               | 9.505  | 0      | 4.059              | 0      | 85.71  |
| <i>Env_Compre</i>                        | 2,234               | 9.089  | 0      | 7.557              | 0      | 79.17  |
| <b>Independent variables:</b>            |                     |        |        |                    |        |        |
| <i>CEO power</i>                         | 2,456               | 1.089  | 1      | 0.888              | 0      | 4      |
| <i>Env Health &amp; Safety Committee</i> | 2,210               | 0.06   | 0.006  | 0.238              | 0      | 1      |
| <i>Board Size</i>                        | 2,456               | 8.990  | 9.00   | 2.458              | 3      | 31     |
| <i>Board Indep</i>                       | 2,456               | 78.812 | 83.333 | 12.210             | 25.00  | 100    |
| <i>Env_Perf</i>                          | 2,234               | 0.490  | 0      | 0.500              | 0      | 1      |
| <i>ROAsqLog</i>                          | 2,456               | 1.299  | 1.360  | 1.160              | -4.281 | 5.065  |
| <i>RevenueLog</i>                        | 2,456               | 8.745  | 8.929  | 1.479              | 0      | 11.683 |

Note: Variable definitions are provided in Table 3.

## 4.2. Bivariate results

*CEO power* has a significant negative correlation with all environmental disclosure characteristics. Correlation matrices are presented in Table 5. Unexpectedly, the negative correlation is the largest with qualitative disclosures. Consistent with expectations and prior research environmental performance (*Env\_Perf*) is positively correlated with each environmental disclosure characteristic and *CEO power*. Finally, as expected and consistent with prior research board independence (*IndepDirectors*), the size of the board (*Board Size*), and the presence of an environmental, health, and safety committee (*Env Health & Safety Committee*) are all negatively correlated with *CEO power*.

## 4.3. Multivariate results

### 4.3.1. Replication and single E disclosure characteristics: H1 and H2 results

*H1* predicted a negative relationship between *CEO power* and the comprehensiveness of environmental disclosures, previously demonstrated by Muttakin et al. (2018). Multiple regression results provide support for this hypothesis as validated by the

significant and negative coefficients for *CEO power* in ( $B = -.931$   $p = .008$ ). These results suggest that other things equal, a one-unit change in *CEO power* means a .93% decrease in the comprehensiveness of environmental disclosures. Given the average values of environmental comprehensiveness of disclosures is 8.09%, this decrease implies a robust 11.5% decrease from the average.

*H2* predicted that *CEO power* would have a negative association with each of the individual characteristics of environmental disclosures. The negative coefficients for *CEO power* in each regression predicting the different disclosure characteristics provided support for this hypothesis. For example, the *CEO power* coefficient predicting effectiveness disclosures ( $B = -1.033$   $p = .01$ ) can be interpreted as follows: all other things equal, a one-unit change in *CEO power* means a 1.03% decrease in effectiveness environmental disclosures. Given the average value of environmental effectiveness disclosures is 8.55% this decrease implies a 12.05% decrease from the average. The *CEO power* coefficients for all other models predicting the other characteristics (effort and qualitative) were similarly interpreted. Summarily, *H2* is supported, suggesting a negative association between *CEO power* and all E disclosure characteristics.



Table 5. Correlation table

| Correlations                  | Qual    | Quant   | Effect  | Effort  | Comprehensive | CEOPower | Env_Perf | ROAsquaredLG | RevenueLG | IndepDirectors | Board Size | Env Health & Safety Committee |
|-------------------------------|---------|---------|---------|---------|---------------|----------|----------|--------------|-----------|----------------|------------|-------------------------------|
| Qual                          | 1       |         |         |         |               |          |          |              |           |                |            |                               |
| Quant                         | .778**  | 1       |         |         |               |          |          |              |           |                |            |                               |
| Effect                        | .766**  | .990**  | 1       |         |               |          |          |              |           |                |            |                               |
| Effort                        | .919**  | .949**  | .920**  | 1       |               |          |          |              |           |                |            |                               |
| Comprehensive                 | .864**  | .988**  | .977**  | .982**  | 1             |          |          |              |           |                |            |                               |
| CEOPower                      | -.220** | -.193** | -.193** | -.212** | -.208**       | 1        |          |              |           |                |            |                               |
| Env_Perf                      | .405**  | .345**  | .345**  | .384**  | .373**        | -.134**  | 1        |              |           |                |            |                               |
| ROAsquaredLG                  | -.036   | -.019   | -.008   | -.037   | -.024         | -.028    | -.005    | 1            |           |                |            |                               |
| RevenueLG                     | .538**  | .462**  | .449**  | .528**  | .501**        | -.202**  | .238**   | -.240**      | 1         |                |            |                               |
| IndepDirectors                | .230**  | .190**  | .182**  | .220**  | .206**        | -.092**  | .099**   | -.042*       | .173**    | 1              |            |                               |
| Board Size                    | .350**  | .328**  | .313**  | .365**  | .348**        | -.146**  | .121**   | -.299**      | .437**    | .222**         | 1          |                               |
| Env Health & Safety Committee | .357**  | .341**  | .345**  | .354**  | .357**        | -.138**  | .173**   | -.031        | .235**    | .135**         | .175**     | 1                             |

Note: \*\* Correlation is significant at the 0.01 level (2-tailed).

Table 6. Regressions and seemingly unrelated regression results

| $\text{Disclosure Characteristic1} = \beta_0 + \beta_1 \text{Industry dummies} + \beta_2 \text{ROA} + \beta_3 \text{BoardSZ} + \beta_4 \text{E or S Perf} + \beta_5 \text{Firm size} + \beta_6 \text{BoardInd} + \beta_7 \text{CEOPOWER} + \beta_8 \text{EnvHlth\&SafetyCom} + \varepsilon \quad (1.1)$ |  |                        |                        |                       |                        |
|---|--|------------------------|------------------------|-----------------------|------------------------|
| $\text{Disclosure Characteristic2} = \beta_0 + \beta_1 \text{Industry dummies} + \beta_2 \text{ROA} + \beta_3 \text{BoardSZ} + \beta_4 \text{E or S Perf} + \beta_5 \text{Firm size} + \beta_6 \text{BoardInd} + \beta_7 \text{CEOPOWER} + \beta_8 \text{EnvHlth\&SafetyCom} + \varepsilon \quad (1.2)$ |  |                        |                        |                       |                        |
| SUR: $\beta_7 \text{CEOPOWER} (1.1) > \beta_7 \text{CEOPOWER} (1.2)$  |  |                        |                        |                       |                        |
| Variable  | Environmental disclosure characteristics |                        |                        |                       |                        |
|   | Effectiveness                            | Effort                 | Quantitative           | Qualitative           | Comprehensiveness      |
|   | $\beta (t)$                              | $\beta (t)$            | $\beta (t)$            | $\beta (t)$           | $\beta (t)$            |
| CEO power   | -1.033**<br>(-2.52)                      | -0.848***<br>(-2.64)   | -0.855**<br>(-2.33)    | -1.208***<br>(-3.54)  | -0.931***<br>(-2.67)   |
| ENV_Perf  | 8.798***<br>(11.56)                      | 7.862***<br>(13.18)    | 7.836***<br>(11.51)    | 10.019***<br>(13.66)  | 8.253***<br>(12.77)    |
| Board Size  | 1.22***<br>(6.96)                        | 1.178***<br>(8.59)     | 1.168***<br>(7.47)     | 1.353***<br>(8.03)    | 1.196***<br>(8.05)     |
| Indep Directors   | 0.090***<br>(2.88)                       | 0.106***<br>(4.42)     | 0.085***<br>(3.12)     | 0.154***<br>(5.38)    | 0.098***<br>(3.78)     |
| Env Health & Safety Committee   | 16.968***<br>(10.58)                     | 12.561***<br>(9.98)    | 14.638***<br>(10.20)   | 13.900***<br>(8.99)   | 14.500***<br>(10.64)   |
| ROA   | 0.821***<br>(5.08)                       | 0.691***<br>(5.45)     | 0.728***<br>(5.03)     | 0.845***<br>(5.42)    | 0.747***<br>(5.44)     |
| Revenue   | 3.344***<br>(15.60)                      | 3.052***<br>(18.73)    | 2.908***<br>(15.65)    | 3.627***<br>(18.12)   | 3.306***<br>(17.32)    |
| Industry controls   | Yes                                      | Yes                    | Yes                    | Yes                   | Yes                    |
| Constant  | -80.284***<br>(-18.33)                   | -79.785***<br>(-23.21) | -75.908***<br>(-19.36) | -96.810***<br>(22.92) | -79.912***<br>(-21.47) |
| Adjust R Squared  | .366                                     | .461                   | .378                   | .486                  | .431                   |
| F-Statistic   | 85.99                                    | 126.89                 | 90.61                  | 140.08                | 112.34                 |
| Prob (F-Statistic)  | < .001                                   | < .001                 | < .001                 | < .001                | < .001                 |
| <b>Seemingly unrelated regression (SUR) results</b>   |  |                        |                        |                       |                        |
|   | <i>p-value</i>                           |                        |                        |                       |                        |
| Quant v Qual  | .271                                     |                        |                        |                       |                        |
| Effect v Effort   | .356                                     |                        |                        |                       |                        |
| Effect v Quant  | .026                                     |                        |                        |                       |                        |

Note: The SUR results present paired regression models testing combinations of each pair of the disclosure characteristics and the difference in the CEO power coefficients. Variable definitions are provided in Table 3. The sample size is 2,210. The *t*-statistics are shown in parentheses below the coefficients.

\*\*\*, \*\*, \* indicate significance at the .01, .05, and .10 levels respectively.

#### 4.3.2. Competing E characteristics: H3, H4, H5 results of SUR

The remaining three hypotheses each compared the relationship between CEO power and two different disclosure characteristics by employing SUR to test if there is a significant difference in the CEO power coefficients for the competing models. H3 predicts that the association between CEO power and quantitative environmental disclosures will be more negative than the association between CEO power and qualitative environmental disclosures. However, the coefficient for CEO power predicting qualitative disclosures ( $B = -1.208$ ) is unexpectedly larger than the coefficient for CEO power predicting quantitative disclosures ( $B = -0.855$ ), but the difference is insignificant ( $p = .271$  for the SUR). This suggests that CEO power does not have a significantly more negative relationship with quantitative environmental disclosures than with qualitative environmental disclosures.

H4 predicted that the negative association between CEO power and effectiveness environmental disclosures would be larger than the negative association between CEO power and effort environmental disclosures. While the coefficient for CEO power predicting effectiveness disclosures ( $B = -1.033$ ,  $p = .01$ ) is larger than the coefficient for CEO power predicting effort disclosures ( $B = -0.848$ ,  $p = .008$ ), the SUR suggests they are not statistically different ( $p = .356$ ). This suggests that the inverse relationship between CEO power and effectiveness disclosures is larger than that of CEO power and

effort disclosures, but the difference is not significant.

H5 predicted that the negative association between CEO power and effectiveness environmental disclosures would be larger than the negative association between CEO power and quantitative environmental disclosures. The significant *p-value* ( $p = .026$ ) from the SUR comparing CEO power coefficients between the environmental effectiveness disclosures and environmental quantitative disclosures suggests CEO power does differentially associate with the competing environmental disclosure characteristics. Examining the coefficients of CEO power in each model ( $B = -1.033$ ,  $p = .01$  in the effectiveness model and  $B = -0.759$ ,  $p < .001$  in the quantitative model), a one-unit change in CEO power means a larger decrease in effectiveness environmental disclosures than the decrease in quantitative environmental disclosures which supported H5.

#### 4.4. Supplemental analysis

##### 4.4.1. Alternative explanations

To rule out these alternative explanations, this paper's models were estimated with two additional variables used by Muttakin et al. (2018): company age and leverage. Company age was calculated based on Compustat's initial public offering date. Including this variable shrunk the sample size to 952. Company age was not significant in any of the models and did not significantly change the other

components of the model. Muttakin et al. (2018) exhibited a significant positive relationship between disclosure and firm age in Bangladeshi companies, but this difference could be due to country differences. The average company age in Muttakin et al. (2018) was over 24 years but was 13.64 years in this sample.

Leverage was also calculated as the ratio of total debt to assets, based on Compustat data. When this variable was included the sample shrank to 1,675. Leverage was not significant in any of the models and did not significantly change the other components of the model. Muttakin et al. (2018) exhibited a significant positive relationship between disclosure and leverage in Bangladeshi companies, but this difference could be due to country differences. The average leverage in Muttakin et al. (2018) was less than one but was 3.03 years in this sample. The inclusion of these two variables in the supplemental analysis suggested leverage and company age are not influential on individual E disclosure characteristics for publicly traded U.S. companies.

Gender has also been examined as an antecedent to the quality of environmental disclosure (Al-Shaer & Zaman, 2016; Birindelli et al., 2018). The models were estimated including a dichotomous variable indicating if the CEO was female and the interaction term between CEO gender and CEO power. Neither of these variables was significant in any of the models suggesting the gender of the CEO is not influential on E disclosures for this sample.

#### 4.4.2. Robustness

All elements of CEO power may not be equal determinants of a CEO's position of power over the board. The ownership dimension of power particularly blurs the agency relationship. To explore the possibility that ownership power has more of an influence than other dimensions, a new index was estimated by doubling the weight of the ownership variable. The other three dimensions were also included at their original equal weights, resulting in CEO power index values that range from 0 to 5. This index was substituted in all models for the four-item CEO power index and there was no change in the results.

With any complex construct, there are different ways of measuring that have the potential to produce different results. To investigate this each equation was estimated with the four disaggregated dimensions of CEO power. This reveals results are primarily driven by the ownership dimension of CEO power. Individual proxies may yield alternative inferences about the relationship between CEO power and E disclosure. CEO power is a complex construct and with any complex construct, different inputs to the construct have the potential to produce different results; however, Finkelstein's (1992) seminal paper on CEO power identifies four dimensions that are all accounted for in this study.

Additionally, an alternative CEO power index was substituted with the main index used in this paper. The alternative index was similarly calculated to the original index and was comprised of the following four proxies: CEO is on the compensation committee, CEO is also the founder, CEO tenure, and CEO ownership percentage. This index excludes

a measure of network or prestige power and includes two measures of ownership power (CEO ownership percentage and CEO is a founder). Using this index yielded no change in results in the main analysis.

## 5. DISCUSSION

This study finds that all characteristics of E disclosure are significantly and negatively influenced by CEO power, but that these relationships are not equally across characteristics. The power of a CEO and the undesirable relationship with environmental effectiveness disclosures (numeric and comparable) is more pronounced than environmental quantitative (numeric) disclosures. Similarly, the negative association with CEO power and effectiveness disclosures (output-based) and is larger than that of CEO power and effort disclosures (input-based) but SUR results do not detect a significant difference between these relationships. Collectively, this evidence supports the notion that effectiveness disclosures are perceived differently than quantitative disclosures. These results are explained using agency theory which contends that providing the most accountable E disclosures is risky and costly to a CEO. However, only a powerful CEO can limit the effectiveness of the board monitoring function and thereby choose to withhold or to neglect resources needed to provide the most comparable and outcome-based disclosures. While all disclosure types are suppressed as CEO power increases, the less useful types are also less neglected than the most useful (effectiveness)

## 6. CONCLUSION

The purpose of this study was to provide a more granular measure of E disclosure characteristics that vary between indications of outcome and intention and to illuminate our understanding of how they relate to CEO power. This study demonstrated that the association between CEO power and the multiple characteristics of E disclosures is not uniform. In general, the results were consistent with prior research which suggested that CEO power is a detriment to voluntary disclosures like E disclosure. However, this study also specifically demonstrated that CEO power suppressed the disclosures that were the most comparable and results-oriented more than other disclosures that were less comparable and more intention-oriented. Specifically, effectiveness disclosures (numeric and comparable) suffer more than quantitative (numeric) disclosures.

Effectiveness disclosures capture an E outcome measure in ratio or percentage form that makes it both precise and comparable across time and companies as desired by investors and stakeholders. This means that a powerful CEO is less likely to provide a disclosure indicating the percentage of sites that are ISO 14001<sup>7</sup> certified than they are to provide the total number of sites ISO 14001 certified. While the total number of certified sites is helpful information, it is not as useful as the percentage of sites with that certification, because the total number of certified sites is a better assessment of progress and can more appropriately be compared across companies and time. Therefore,

<sup>7</sup> ISO 14001 refers to the international standards for environmental management systems.

in the interest of promoting disclosures that provide the most accountability, CEO power may be considered a threat. In other words, because effectiveness disclosures provide the most accountability, CEOs perceive this as a threat and those with a concentration of power can minimize this threat by providing fewer of these disclosures.

This paper contributes to both the literature examining obstacles to E reporting and the consequences of CEO power. Results of this study expose how CEO power relates differently to multiple characteristics of E disclosure rather than disclosures as a whole. By disaggregating the disclosure characteristics and employing SUR to compare how CEO power differentially associates with these varying levels of accountability, this study deepens our understanding of the negative relationship between CEO power and E disclosure. Research examining the quality of E reporting falls short in differentiating the diverse characteristics of E disclosure and how they relate to other variables. To address that shortcoming, this research captures the diverse nature of E disclosures by identifying four characteristics, (e.g., qualitative, quantitative, effectiveness, and effort) which vary in their accountability and usefulness to investors. This study is the first to consider the characteristics of effectiveness and effort and the first to test the association between CEO power and these outcome-based versus intention-based disclosure characteristics. Future E disclosure research should consider disaggregating the disclosures similarly to aid our understanding of E disclosure and how it relates to other variables.

The implications of this study are relevant to investors, board members, regulators, and general stakeholders interested in corporate E transparency and accountability. It is beneficial to all parties to understand how a CEO's power can stifle characteristics of E disclosure that comparably communicate performance. Articulating the granularity of the different E disclosure characteristics may assist investors in advocating for

particular metrics from companies and assist board members in setting metric standards for the CEO. Further, given the costs associated with E reporting, prioritization can be placed on preparing effectiveness disclosures as the most efficient use of resources. Board members may decide to reconsider elements of CEO contracts, look at the number of board positions held by the CEO, or increase their monitoring efforts of CEOs. Boards may also consider explicit linking of ESG and assessment of CEO performance to avoid an incomplete contract situation that results in a renegotiation process as described by agency theory. As regulators and policymakers move forward with formulating E disclosure norms and standards, they should consider the disincentive and leeway of powerful CEOs to provide or not provide the most accountable E disclosures.

The results of this research are subject to several limitations that provide opportunities for future studies. For instance, personal opinions or characteristics of the CEO such as age or education are not captured in this study and could influence disclosure positively or negatively. Additionally, absent a time lag between the disclosure scores and CEO power, this study does not make claims at causality. However, because E disclosure is relatively stable over shorter periods the same conclusions may be reached. Qiu, Shaukat, and Tharyan (2016) showed that disclosure scores and lagged values are highly correlated suggesting the stickiness of score across years and Jain et al. (2016) found no significant change in CSR disclosures between 2009 and 2011. Future research can examine the stability of these results over longer periods, which can capture the evolution of these disclosure practices. Given the multi-faceted nature of CEO power, future research may focus on disaggregated elements, and individual proxies of those elements, and their relationship with E disclosure characteristics. Finally, further research could replicate these findings in other countries to evaluate the generalizability of this study.

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## APPENDIX

**Table A.1.** Environmental disclosures by characteristic

| <i>Total by industry and disclosure characteristic</i> | <i>Qualitative</i> | <i>Quantitative</i> | <i>Effectiveness</i> | <i>Effort</i> |
|--|--------------------|---------------------|----------------------|---------------|
| A: Energy, materials, industrials                      | 8                  | 39                  | 21                   | 26            |
| B: Consumer discretionary and consumer staples         | 10                 | 38                  | 21                   | 27            |
| C: Communication, financials, health care, technology  | 6                  | 18                  | 10                   | 14            |
| D: Utilities   | 8                  | 38                  | 20                   | 26            |
| <i>Total</i>   | <i>10</i>          | <i>43</i>           | <i>22</i>            | <i>31</i>     |