

RESEARCH NOTES AND COMMENTARIES

DIFFERENCE IN DEGREES: CEO CHARACTERISTICS AND FIRM ENVIRONMENTAL DISCLOSURE

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We contribute to the literature on firms' responses to institutional pressures and environmental information disclosure. We hypothesize that CEO characteristics such as education and tenure will influence firms' likelihood to voluntarily disclose environmental information. We test our hypotheses by examining firms' responses to the Carbon Disclosure Project (CDP) and find that firms led by newly appointed CEOs and CEOs with MBA degrees are more likely to respond to the CDP, while those led by lawyers are less likely to respond. Our results have implications for research on strategic responses to institutional pressures and corporate environmental performance. Copyright © 2013 John Wiley & Sons, Ltd.

INTRODUCTION

Scholarly interest in firms' environmental actions has grown substantially in recent years. Although much of this research has demonstrated how institutional pressures can lead to homogeneity in environmental strategies (Hoffman, 1999; Lounsbury, 2001), recent work has begun to address why firms exhibit heterogeneous strategies when facing common sets of pressures (Delmas and Toffel, 2008, 2012; Doshi, Dowell, and Toffel, 2011; Walls and Hoffman, 2013). Some scholars working in this arena have recognized that managers might play an important role in explaining the diversity of environmental practices (Bansal and Roth, 2000;

Cordano and Frieze, 2000; Delmas and Toffel, 2008; Sharma, 2000; Sharma, Pablo, and Vredenburg, 1999). While the majority of this work has focused on managerial preferences for corporate environmental response, we have a limited understanding of how such preferences might influence actual firm responses to institutional pressures.

Consequently, the objective of this study is to examine how managerial attributes influence firms' strategic responses to environmental issues. We argue that the characteristics of the CEO play a particularly important role in the extent to which external environmental pressures are attended to and how they are interpreted and acted upon (Hoffman, 2001). As top managers, CEOs strongly influence whether stakeholder groups are considered salient (Delmas and Toffel, 2008; Eesley and Lenox, 2006) and how environmental issues should be addressed (Sharma, 2000).

Specifically, we examine how firms respond to requests to disclose their environmental

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performance. Because the costs and benefits of disclosure are often uncertain, decisions about firm response may be subject to managerial interpretation (Clarkson *et al.*, 2008; Li, Richardson, and Thornton, 1997). Interpretation, in turn, depends on a manager's personal characteristics (George *et al.*, 2006; Hambrick and Mason, 1984). Therefore, we propose that CEO characteristics play an important role in determining whether the disclosure of environmental information is perceived as an opportunity or a threat (Sharma *et al.*, 1999). Such differences in interpretation, we argue, partially explain why firms that face similar institutional pressures pursue different environmental strategies.

THEORY

Institutional influences and environmental performance

Institutional theory has been widely used to examine corporate environmental issues and practices (Bansal and Clelland, 2004; Delmas and Toffel, 2008; Hoffman, 1999; Lounsbury, 2001). While much of this research has sought to explain why firms exhibit similar environmental strategies (e.g., Chatterji and Toffel, 2010; Cho and Patten, 2007; Reid and Toffel, 2009), there is also evidence that firms exhibit heterogeneous responses even in the face of what appear to be similar institutional pressures. Many firms, for example, have distinct organizational cultures and structures that serve as interpretive lenses that ultimately shape organizational response (Delmas and Toffel, 2008; Hoffman, 1999). Firms may also exhibit greater sensitivity to institutional pressures because they have more to gain from acquiescence in the form of reputational benefits (Christmann and Taylor, 2001) or because they possess greater complementary assets (Christmann, 2000).

A number of studies have also noted the prominent role managers play in the interpretation of and response to environmental issues (e.g., Cordano and Frieze, 2000; Egri and Herman, 2000; Sharma, 2000). The majority of this work has focused on explaining how managerial attitudes and values influence firm response. Cordano and Frieze (2000), for example, found that managerial attitudes toward the natural environment influence their preferences for pollution reduction activities. Bansal and Roth (2000) showed that many

firms have individuals who champion ecological initiatives, driven by a sense of obligation, responsibility, and philanthropy. Nevertheless, while such studies establish that managerial characteristics do indeed influence firms' *preferences* for sustainable activities, we still lack knowledge about how such characteristics influence firms' *actual* responses to institutional pressures (Eesley and Lenox, 2006). Highlighting this lack of understanding, Delmas and Toffel (2008) have called for further research to examine how managers' characteristics and experiences influence a firm's susceptibility to institutional pressures.

Managerial characteristics and environmental disclosure

In this article, we argue that managerial characteristics influence how institutional pressures are perceived and interpreted (George *et al.*, 2006). In particular, we contend that the attributes of a chief executive officer (CEO) are likely to have a significant influence on how firms respond to institutional pressures. As a critical member of a firm's management team, we maintain that CEOs have the power and ability to make decisions that may ultimately influence organizational outcomes (Hambrick and Fukutomi, 1991; Hambrick and Mason, 1984). Furthermore, we expect that CEOs imprint their own values and cognitive styles upon their respective firms (Wally and Baum, 1994), which then become manifest in firm decision processes (Keeney, 1992; Norburn, 1989).

In the context of organizations and the natural environment, institutional pressures can emanate from a variety of constituents and can take on multiple forms (Delmas and Toffel, 2012). Here, we focus on requests made by shareholders for firms to increase the disclosure of their environmental performance. We focus on disclosure because the decision to disclose is both fraught with uncertainty and strategically important, as the information is relevant to and acted upon by investors, customers, regulators, and nongovernmental organizations. Furthermore, disclosure about environmental performance is, in most instances, done on a voluntarily basis and is, therefore, subject to managerial discretion (Clarkson *et al.*, 2008).

Voluntary disclosure theory predicts that firms will disclose environmental information when the perceived benefit of disclosure outweighs the perceived costs (Verrecchia, 1983). Potential

benefits include insurance-like protection from environmental disasters or legal action (Blacconiere and Patten, 1994; Godfrey, Merrill, and Hansen, 2009), improved corporate reputation (Aerts and Cormier, 2009), and a stronger voice in the public policy process (Cho and Patten, 2007). Potential costs include increased legal exposure (Cormier and Magnan, 1997), future regulatory constraints (Li *et al.*, 1997), and an increased likelihood of being targeted by activists or labeled as a 'greenwasher' (Lyon and Maxwell, 2011).

Prior research, however, suggests that executives face considerable difficulties in assessing the costs and benefits of disclosure (Barth, McNichols, and Wilson, 1997; Clarkson *et al.*, 2008). Because of this ambiguity, executives are likely to rely on their own knowledge and interpretation when deciding upon a disclosure strategy (Delmas and Toffel, 2008). Given this reliance on individual interpretation, we contend that managerial decisions about disclosure are likely to be influenced by their background characteristics. These characteristics may cause some managers to view requests to voluntarily disclose environmental information as strategic opportunities and others as threats (Sharma *et al.*, 1999).

Drawing on upper echelon theory (Hambrick and Mason, 1984), we examine several background characteristics of CEOs and explain how they influence the firm's decision to voluntary disclose environmental information. We specifically seek to understand how firms respond to requests that emanate from large current and potential shareholders. By limiting our analysis to one source of pressure and one type of request, we can more readily isolate the role of managerial characteristics in these decisions (Eesley and Lenox, 2006).

CEO educational background

Prior research suggests that an executive's educational background can have a significant effect on firm behaviors and outcomes (for a review, see Finkelstein, Hambrick, and Cannella, 2009). While the majority of this work has focused on firm outcomes such as innovation and financial performance, very few scholars have addressed how educational backgrounds affect a firm's voluntary disclosure practices, particularly with regard to the firm's environmental performance. Although educational backgrounds can

be classified into several different categories, two categories—MBA and legal education—are particularly relevant for decisions about voluntary disclosure. From a theoretical viewpoint, people with these two educational backgrounds are likely to exhibit stark differences in how disclosure requests are perceived and interpreted. From a practical viewpoint, MBA and law degrees represent common educational backgrounds for CEOs of large firms (Felicelli, 2008; France and Lavelle, 2004).

MBA degree

Research suggests that executives with MBA degrees tend to make different decisions than executives without MBA degrees (Finkelstein *et al.*, 2009). These differences appear to arise from both selection (i.e., who chooses to obtain an MBA) and training. While earlier work claimed that MBA programs attract more risk-averse, conformist individuals who are less likely to undertake innovative strategies (Hambrick and Mason, 1984), empirical evidence suggests that managers with MBA degrees tend to follow more aggressive strategies. Bertrand and Schoar (2003), for example, found that firms led by CEOs with MBAs spend more on capital expenditures, take on more debt, make more diversifying acquisitions, and issue fewer dividends than firms with other CEOs.

One plausible explanation for this aggressive activity is that executives with MBAs may be more skilled in strategic decision making and, therefore, possess a greater capacity to recognize and take advantage of opportunities that increase the value of the firm (Geletkanycz and Black, 2001). Indeed, some research suggests that MBAs have greater levels of 'human capital.' Graham and Harvey (2001), for example, found that CFOs with MBAs use more sophisticated valuation techniques than those without MBAs. Grimm and Smith (1991) also found that U.S. railroads with a higher proportion of executives with MBAs were more likely to change their strategies in response to deregulation.

Given these findings, we argue that chief executives with MBAs will be more likely to perceive requests to voluntarily disclose the firm's environmental performance as a strategic opportunity than other business executives. As vigilant observers of their institutional environments, we contend that MBAs are more responsive to clear-cut trends in the environment (Finkelstein *et al.*, 2009). We also

expect that CEOs with MBAs will be more likely to perceive voluntary disclosure as an opportunity to enhance the firm's reputation and environmental legitimacy (Bansal and Clelland, 2004; Hart, 1995; Patten, 1992; Slater and Dixon-Fowler, 2010). We, therefore, predict that firms led by executives with MBAs will be more likely to respond to requests to disclose the firm's environmental performance.

Hypothesis 1 (H1): Firms led by CEOs with MBAs are more likely to disclose voluntary environmental information than are other firms.

Legal degree

Prior research also demonstrates that individuals with a legal education exhibit distinctive decision-making patterns compared to those without legal educations. Executives with legal degrees are often criticized for their conservative approach to business activities (Barker and Mueller, 2002) or caricatured as worrywarts and naysayers who obsess about risk (Langevoort and Rasmussen, 1996). The tendency for lawyers to err on the side of caution can be explained by way of professional norms (Bagley, 2008). Lawyers are trained to protect their clients' interests and socialized to behave conservatively and minimize risk (Delmas and Toffel, 2008; Langevoort and Rasmussen, 1996). These behaviors are likely to become more intense when lawyers become CEOs since they are taking on a large responsibility for the business' decisions (Bagley, 2008).

Empirical research shows that managers with legal degrees tend to act conservatively. For example, executives with legal backgrounds tend to stick to the status quo (Geletkanycz and Black, 2001). CEOs with legal degrees also conserve cash when the market is uncertain, leading to lower levels of R&D spending (Barker and Mueller, 2002). Finally, CEOs with legal educations tend to guide down earnings forecasts due to a greater sensitivity to litigation risk (Bamber, Jiang, and Wang, 2010).

Given this general proclivity toward risk mitigation, we expect that CEOs with legal degrees will place greater weight on the potential costs of voluntary disclosure. Because those with a legal education tend to exhibit greater risk aversion, we predict that firms led by a CEO with a legal degree will be less receptive to institutional

pressure to disclose information about their environmental performance.

Hypothesis 2 (H2): Firms led by CEOs with law degrees are less likely to disclose voluntary environmental information than are other firms.

CEO tenure

The second CEO characteristic we consider is CEO tenure. Research on the effects of tenure has consistently demonstrated an inverse relationship between the time in office and organizational change (Finkelstein *et al.*, 2009). Newly appointed executives have been shown to be more willing to experiment (Miller and Shamsie, 2001) and pursue innovative strategies (Bantel and Jackson, 1989), while longer-tenured executives have been shown to be more resistant to strategic change (Finkelstein and Hambrick, 1990). Perhaps the most compelling evidence in this stream of literature, Gabarro (1987) found that almost all major actions taken by CEOs occur in the first two and a half years in office.

Explanations for the negative relationship between tenure and organizational change have often focused on an executive's commitment to the status quo (Hambrick, Geletkanycz, and Fredrickson, 1993). Theorists have argued that tenure is associated with rigidity and commitment to established policies and practices as executives become more wedded with the correctness of their views with the passage of time (Hambrick and Fukutomi, 1991). Miller (1991: 34) described this process as becoming 'stale in the saddle,' that is, committed to the status quo, risk averse, and insulated from fresh, accurate information.

Prior research also suggests that an executive's power increases with each year in office. Finkelstein and D'Aveni (1994), for example, argued that informal CEO power increases over time because: (1) boards can be co-opted with CEO appointees; (2) CEOs gain the loyalty of their subordinates; and (3) informal power becomes institutionalized. CEOs with greater power have the ability to recruit and promote other executives that share similar views and are demographically similar to themselves (Westphal and Zajac, 1995), thereby increasing their autonomy and influence over the organization. CEOs with greater power are also better able to resist pressures for change, as their autonomy and influence allow them to veto

projects that are not aligned with the established paradigm (Miller, 1991).

Given these general patterns, we expect that newly appointed CEOs are more willing to acquiesce to requests for voluntary disclosure than long-tenured CEOs. Because they are less ingrained in the existing norms of the firm and more open minded about how an organization should be run, short-tenured CEOs will likely perceive less risk in responding to requests to disclose environmental information. Long-tenured CEOs, however, are more committed to the established operating paradigm and likely to view voluntary disclosure as unnecessary. Because of their greater informal power, CEOs with longer tenures are better able to ignore requests that may call for a change in the way of doing business. Therefore, we predict that newly appointed CEOs are more likely to acquiesce to pressure to voluntarily disclose environmental information than are long-tenured CEOs.

Hypothesis 3 (H3): Firms led by new CEOs are more likely to disclose voluntary environmental information than are other firms.

METHODS

Sample

We created our sample by matching data from the Carbon Disclosure Project (CDP) with several other data sources. Our analysis focuses exclusively on U.S. companies from 2002 to 2008. After dropping observations with missing data, our final sample consisted of 589 firms and 2,157 firm-year observations.

Dependent variable

Our dependent variable came from the CDP, a U.K.-based nonprofit organization that works with institutional investors to persuade large corporations to disclose information on carbon emissions. In 2002, the CDP addressed letters to the CEO of every *Financial Times* Global 500 (FT 500) firm. Co-signed by institutional investors, the letter asked the CEO of each firm to complete a questionnaire that addressed the following issues: (1) the potential risks and opportunities that climate change posed to the company; (2) the firm's climate change strategy; and (3) the firm's

greenhouse gas emissions. Subsequent questionnaires were sent in 2003 and 2005, after which the questionnaire was administered on an annual basis. In 2006, the CDP expanded its scope to include firms in the Standard and Poor 500 (S&P 500) index. *Answered questionnaire* was a binary variable coded '1' if firms answered the CDP questionnaire in one particular year and '0' otherwise (Reid and Toffel, 2009).

Independent variables

Educational background and CEO tenure measures came from BoardEx, a comprehensive database containing profiles for more than 380,000 managers and directors worldwide. Where necessary, data were supplemented with *Business Week's* Executive Profile and Biography and company annual reports. *MBA degree* and *Legal degree* were created as binary variables to capture the effects of business and legal education, respectively. About 50 percent of the CEOs had either degree, leaving a large group of uncategorized CEOs. We did not account for other degrees since we lacked specific information about the rest (which tended to be listed either as B.A. or B.S.) or the categories (e.g., engineering) did not contain sufficient observations for reliable analysis. CEO tenure was also measured as a binary variable. We coded *New CEO* as '1' if the CEO had been in office for less than three years and '0' otherwise, since most CEOs take major actions within the first two and a half years of office (Gabarro, 1987).

Control variables

To isolate the effect of CEO characteristics on disclosure, we controlled for a number of organizational and institutional factors. First, we controlled for the *Proportion of shares held by CDP signatories*, as firms are more likely to respond if institutional investors own large stakes (Reid and Toffel, 2009). This was calculated as the total number of shares held by all signatories (using Thomson Reutersdata) divided by the total number of shares outstanding. We also controlled for *Shareholder resolutions* using the EthVest database (Interfaith Center on Corporate Responsibility), as firms targeted by shareholder activism are more likely to respond to the CDP (Reid and Toffel, 2009). Since these are rare events, we coded this as a binary variable: '1' if the firm had been

targeted at least once in the past two years and '0' otherwise. Following prior research, we also control for the stringency of the institutional regulatory environment (Reid and Toffel, 2009): *State regulatory threat* was coded as '1' if firms were located in states that were part of the Regional Greenhouse Gas Initiative (RGGI) or the Western Climate Initiative (WCI) and '0' otherwise. We also controlled for *Industry sector* using the firm's two-digit North American Industry Classification (NAICS), as industry might be related both to the likelihood of disclosure and to the proportion of CEOs with a given educational background.

We captured a measure of *Transparency strength* using KLD in order to control for firms that already disclosed a wide range of environmental and social information. KLD is a leading database on environmental and social data used extensively in academic articles (Waddock, 2003). Because prior environmental performance of firms is thought to affect environmental disclosure (Clarkson *et al.*, 2008), we included *Climate change concern* (KLD) as a proxy for a firm's prior environmental performance. In addition, we interacted *Climate change concern x shareholder resolutions* to account for the nonmonotonic relationship between environmental performance and disclosure through the moderating effect of activist pressure (Lyon and Maxwell, 2011). We additionally control for firm size as *Revenue (log)*, since large firms are more likely to disclose voluntary information than small firms (Reid and Toffel, 2009). Finally, we controlled for *Proportion of questionnaires answered* since firms are exposed to pressure from the CDP over time that could become legitimated as practices diffuse (Sharma, 2000).

Model specification

We estimated the likelihood that a firm would answer the questionnaire using the following logistic regression model:

$$\begin{aligned} \text{Pr}(AQ_{ijt} = 1) = & F(\beta_1 \text{MBA}_{it} + \beta_2 \text{Legal}_{it} \\ & + \beta_3 \text{New CEO}_{it} + \beta_4 X_{ijt} + \delta T_t + \varepsilon_i) \end{aligned}$$

where i represented firm i , j represented industry j , t represented year t , and AQ_{ijt} was the dependent variable. X_{ijt} was a matrix of controls and T_t a year dummy to account for unobserved

changes in environmental policy and social trends. Clustered standard errors were used to account for heteroskedasticity and correlation in the error term due to repeated measurements for each firm over time. CEO educational background and tenure were based on the current year, but control variables were lagged by one year to minimize simultaneity concerns.

RESULTS

Roughly 58 percent of firms responded at least once to the CDP questionnaire, and 43 percent of all 2,157 questionnaires were answered during 2002 to 2008 (Table 1). Only 23 percent responded the first time they received the questionnaire; response rates went up to 77 percent by the time the sixth CDP request was made. Similar to other studies, about 41 percent of CEOs held an MBA and nine percent had legal degrees (Bamber *et al.*, 2010; Bertrand and Schoar, 2003).

We test our hypotheses (Table 2) using logistic regression and report the odds ratios for the independent and control variables. We interpret the magnitude of our coefficient estimates using marginal effects. Model 1 shows that the best predictor of current disclosure was prior disclosure to the CDP. In addition, larger firms were more likely to acquiesce to CDP requests, as were firms that were more transparent. Firms with noted climate change concerns were less likely to disclose. Consistent with prior research, firms targeted by shareholder resolutions doubled the odds of disclosure ($OR = 2.7$: $p < 0.01$), but only when they exhibited a climate change concern (Reid and Toffel, 2009).

Models 2 to 5 indicate support for Hypotheses 1, 2, and 3. CEOs holding MBA degrees increased the odds that firms would disclose environmental information by a factor of 1.53 ($p < 0.01$). Setting all other variables to their means, firms led by CEOs with MBAs had a 52 percent probability of acquiescing to CDP pressure, versus 41 percent for firms led by other CEOs (Model 2). In contrast, lawyer CEOs decreased the odds that a firm would respond to the CDP by a factor of 0.56 ($p < 0.05$). The marginal effect of firms with CEOs that have legal degrees was 33 percent versus 47 percent for firms led by CEOs without legal education (Model 3). New CEOs were more likely to spur firms to disclose by a factor of 1.25 ($p < 0.05$). The probability of CDP response was 48 percent

Table 1. Descriptive statistics – responding to institutional pressures

Panel A. Summary statistics		Mean	SD	Min	Max
Variable					
Answered questionnaire		0.43	0.50	0	1
MBA degree		0.41	0.49	0	1
Legal degree		0.09	0.29	0	1
New CEO		0.48	0.50	0	1
Proportion of shares held by CDP signatories		0.08	0.08	0	0.66
Shareholder resolutions		0.14	0.35	0	1
State regulatory threat		0.22	0.42	0	1
Transparency strength		0.12	0.32	0	1
Climate change concern		0.09	0.29	0	1
Climate change concern x shareholder resolutions		0.04	0.19	0	1
Revenue (Log)		9.14	1.19	0	12.84
Proportion of prior questionnaires answered		0.25	0.38	0	1

Panel B. Correlations		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Answered questionnaire											
2	MBA degree	0.11										
3	Legal degree	-0.02	-0.18									
4	New CEO	0.04	0.00	-0.02								
5	Proportion of shares held by CDP signatories	0.04	0.04	0.01	-0.04							
6	Shareholder resolutions	0.15	-0.02	0.02	0.03	-0.02						
7	State regulatory threat	0.04	-0.03	0.00	-0.01	0.18	-0.07					
8	Transparency strength	0.31	0.00	-0.03	0.02	0.03	0.10	0.08				
9	Climate change concern	0.11	-0.04	0.13	-0.03	-0.02	0.22	-0.14	0.08			
10	Climate change concern x shareholder resolutions	0.16	-0.05	0.06	0.02	0.00	0.47	-0.08	0.09	0.61		
11	Revenue (Log)	0.19	-0.04	-0.03	0.02	-0.05	0.32	-0.02	0.21	0.22	0.33	
12	Proportion of prior questionnaires answered	0.55	0.08	0.02	0.01	0.09	0.13	0.08	0.40	0.10	0.14	0.19

Note: 2,157 firm-year observations. All independent variables are lagged one year, except the CEO characteristics which are based on the current year, and shareholder resolutions variable, which are based on one- and two-year lags.

for new CEO firms versus 43 percent for firms with longer-tenured CEOs (Model 4). These relationships held in Model 5 when all variables were included.

DISCUSSION

In this article, we argue that managerial characteristics are a key factor in explaining why organizations respond to institutional pressures in heterogeneous ways. We test this premise by examining how CEO characteristics affect the likelihood that firms will voluntary disclose environmental information. We find that a CEO's educational background and tenure affect the firm's likelihood of disclosing information. Firms with CEOs who have MBA degrees are significantly

more likely to disclose than are other firms. Conversely, we find that firms led by CEOs with legal educations are more likely to resist pressures to disclose. Finally, we find that firms led by newly appointed CEOs are also significantly more likely to acquiesce.

The central contribution of our work speaks to a recent body of literature that has sought to explain why firms that face similar institutional pressures pursue different strategies (Delmas and Toffel, 2012). While a number of studies have explored how organizational factors shape firm response to institutional pressures (Delmas and Toffel, 2008; Doshi *et al.*, 2011; Reid and Toffel, 2009; Walls and Hoffman, 2013), our results suggest that differences in environmental strategy can also be explained by CEO characteristics. Thus, by linking managerial characteristics to firms' environmental

Table 2. Logistic regression results – responding to institutional pressures

	(1)	(2)	(3)	(4)	(5)
<i>Control variables</i>					
CDP shares	0.804 (0.694)	0.713 (0.621)	0.802 (0.690)	0.833 (0.708)	0.744 (0.635)
Shareholder resolutions	1.322 (0.239)	1.319 (0.238)	1.326 (0.243)	1.322 (0.242)	1.324 (0.243)
State regulatory threat	1.064 (0.164)	1.108 (0.174)	1.077 (0.166)	1.071 (0.166)	1.124 (0.176)
Transparency strength	3.237*** (0.844)	3.284*** (0.858)	3.199*** (0.831)	3.194*** (0.827)	3.206*** (0.831)
Climate change concern	0.448*** (0.131)	0.458*** (0.134)	0.445*** (0.129)	0.460*** (0.134)	0.467*** (0.138)
Climate change concern X	2.708** (1.181)	2.921** (1.225)	2.668** (1.172)	2.572** (1.121)	2.735** (1.169)
Shareholder resolutions					
Revenue (log)	1.428*** (0.085)	1.435*** (0.086)	1.441*** (0.085)	1.420*** (0.085)	1.435*** (0.085)
Proportion of questionnaires answered	20.205*** (4.255)	19.593*** (4.140)	20.205*** (4.229)	20.442*** (4.333)	19.881*** (4.215)
<i>Independent variables</i>					
MBA degree (H1, predicted odds ratio > 1)		1.528*** (0.177)			1.471*** (0.172)
Legal degree (H2, predicted odds ratio < 1)			0.561** (0.131)		0.640* (0.152)
New CEO (H3, predicted odds ratio > 1)				1.250** (0.141)	1.247* (0.142)
Year effects	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes
Observations	2,157	2,157	2,157	2,157	2,157
Pseudo R-squared	0.311	0.316	0.314	0.313	0.319

Note: Models use logistic regression with odds ratios. Standard errors are in parentheses clustered by firm.

The dependent variable refers to whether the firm responded publicly to the Carbon Disclosure Project. All models include year effects and industry effects.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

strategies, we extend prior literature on strategic responses to institutional pressures and the role of top management in interpreting and legitimizing these pressures (Sharma, 2000; Sharma *et al.*, 1999).

Our work also complements prior research that demonstrates how firms' receptivity to pressures varies by the source and type of pressure employed (Eesley and Lenox, 2006). Delmas and Toffel (2008), for example, found that firms with influential legal departments are more receptive to pressure from regulatory bodies. In contrast, our results indicate that when the pressures originate from nonregulatory sources, firms led by lawyers are less likely to acquiesce. Taken together, the results suggest that it is important to consider both where the pressures emanate and how the pressures are likely to be interpreted by top management with differing backgrounds.

At a somewhat broader level, our study complements research that seeks to explain how pressure groups gain traction within firms. Weber, Rao, and Thomas (2009), for example, demonstrate that internal politics influence the degree to which social movement affects firm decisions. According to these authors, it is too simple to assume that firms acquiesce to institutional pressure for moral reasons or because they internalize the goals of pressure groups. Instead, as our results suggest, firms' actions are more likely to be based on the leaders' perceptions of the benefits and costs of disclosure, and that perception, we argue, is significantly influenced by CEO characteristics.

We acknowledge a number of limitations in our study and suggest future areas of research. Because our analysis of corporate responses to CDP requests incorporated only the largest public firms in the U.S., our findings may not generalize to firms in other geographical regions. Future

research could rectify this issue by extending the analysis to other geographic regions. For instance, response rates among European firms to CDP requests are much higher than U.S. companies, perhaps due to a greater overall awareness and attitude toward environmental issues. Thus, for European firms, generalized norms about acceptable environmental behavior of firms may overshadow CEO differences based on the perceptions of risk and opportunities.

The results of our analysis are also limited by the specificity of our analysis. Requests to disclose greenhouse gas emissions by the CDP constitute one particular type of institutional pressure. Future studies could, therefore, examine how CEO characteristics influence other types of pressure, such as those emanating from regulatory bodies. In addition, we also focused on the effects of having an MBA versus a legal degree. While approximately half of our sample had either an MBA or law degree, we were unable to differentiate further categories, such as science and engineering. Future research might extend our work by examining how other educational backgrounds influence corporate response to institutional pressures.

In this study, we focused our analysis on the antecedents of environmental disclosure. Future research could extend our work by examining the performance consequences of disclosure. Some scholars, for example, maintain that environmental disclosure can lead to performance improvement by raising the legitimacy of environmental issues within the firm (Sharma, 2000) or by generating external scrutiny (Fung, Graham, and Weil, 2007). However, it is well known that firms can comply symbolically to pressures (Oliver, 1991) without making substantive changes to organizational routines and procedures (Kim and Lyon, 2011). Given these theoretical explanations, more work is needed to understand whether and when environmental disclosure actually results in performance improvements.

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