

Unmasking Symbolic Management: Evidence from Voluntary Corporate Carbon Disclosures

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ABSTRACT

Information intermediaries have emerged as credible institutions for voluntary corporate disclosures of non-financial performance. However, research suggests that these mechanisms do not always lead to corresponding improvements in substantive performance or transparency. This study extends new theory of voluntary disclosure intermediaries and their explicit endorsements as “credibility shields” that can serve to deflect stakeholder scrutiny. Using forensic analysis of detailed corporate disclosures made to one such prominent intermediary, we develop measures of symbolic management and motivation to attain intermediary endorsement to empirically test the theory. Results suggest that CDP endorsement of firm disclosures is granted equally to firms engaging in either symbolic or substantive management. The study contributes to our understanding of symbolic management and provides guidance for improved design of corporate voluntary disclosure institutions.

Keywords: voluntary disclosure, information intermediaries, symbolic management, third-party ratings, assurance

INTRODUCTION

As both investor and stakeholder demand for information on non-financial aspects of corporate policies and performance has increased, more firms engage in voluntary disclosure of information.¹ However, this increase in disclosure is often viewed with skepticism as just another channel of public relations management (Laufer, 2003). Voluntary disclosure intermediaries have emerged as institutional mechanisms to increase transparency in discretionary corporate reporting. The promise of such third party information intermediaries lies in their potential to drive substantive improvements in both transparency and performance along dimensions of public interest, both through specification of standardized information disclosure guidelines and via application of coercive and normative pressures (Delmas and Toffel, 2004). The intermediary then gains credibility through the effectiveness of its mechanism (as perceived by relevant stakeholders) and network effects of its adoption by firms.

However, extant literature suggests that such intermediaries often fail to generate improved performance among adopters along dimensions specifically targeted by the program.² If intermediaries are not effective at improving performance, one may question whether true transparency is being achieved. Third party voluntary disclosure intermediaries typically dictate a fixed format for information disclosure in the mold of financial reporting standards in an effort to reduce opportunity for exaggeration and obfuscation. Such reporting structure may serve investors and other stakeholders by setting common information disclosure standards across firms and unbiased aggregation by a neutral arbiter, but may also inadvertently create new incentives for firms to misrepresent reported data in ways that mislead investors and other stakeholders as to the true performance. Whereas evidence of symbolic disclosure (e.g. earnings management) abounds within both mandatory and voluntary reporting mechanisms (Healy and Wahlen, 1999; Healy and Palepu, 2001), we have relatively limited understanding of strategic behavior by firms

¹For example, the proportion of firms listed in the S&P500 index to publish a corporate sustainability report increased from roughly 20% in 2011 to more than 80% in 2015 (Governance & Accountability Institute, 2016).

²Examples include the US DoE 1605(b) greenhouse gas disclosure program (Kim and Lyon, 2011), the Dow Jones Sustainability Index (Cho *et al.*, 2012), CDP (Matisoff, 2013), and the Global Reporting Initiative (Milne and Gray, 2013).

to manipulate third-party voluntary disclosure intermediaries.³ Yet the implicit assumption that ratings are valid gives incentive to firms to exercise symbolic management (Chatterji *et al.*, 2016), particularly when they have sufficient information and attentiveness to the methodology used to construct ratings.

An understanding of strategic motivations over content of disclosure requires multiple theoretical lenses (Hahn *et al.*, 2015); we consider the role of stakeholder legitimacy, symbolic management / decoupling, and economic theory in constructing a theory of voluntary disclosure evaluators — those that issue subjective performance ratings — as external sources of credibility that shield firms from stakeholder scrutiny. We theorize that voluntary disclosure evaluators have emerged to satisfy demand for material disclosures to reduce information asymmetry; those firms with strong strategic motivation to enhance the credibility of disclosures among stakeholders seek the evaluator’s endorsement, and stakeholders seek to reliably identify firms making substantive performance improvements on dimensions of concern. However, the credibility developed by such evaluators over time carries the possibility of perverse incentives as opportunistic firms seek to leverage endorsements to enhance stakeholder perceptions of performance without material improvement (Westphal and Zajac, 1994).

Building from this new theoretical context, we find empirical evidence that firms respond to those incentives and engage in undetected symbolic disclosure through third-party evaluators. Symbolic disclosure may be pervasive considering that intermediated voluntary disclosures face heterogeneous and often lower standards of verification and audit (Gürtürk and Hahn, 2016). We also find that a prominent means of signaling substantive performance (third-party assurance) sometimes predicts substantive disclosure (see Bagnoli and Watts, 2017), but that evaluators often fail to recognize the value-relevant information contained in those signals. Whereas prior research on symbolic voluntary disclosure has relied on limited subsets of firms with available data on actual performance (Kim and Lyon, 2011; Delmas and Montes-Sancho, 2010), this study takes a

³Delmas and Montes-Sancho (2010) find late joiners to voluntary agreements tend to make more symbolic gestures; Kim and Lyon (2011) find evidence of selective disclosure in voluntary government programs; Fabrizio and Kim (2016) find that lower performing firms tend to use more obfuscatory language in their disclosures.

novel approach. Using data from a well known voluntary disclosure intermediary, CDP (previously the Carbon Disclosure Project), we perform detailed analysis of microdata embedded in individual firm disclosures and identify patterns in the data that are consistent with symbolic disclosure. Our approach is unique among a substantial literature exploring CDP disclosures; rather than focus on the binary decision to disclose or not (e.g., Lewis *et al.*, 2014; Reid and Toffel, 2009), we take a deep dive into the content of disclosures and CDP's scoring methodology, evaluate the effect of CDP performance rank scores, and consider disclosure data over a period of several years, taking advantage of small perturbations in disclosure format and scoring for identification purposes. From this detailed analysis we develop and validate measures of symbolic disclosure as well as overall motivation to obtain CDP's explicit endorsement. This study joins a small subset of literature that identifies symbolic disclosure (see Fabrizio and Kim, 2016; Kim and Lyon, 2011) and examines the effect of sustainability rankings on firm behavior (see Chatterji and Toffel, 2010).

This study makes several contributions to knowledge of symbolic management in voluntary corporate disclosures. First, we synthesize disparate theory of voluntary disclosure and introduce new theory of intermediaries as "credibility shields" to improve stakeholder management. This theory also describes the motivation for firms to attain higher levels of endorsement beyond minimal disclosure, and to signal that motivation using different levels of assurance. Second, we apply rigorous quantitative analysis of detailed individual firm disclosures to CDP and develop empirical measures of both this motivation for endorsement and symbolic management. Our analytic results provide new empirical evidence both of symbolic management through voluntary disclosure intermediaries and of the use of different quality levels of third-party assurance by firms to either signal substantive management or provide additional external credibility for symbolic management. The study offers practical guidance both for design of disclosure institutions and methods and for investors and other stakeholders that make use of endorsements that may help reduce the incidence of symbolic management and its resulting inefficiencies.

THEORY

Legitimacy, credibility, and voluntary disclosure

Stakeholders⁴ increasingly demand higher levels of corporate transparency and performance along non-financial dimensions of stakeholder-specific or broader societal interest. In turn, firms seek to establish legitimacy — a general societal perception that firm actions are desirable or appropriate (Suchman, 1995) — in the eyes of stakeholders. Obtaining and managing legitimacy can serve as an operational resource that firms develop in strategic contexts (Dowling and Pfeffer, 1975; Ashforth and Gibbs, 1990) to enable competitive advantage and other private benefits. By communicating information about performance of societally desirable activities, firms continually engage in a *process* of legitimation to influence stakeholder perceptions in an effort to achieve the *property* of legitimacy (Suddaby *et al.*, 2017). Whereas the property of legitimacy is often characterized as an intangible asset or strategic resource possessed by a firm, theory on the process of legitimation suggests that this resource is fleeting and must be cultivated and maintained through a continual interaction between firms and social actors (Suddaby *et al.*, 2017).

Firms generally attempt to exercise control over the process of legitimation through either substantive or symbolic management (Ashforth and Gibbs, 1990). Substantive management consists of material change in corporate policies and practices that leads to direct improvement in performance desired by stakeholders. Symbolic management involves creating the perception of desirable practices or performance without substantively implementing them; a symbolically managed firm effectively decouples its formal structure and public image from its internal functions and processes (Meyer and Rowan, 1977). Symbolic management is often perceived favorably by stakeholders (Westphal and Zajac, 1998) and thus offers firms an opportunity to reap the benefits of legitimacy at lower cost than under substantive management (Delmas and Montes-Sancho, 2010). However, the practice of symbolic management carries significant risk of backfire if perceived by stakeholders as misleading or illegitimate (Ashforth and Gibbs, 1990),

⁴In this paper we refer to stakeholders in the broad sense of Donaldson and Preston (1995): “groups with legitimate interests in procedural and/or substantive aspects of corporate activity”.

especially when stakeholder scrutiny is high (Marquis *et al.*, 2016). While such scrutiny often motivates firm efforts toward substantive management, some firms may instead seek external validation of symbolic structures to reduce risk associated with this “double-edge” of legitimation.

The notion of legitimacy also suggests that firms tend to satisfice, or seek to do the minimum required actions to achieve the desired outcome and no further (Bansal and Roth, 2000). However, given the dynamic interplay between firms and stakeholders over expectations, disclosures, and perceptions, firms may be motivated to go beyond the mere minimum and establish greater credibility of their activities with stakeholders, regardless of whether symbolic or substantive management predominates. Legitimacy as a source of credibility is conceptually distinct from continuity or persistence (Suchman, 1995), and firms obtaining credible accounts of their activities are less subject to risk of stakeholder sanction (Meyer and Rowan, 1977). Furthermore, to establish and maintain credibility firms must seek active engagement in support of stakeholder demands, in contrast to the passive support required in domains with low thresholds of legitimation (Suchman, 1995). A parallel literature on “social license to operate” suggests a hierarchy of stakeholder perceptions whereby firms can move from tacit acceptance to explicit approval by enhancing credibility of their actions (Gehman *et al.*, 2017). We consider credibility as a differentiating factor, akin to reputation or status, that separates and ranks the perceived performance of individual actors relative to others that share in the legitimacy bestowed by virtue of common group membership (Bitektine, 2011).

Voluntary disclosure of performance metrics important to influential stakeholders is a primary manner in which firms engage in the process of legitimation (Patten, 1991). While increased disclosure provides perceived transparency, this does not necessarily translate to improved performance (Aragón-Correa *et al.*, 2016). Lack of formal standards and audited disclosures create incentives for symbolic management (Healy and Palepu, 2001), often realized as selective disclosure of “good news” and withholding of “bad news”. Stakeholders are generally aware of this information asymmetry problem (Milgrom, 1981; Verrecchia, 1983) and may deter symbolic management by providing a credible threat of audit and corresponding sanction. However, as an

unintended consequence of this deterrent, firms employing substantive management may under-disclose positive performance to avoid unwanted scrutiny of its claims, while middle performing firms are more likely to engage in selective disclosure (Lyon and Maxwell, 2011). An outcome is that firms whose actual performance is more difficult to ascertain may stand to benefit the most from engaging in symbolic management; if the perceived risks of external audit are low, the expected value of symbolic management increases. Stakeholders (including investors) want to provide resources to firms with substantive management, and demand a source of credible disclosures to reduce proprietary costs in verifying claims of individual firms. Meanwhile, substantively managed firms seek improved disclosure credibility to receive credit for higher performance.

This unsatisfied, two-sided demand for credible disclosures creates opportunity for third-party actors to reduce information asymmetry (Nayyar, 1990). Stakeholders tend to place higher value on credibility of disclosure content than on mere conformance, particularly when quality of disclosure or performance is more tangible (i.e. when a formal evaluation of firm disclosure is available) (Philippe and Durand, 2011). Where proprietary firm performance disclosures are insufficient to obtain or enhance credibility, positive third-party assessments of performance may add substantial credibility (Elsbach and Sutton, 1992). When stakeholders perceive the evaluative capabilities of the third-party to be high, they associate a stronger third-party endorsement with higher perceived firm quality on relevant dimensions of performance (Stuart *et al.*, 1999). Furthermore, higher credibility of authoritative endorsements may influence stakeholders to rely on those evaluations (Tost, 2011) in place of their own proprietary analysis. By obtaining the explicit endorsement of credible third parties for voluntary disclosures, motivated firms may improve not only the stability of their legitimacy status, but also move toward credibility of disclosures that can reduce risk of future sanction and free up resources for other productive pursuits (Bitektine and Haack, 2015).

Voluntary Disclosure Evaluators

Increasing demand for credibility in voluntary disclosures has led to the emergence of a variety of information intermediaries. Our theory addresses a specific type of intermediary that we term voluntary disclosure evaluators (VDEs). We define a VDE as a distinct type of voluntary disclosure intermediary generally characterized by its systematic collection of issue-specific information directly from firms and subsequent analysis, aggregation, and dissemination of consolidated information in a fixed framework to the general public or subscribers.⁵ Importantly, VDEs are distinguished from other, passive voluntary disclosure intermediaries by virtue of their explicit use of consolidated ratings to enable direct comparison between firms using a single, aggregate metric.⁶ VDEs are further distinguished from other ratings schemes by virtue of their sole reliance on direct firm disclosures instead of other publicly available information sources. By setting a fixed disclosure framework, VDE mechanisms limit the amount of discretion in reporting available to firms, which theoretically reduces firms' ability to misrepresent performance (Fishman and Hagerty, 1990) and in turn lends perceived credibility to the quality of disclosed information. By relying on firm-provided data, VDEs seek to provide opportunity for firms with substantive management to harness that institutional credibility to distinguish themselves from lower performing firms and improve reputation among stakeholder groups. A VDE's proprietary evaluation of firm disclosures – its rating – thus becomes an effective endorsement with potential to serve the demand from both firms and stakeholder groups for credible voluntary disclosure.

VDEs themselves must first achieve legitimacy (in order to survive) and then credibility (in order to thrive). A VDE may gain legitimacy by virtue of its own transparency regarding the stakeholder groups and interests it represents and how it evaluates information disclosures from firms. Unbiased and transparent assessment of firm disclosures enables a VDE to establish legitimacy as a decentralized institution (King *et al.*, 2005). A successful VDE achieves

⁵Examples of VDEs include CDP (the subject of this study), the Dow Jones Sustainability Indices (DJSI), and FTSE4Good Indices.

⁶Other voluntary disclosure intermediaries that do not aggregate disclosure data or assign ratings include the Global Reporting Initiative (GRI) or the Sustainability Accounting Standards Board (SASB). CDP is unique in that it was formerly a strict information intermediary and only recently did it begin to issue ratings.

credibility by harnessing network effects generated through its normative and coercive influence (Reid and Toffel, 2009; Delmas and Toffel, 2008); an outcome of achieving credibility is that stakeholders place implicit trust in formal VDE endorsements. The VDE endorsement becomes its key value proposition to stakeholders; by processing large amounts of information to arrive at a simple output metric that is easily digested by users (i.e., inclusion on an index or a performance rating), the VDE effectively serves as a provider of information processing services.

By bearing information processing costs and establishing credibility, VDEs allow stakeholders to gravitate towards a simple endorsement or relatable metric rather than scrutinize the complex, underlying data through costly proprietary analysis (Lyon and Shimshack, 2015). Accordingly, once a firm makes the decision to disclose, it faces powerful incentives to improve its rating in order to enhance stakeholder perceptions of performance (Chatterji and Toffel, 2010; Stern and James, 2016) regardless of whether the firm employs substantive or symbolic management to do so. Achieving VDE endorsement confers credibility on a firm's disclosure, differentiating the firm from similar others that merely seek to legitimate through proprietary disclosure without VDE endorsement. A firm can thus expend less proprietary effort to convince stakeholders of substantive performance (and reduce risk of sanction) by obtaining the endorsement. Increased transparency and enhanced stakeholder engagement can lead to improved access to finance and other market benefits (Cheng *et al.*, 2014). Different firms approach disclosure through VDEs with different strategic objectives and are thus heterogeneous in terms of motivation for endorsement. Given the transparency of VDE assessment methodologies, firms with stronger strategic motivation to gain VDE endorsement will be more attentive to the assessment methodology. Firms that are more attentive to the methodology will have a clearer view of the implications of their disclosure, are expected to achieve a higher level of endorsement (i.e. rating).

Hypothesis 1: Firms with stronger attentiveness to VDE methodology will achieve a higher level of VDE endorsement.

According to Hypothesis 1, any firm attentive to the VDE methodology may achieve higher

endorsement. Symbolically managed firms have incentive to obtain a higher level of endorsement to effectively shield disclosures from stakeholder scrutiny. To maintain credibility with stakeholders, VDE schemes need to include sufficient safeguards to prevent manipulation by symbolically managed firms (Kim and Lyon, 2011). Transparency in evaluation methodology allows symbolic firms clear instructions on how to optimize the VDE rating.⁷ For example, in regulated financial reporting, firms may still have leeway within the bounds of fixed protocols to provide misleading information (Healy and Wahlen, 1999); while the rules of disclosure are clear, some discretion in reporting is allowed. To limit opportunity for firms to provide misleading information regarding true performance, VDEs may limit the discretion available to firms (Fishman and Hagerty, 1990). Research indicates that firms may use obfuscating text in efforts to improve VDE endorsement, but strict disclosure content guidelines limits the degree to which those efforts lead to higher levels of endorsement (Fabrizio and Kim, 2016).

However, a distinguishing feature of VDEs is the lack of formal audit mechanism to enforce accuracy and reliability of disclosures. Sophisticated firms, armed with a detailed methodology for maximizing level of VDE endorsement, adeptly find loopholes to manipulate disclosure requirements to improve perceptions of performance and reduce probability of detection (Healy and Wahlen, 1999). When probability of detection is low, information asymmetry provides firm incentives to disclose but insufficient incentives to disclose truthfully or completely (Bagnoli and Watts, 2017; Kim and Lyon, 2011). The lack of formal audit or review over disclosures suggests that firms may act strategically to improve their level of VDE endorsement through symbolic management.

Hypothesis 2: Symbolic disclosures through a VDE will achieve the same level of VDE endorsement as substantive disclosures, all else equal.

⁷Anecdotally, the authors have perused several websites of small consulting firms specializing in CDP questionnaire response preparation. For example, one firm's website claimed "Our expert team of data managers, CDP analysts and project managers can complete your entire response for you."; another stated "With our experience of text management, and knowledge of sustainability ratings, we are certain we are able to improve our clients report (sic)."

Assurance

Successful communications strategies tend to employ multiple channels; firms motivated to achieve credibility among stakeholders for voluntary disclosures will likewise employ multiple signals. One prominent signaling strategy available to firms is to obtain third-party assurance of claims. Assurance is a formal, independent assessment by a certified agent of whether sufficient appropriate evidence has been presented to assure (to an approximate level) an entity is in material compliance with a given set of guidelines or requirements. The “level” of assurance granted is generally classified as either reasonable or limited. Reasonable assurance expresses a relatively high level of confidence in compliance of the entity being assessed and thus dictates a more rigorous (and costly) investigation, often associated with a formal audit. Limited assurance expresses a more moderate level of confidence, is less costly, and is associated with less rigorous investigation.

Assurance is more commonly obtained by firms operating in markets with higher stakeholder orientation and the presence of strong institutional mechanisms governing sustainable corporate practices (Kolk and Perego, 2010). Assurance is generally provided by any one of myriad agents certified to assess compliance with the particular guidelines set forth by a regulatory or extra-regulatory body; great variability exists between assurance practitioners and associated practices (Perego and Kolk, 2012). Whereas obtaining assurance is generally associated with rigor and accuracy (Hummel and Schlick, 2016), assurers are often not trained in the auditing profession and conflicts of interest raise doubt regarding the overall reliability and credibility of assurance certificates for corporate sustainability claims (Boiral and Gendron, 2011; Gürtürk and Hahn, 2016).

While scholars have reason to doubt the legitimacy of a randomly drawn assurance report, their increasing prevalence is an indicator that firms and stakeholders view them in a positive light (Gürtürk and Hahn, 2016). Assurance is generally sought by firms with substantive management to send a signal of quality, and thus might be expected to correspond with a higher level of endorsement by a VDE. However, assurance can be obtained through symbolic management as

well; since assurance is a public signal and symbolic management is meant to be concealed, symbolic firms obtaining assurance may also achieve higher endorsement. A firm that obtains assurance is more likely to be motivated to signal credibility of its disclosure to external stakeholders, regardless of whether they are engaged in substantive or symbolic management. Therefore, assurance is likely to have a significant moderating effect on the relationship of motivation to VDE endorsement. Different levels of assurance may be associated with different levels of rigor taken in the assurance process, though the level of assurance obtained is not likely to be associated with a firm's ability or motivation to achieve a higher level of VDE endorsement. If the level of assurance adds information about a firm's proclivity for substantive management, its effect will be overshadowed by the motivation to achieve endorsement.

Hypothesis 3a: Limited assurance of GHG emissions inventories will positively moderate the relationship between motivation and VDE endorsement.

Hypothesis 3b: Reasonable assurance of GHG emissions inventories will positively moderate the relationship between motivation and VDE endorsement, but not more so than limited assurance.

While the obtainment of any level of assurance may be a positive indicator of the motivation to achieve higher VDE endorsement, the specific level of assurance obtained may present a useful signal of substantive management. While assurance in general is subject to manipulation (Boiral and Gendron, 2011), a significant majority of firms obtaining assurance of voluntary disclosures choose to obtain limited assurance instead of the more costly and rigorous reasonable assurance (Gürtürk and Hahn, 2016). These findings suggest that limited assurance is more easily obtained by firms exercising symbolic management. Bagnoli and Watts (2017) present a formal economic model of the decision to obtain assurance and conclude that firms with substantive management have a stronger incentive to obtain a higher level of assurance and thus select a separating equilibrium that signals differentiation from symbolic types. Therefore, we propose that firms obtaining reasonable assurance are less likely to engage in symbolic management. Moreover, whereas Bagnoli and Watts (2017) do not predict a pooling equilibrium in which firms of both

types obtain assurance, practical observations indicate that limited assurance has value to both types under a variety of circumstances (Boiral and Gendron, 2011); thus we expect limited assurance will not distinguish symbolic from substantive management.

Hypothesis 4a: Firms that obtain limited assurance of performance disclosures are neither more nor less likely to engage in symbolic management through a VDE.

Hypothesis 4b: Firms that obtain reasonable assurance of performance disclosures are less likely to engage in symbolic management through a VDE.

Figure 1 summarizes the hypothesized relationships in a path model.

Insert Figure 1 about here.

EMPIRICAL SETTING

To test these hypotheses, we analyze voluntary corporate disclosures made through CDP, a prominent VDE. CDP is a private, not-for-profit organization founded in 2002 with the backing of multiple institutional investors that seeks to influence corporations to make voluntary disclosure of performance and risks related to climate change.⁸ Greenhouse gas (GHG) emissions and carbon risk management are increasingly relevant to investors, as they weigh the long term risks and opportunities faced by firms as both natural systems and international regulatory response adjusts to climate change. CDP is perhaps the preeminent intermediary in this domain and has established substantial institutional credibility since its inception.⁹ The number of firms responding to CDP questionnaires has increased substantially over the past 12 years, as have the number of institutional investor signatories supporting the CDP mission (see Figure 2), which lends it substantial normative and coercive influence (Reid and Toffel, 2009).

⁸In recent years, CDP has added disclosure programs in other domains of environmental impact, including water (in 2010) and forests (in 2013).

⁹A 2013 study by GlobeScan found CDP to be the most credible source of sustainability rankings according to surveys of a cross-section of experts from corporate, government, NGO, academic, and consulting domains. A parallel study found CDP the second most commonly used source of sustainability rankings by institutional investors, after the Dow Jones Sustainability Indices (DJSI).

Insert Figure 2 about here.

A key factor in CDP's success is its specification of a standard disclosure format. Since 2003, CDP has annually distributed questionnaires to the largest publicly traded global firms.¹⁰ These questionnaires consist of a series of questions to which a firm responds by variably (a) selecting a discrete choice from a drop-down menu, (b) entering numerical data, (c) providing a detailed free text response to describe a policy or strategy, or (d) attaching relevant documents prepared for other purposes (e.g. corporate sustainability report, third-party assurance certificate, etc). Questions are organized into topical categories, such as Governance, Strategy, Risk Management, and Emissions Performance. While firms have the option of responding to any given question or not, each response (or set of related responses) may be directly compared to those of other firms on a standalone basis. Each year CDP collects both solicited and unsolicited responses, analyzes the data, and publishes a series of regional and sectoral reports based on the content of disclosures made by firms. While CDP makes publicly available the raw, individual questionnaire responses,¹¹ the primary vehicle for communicating the data is through the CDP formal reports.

In early report years, in addition to aggregate analysis of disclosure data and select case studies, CDP mainly reported the disclosed emissions levels of responding firms. Starting in 2010, as the CDP questionnaire grew more lengthy and complex, CDP developed and compiled two separate quantitative scores for each firm based on 1) completeness of disclosure and 2) overall emissions management performance.¹² The Carbon Disclosure Leadership Index, or CDLI, is a numerical score on a 0-100 scale that ranks firms on overall transparency. The Carbon Performance Leadership Index, or CPLI, is a categorical rank score that places firms in one of six performance bands (A, A-, B, C, D, E) based on CDP's assessment of overall emissions

¹⁰In 2003 CDP targeted listed firms of the S&P 500 index of largest United States listed firms and Global 500 index of largest listed firms around the world. Since then, CDP has distributed questionnaires to a larger set of global firms, and also collects unsolicited disclosures from smaller firms.

¹¹Firms have the option of requesting their response not be publicly released; CDP notes those firms that have done so in its reports. With respect to public access, users have free access only to a limited number of disclosures; full access is available through a paid subscription.

¹²N.B. CDP has substantially overhauled its scoring methodology beginning in 2016.

management. Importantly, CDP provides firms with a detailed description of its scoring methodology for both CDLI and CPLI in advance, so that attentive respondents can estimate with confidence the manner in which their individual responses will be scored.

Within the scoring methodology, various numbers of points are awarded for providing different types of information.¹³ For each questionnaire item, CDP assigns both a numerator score (the individual score for the item) and a denominator score (the maximum possible points for the item), wherein the denominator score for a given item may take different values depending on the response to a previous item (note that many items have a denominator score of zero, indicating that those items are not considered in computing the overall score). For both CDLI and CPLI, each firm's score is the sum of all numerator scores divided by the sum of all denominator scores. The CPLI performance bands are set by CDP based on the overall distribution of tabulated scores.

Based on our analysis of CDP scoring methodology, there are three general criteria by which CDP assigns points (for both CDLI and CPLI) based on individual questionnaire responses. The first criterion is by awarding a set number of points based on whether a respondent selected a specific option or series of options from discrete choice drop-down menus, or entered numerical data upon request. These provide a convenient way for a dispassionate observer to objectively analyze disclosures between companies. A second criterion is by awarding points based on whether a free text response meets a number of clearly specified criteria. While difficult to analyze quantitatively, CDP employs teams of analysts who review these responses and assign scores based on how well the text response meets those criteria.¹⁴ The third criterion is by awarding points based on the content of an uploaded document and how well it meets the clearly specified criteria. Many of the questionnaire items request corporate information that is often proprietary and may not be accessible or otherwise verifiable through other public disclosures. In this way, CDP offers a compelling advantage over other types of ratings in that it is able to obtain (and make public) potentially proprietary information from a broad range of firms that may not

¹³As of June 2017, the 2015 CDP Scoring Methodology document may be retrieved online at <https://www.cdp.net/Documents/Guidance/2015/CDP-climate-change-scoring-methodology.pdf>

¹⁴CDP does not provide access to its raw, itemized scores.

otherwise be disclosed. A downside of this information is that it may often not be objectively verifiable from other third-party information intermediaries. Users of the data thus rely on the accuracy of the self-report and must be wary of incentives created that may influence firms to respond in a particular way.

DATA AND MEASURES

We address the extent to which firms engage in symbolic management through detailed analysis of microdata contained within individual CDP questionnaire responses. This analysis yields several novel measures that enable a test of the degree to which symbolic disclosure is detected by CDP (hypothesis 1), as well as a test for the degree to which other disclosure signals sent by firms reliably indicate substantive management (hypotheses 2 and 3). Note that with our sample we are unable to directly estimate the effectiveness of CDP scoring methodology on emissions performance, as actual emissions figures are all self-reported and most firms in the sample are not subject to regulated emissions measurement and disclosure. We use CDP scores and detailed disclosures from years 2011-2015, which contain 8514 unique firm-year observations from 2087 individual firms.

VDE endorsement

Our dependent variable measure of information intermediary endorsement is CDP's Carbon Performance Leadership Index rating, or *CPLI*. We assign an ordinal scale to CDP's letter grade performance bands, where "A" equals 6 and "E" equals 1 (CDP includes a grade of "A-" which we score as 5). Characterization of the CPLI performance band score as explicit endorsement is appropriate; the CDP actively promotes the firms scoring "A" each year as members of its "A-list": those companies that are best "measuring, verifying, and managing their carbon footprints" (CDP, 2015).

Motivation for endorsement

To understand a firm's motivations to obtain a higher CPLI score, we require a measure of general competence and higher attentiveness to the finer details of the scoring methodology. A firm that is highly motivated to achieve a high CPLI score will be more attentive to the content and incentives set forth in the CDP scoring methodology. We therefore define *Attentiveness* as the ratio of points awarded (or otherwise enabled; see below) through simple drop-down and quantitative input questionnaire items to the maximum number of points achievable for those items. A higher *Attentiveness* score signals that a firm is not only more aware of the implications of certain questionnaire responses on its CPLI score but also more motivated to increase its score.

The CDP questionnaire and scoring methodology offers firms the opportunity to score CPLI numerator points by simply selecting a certain choice (or combination of choices) from drop-down menu discrete choice questionnaire items. By selecting the appropriate response choice as indicated by the CDP scoring methodology document, firms are either directly awarded points or gain eligibility to receive points on a corresponding text response to a subsequent question. If the appropriate choice is not selected, firms automatically receive zero points regardless of what is contained in the corresponding text response. Whereas we do not subjectively code subsequent text responses for potential points, firms signal intent to obtain these points by selecting the appropriate discrete choice response. For purposes of analysis, we assign an indicator variable with value 1 for each such response made by a given firm in a given year, and value 0 for any such response that ensures zero CPLI points awarded by CDP. We then weight those indicators by the number of eligible CPLI denominator points enabled by the appropriate drop-down menu selection. The variable *Attentiveness* is then coded as the total eligible CPLI points divided by the maximum number of points possible (i.e. if all such indicators were scored 1) in a given year; thus *Attentiveness* of 1 indicates that a firm has scored the maximum number of points possible for these questions in a given disclosure year. A firm that demonstrates higher attentiveness is both more motivated to achieve a higher CPLI and more aware of the effects an individual questionnaire response has on its CPLI. Figure 3 shows the simple correlative

relationship of *Attentiveness* to *CPLI*. Note that this relationship effectively describes the path from “Motivation” to “VDE Endorsement” in the theoretical model described by Figure 1 earlier.

Insert Figure 3 about here.

To aid with intuition on the concept of attentiveness as a measure of both motivation and competence, consider that CDP made minor changes in its scoring methodology each year during the study period in order to add or remove emphasis from various aspects of firm disclosure and performance on aggregate scores. As the questionnaire content remained fairly consistent throughout the study period, most such changes involved updates to the number of CPLI points awarded for various responses. We consider such inter-year scoring changes as exogenous “shocks” that influence firm behavior. However, firms that change their response to a particular disclosure question when CDP changes the number of performance points awarded for a target response to the question may or may not be directly responding to the scoring incentive. In order to identify whether response changes are influenced by the scoring change or some other, unobserved factor, we can compare the propensity to change response relative to some comparable “control” question. This yields a quasi-experimental method for identifying attentiveness to changes in the scoring methodology. As an example, Figure 4 shows the results of a quasi-experiment on the change in CPLI points awarded from 2014 to 2015 for having a C-level executive or board member sign off on the firm’s CDP questionnaire response. The solid line shows that the proportion of respondents claiming this governance measure more than doubled after CDP awarded CPLI points for doing so in 2015. To check for exogeneity of this effect, a control question (“Where is the highest level of direct responsibility for climate change within your organization?”) that had no change in scoring is shown by a dashed line; almost no change in aggregate response to this question was observed in the same time frame. Though not a true experiment (no random assignment, all subjects receive treatment), a “treatment effect” of roughly 140 percent presents compelling evidence of attentiveness to scoring methodology.

Importantly, *Attentiveness* is neither a signal of substantive nor symbolic management; a more specific measure of symbolic management is thus required.

Insert Figure 4 about here.

Symbolic management

The CDP questionnaire format and performance scoring methodology was fairly consistent over the years sampled (2011-2015), which motivates a novel approach to identification of symbolic management. Firms that are willing to indicate compliance with target performance along some measure of interest (as specified by CDP scoring methodology), without engaging in costly measures to actually achieve that performance, are engaging in symbolic management. We focus on firm disclosure responses to discrete choice drop-down menu questionnaire items. The premise behind this approach is that such information disclosures require no special preparation and are often difficult to verify externally. Such discrete choice questionnaire items thus represent low-hanging fruit for firms seeking to improve scores and willing to tolerate the risk that the symbolic disclosure might be detected by a third party. One way to establish presence of symbolic management is to identify internal inconsistencies within a firm's disclosure that directly benefit its score, either in the current year or comparing across years.

We define *Inconsistency* as some aspect of a firm's CDP disclosure in a given year that contradicts information disclosed by the same firm in the prior year. The nature of most questionnaire items allows for firms to improve their score over the previous year by implementing policies or practices that are rewarded by the CDP scoring methodology. However, each year CDP offers three specific opportunities for firms to score CPLI points in a way that may contradict previously disclosed information: reporting of absolute GHG emissions, revenue intensity of emissions (i.e. emissions per unit revenue), and employment intensity of emissions. Firms score CPLI points in a given year if they claim a decrease in emissions relative to the previous year specifically due to "emissions reduction activities", but are not requested to report

their previous year emissions. We exploit the panel data structure of firm CDP disclosures over time to effectively audit each firm's claim for emissions decreases. We assign an indicator variable for the response to each of the three emissions decrease items. Firms that claim an emissions decrease that contradicts the current and prior year levels of disclosed emissions are scored an indicator value of 1 for that year, otherwise 0. The binary variable *Inconsistency* takes the value 1 when any one or more of the three item indicators is present, otherwise 0. We also assign an alternate ordinal measure that is calculated as the total number of inconsistent disclosures a firm makes in a given disclosure year, thus ranging from 0 to 3.

There are a number of reasons why firms may need to "restate" prior year emissions, which could render our audit methodology inconclusive. However, each year CDP offers firms the opportunity to restate aspects of prior year disclosures. We compile the most recent prior year disclosure (whether original or restated) as the baseline for emissions reduction claims, reducing the possibility that firms may be legitimately reporting an emissions decrease that contradicts prior year disclosures. More importantly, it is plausible that a firm may simply err when providing information about its emissions trends relative to the prior year; an inconsistent disclosure as coded above may arguably be the result of incompetence in completing the questionnaire correctly.

A primary concern is whether internally inconsistent disclosures are truly an example of symbolic management or whether they are the result of fundamental errors in a responding firm's execution of the questionnaire response (i.e. incompetence). To demonstrate evidence that *Inconsistency* is associated with symbolic disclosure and not simply incompetence, we present two static analyses here pointing to the propensity of firms with temporally inconsistent emissions disclosures to be aware of their disclosed data. Across all disclosures, we find evidence that a substantial proportion of firms overstate their emissions reductions. Figure 5 shows the distribution of the difference between reported and actual emissions intensity for all firms that claimed an emissions reduction in a given disclosure year. Negative numbers indicate that reported emissions reductions are greater in magnitude than actual emissions reductions. Gray

bars correspond to firms whose claims are inconsistent with prior year disclosure (by definition all gray bars are left of zero), clear bars correspond to firms that reported consistently. Interestingly, most firms that reported consistently tended to understate their actual reductions. Two-sample t-tests of equal means are significant with test statistics of greater than 29; this indicates that firms are more likely to overstate emissions reductions when those claims are not consistent with actual performance.

Insert Figure 5 about here.

Next, we compare the distribution of *Attentiveness* between firms that produce inconsistent emissions disclosures and those that do not. Figure 6 below shows that firms that report inconsistent disclosures are significantly more attentive than firms that do not. A two-sample t-test of means is strongly significant, with t-statistic of greater than 17. Given our understanding of *Attentiveness* as a gage of a firm's motivation to increase CPLI, this result strongly suggests that inconsistent disclosures are a sign of symbolic management as opposed to incompetence. Note that this relationship effectively describes the path from "Motivation" to "Symbolic" in the theoretical model described by Figure 1 earlier.

Insert Figure 6 about here.

Assurance

Firms that obtain costly third party assurance of GHG emissions inventories may be more likely to pursue other policies and practices that lead to higher performance. The CDP questionnaire solicits disclosure on whether firms have obtained third party assurance. Unlike other CDP questionnaire items that rely on self-reported information, firms claiming third-party assurance for GHG emissions inventories are required by CDP to provide a formal certificate of assurance as

evidence. Firms that provide a certificate of reasonable assurance for GHG emissions are assigned an indicator variable *Reasonable* with value 1 and 0 otherwise; evidence of limited assurance for GHG emissions is assigned an indicator variable *Limited* with value 1, 0 otherwise.¹⁵

Control variables

Risk of audit is heightened when activist stakeholders suspect symbolic management. One signal available to firms is to disclose material risks via Forms 10-K or other regulatory channels.

Whereas disclosure of such risks is technically voluntary (in terms of the nature of risks disclosed) it is generally recognized as good practice to disclose all material risks in order to reduce the probability of future legal action in the event of stock price collapse or other shocks (Healy and Palepu, 2001). Given that certain stakeholders have developed sophisticated monitoring mechanisms, consistency in disclosure is important to avoid scrutiny. It follows that firms that disclose climate risks and strategies through regulated disclosure channels are less likely to engage in symbolic management. Firms that indicate such voluntary disclosure was made through Forms 10-K or other regulatory filings on their CDP questionnaire response are assigned an indicator variable *RegDisclose* with value 1, otherwise 0. Furthermore, firms that are subject to regulation via emissions trading schemes (ETS) or other carbon pricing mechanisms may be less likely to provide inconsistent disclosures of their GHG emissions. The indicator variable *ETSReg* takes the value 1 for firms subject to carbon pricing regulations, otherwise 0.

The effectiveness of management performance incentives as solution to the agency problem has been disputed (Westphal and Zajac, 1994). Long-term incentive plans are often symbolic and can deter from more substantive corporate governance controls (Westphal and Zajac, 1998). Furthermore, higher levels of performance incentives lead to greater risk taking and are associated with greater environmental harm (Minor, 2016). However, compensation incentives oriented toward environmental performance are be associated with a range of favorable outcomes (Flammer *et al.*, 2016). The indicator variable *MgmtIncentive* takes value 1 for firms that disclose

¹⁵Firms must provide evidence of assurance for both Scope 1 (i.e. direct) and Scope 2 (i.e. indirect) emissions to be designated by these indicator variables.

the presence of senior/executive management performance incentives for climate change related issues on their CDP questionnaire response, and 0 otherwise.

Firms that score in a lower *CPLI* performance band in a given year, particularly relative to other companies within the same industry, may be more motivated to improve performance in the following year (Chatterji and Toffel, 2010). We classify firms into industries according to their 4-digit GICS (Global Industry Classification Standard) code, and calculate the variable *LagRelativeCPLI* as the previous year *CPLI* minus the average *CPLI* of all other firms in the same GICS industry group. We use the integer representations of *CPLI* as discussed above, and the industry group average may take on a real (floating point decimal) number in order to better represent perceived distance. A positive value indicates the firm has a higher than average *CPLI* score within its industry group.

Larger firms tend to have greater public visibility and are often subject to greater scrutiny regarding environmental impacts. We use total assets as a relevant measure for firm size, and take the natural logarithm to account for the skewed distribution. Firm profitability is associated with greater resources and capacity for attention to environmental performance. We use the return on assets (ROA) measure of accounting profits. All financial performance variables are lagged one year to correspond with the CDP disclosure time frame. Financial performance data is obtained from Thomson-Reuters Datastream.

Firms with larger environmental footprints may be less prone to symbolic disclosure, considering heightened stakeholder scrutiny of environmental impacts (Lyon and Maxwell, 2011). A direct measure of environmental impact is provided by Trucost; the variable *ImpactRatio* corresponds to Trucost's assessment of the financial value of a firm's impact on environmental natural capital across a comprehensive set of emissions and resource extraction metrics. We take the natural logarithm of the ratio of a firm's estimated impact to its revenue. Finally, the variable *GHGIntensity* is the natural logarithm of Trucost data on estimated firm-level GHG emissions per unit revenue. Whereas Trucost estimates impact based partly on firm-level disclosures (including CDP), it augments those estimates using proprietary input-output modeling

based on sector-level data from multiple sources, including government census and surveys, industry reports, and other economic data.

METHODS AND RESULTS

Descriptive statistics

Table 1 contains a summary of descriptive statistics and covariate correlations. *Attentiveness* is highly correlated with *CPLI*, as predicted by Hypothesis 1 and illustrated in Figure ???. Several variables exhibit relatively high correlations with *CPLI* and *Attentiveness*, and an examination of variance inflation factors indicates multicollinearity is not a concern (all $VIF < 2$).

Insert Table 1 about here.

Empirical models

To test hypotheses 1, 2, 3a, and 3b, we evaluate the effect of symbolic disclosure on *CPLI*, controlling for attentiveness and other relevant factors as outlined above. The basic model is described as:

$$CPLI_{it} = \alpha Inconsistency_{it} + \beta Attentiveness_{it} + \gamma Assurance_{it} + \delta \mathbf{X}_{it} + c_i + s_t + \varepsilon_{it} \quad (1)$$

Subscript i denotes individual firm, and t corresponds to the year of CDP disclosure. Note that *Assurance* is a vector of assurance levels (*Reasonable* and *Limited*). \mathbf{X}_{it} is the a vector of control variables, c_i represents unobserved time-invariant firm-specific factors, s_t a vector of year dummies, and ε_{it} time-varying unobservables. The model may be estimated both as a linear model (by classifying *CPLI* as a discrete random variable) and as a nonlinear model (*CPLI* as an ordinal scale).

Our theory suggests that firms with greater *Attentiveness* are more likely to engage in symbolic management, regardless of the ultimate outcome (i.e. *CPLI*). By including additional interaction terms of *Inconsistency* and both levels of assurance on *Attentiveness*, we test for the moderating effect of these variables on the overall effect of *Attentiveness* on *CPLI*.

We test hypotheses 4a and 4b by evaluating the effects of disclosures and other firm characteristics on our binary measure of symbolic management, *Inconsistency*. This model is described as:

$$\mathbb{P}(Inconsistency_{it}) = F(\alpha LagRelativeCPLI_{it} + \beta Attentiveness_{it} + \gamma Assurance_{it} + \delta \mathbf{X}_{it} + s_t + \varepsilon_{it}) \quad (2)$$

Where F represents the logistic cumulative distribution function. The model may be estimated both using a logit fixed effects within estimator as well as a “pooled” logit estimator. Because a large subset of firms in the sample exhibit no variation in *Inconsistency* over time, the pooled estimator preserves the number of observations analyzed in the model and sacrifices the control over unobserved time-invariant firm characteristics offered by the within estimator. As with the first model, interactions between *Attentiveness* and the components of *Assurance* allow for estimation of marginal effects.

Empirical results

Factors influencing VDE endorsement

Results of the first analysis – identification of key factors influencing the *CPLI* score – are displayed in Table 2. All models use *CPLI* as the dependent variable and contain the same set of control variables. Models 1-4 employ a panel ordinary least squares (OLS) within estimator with firm-level fixed effects; each successive model adds additional explanatory variables. A Hausman test confirms that pooled OLS is inconsistent and indicates the use of fixed effects. Hypothesis 2 – that *CPLI* does not distinguish between substantive and symbolic disclosure – will be rejected

when the regression coefficient on *Inconsistency* is significantly different from zero; in other words, if the coefficient on *Inconsistency* is indistinguishable from zero, this indicates that *CPLI* does not distinguish between firms that make symbolic disclosure and those that do not (holding all other factors constant).

In Table 2, model 1 results indicate that symbolic management is positively associated with *CPLI*, which suggests that (without controlling for motivation) symbolic management is directly rewarded by CDP; the coefficient reported suggests that symbolic firms are roughly 12% more likely to achieve a higher *CPLI* performance band than substantive firms, all else held constant. However, model 2 results indicate that when controlling for *Attentiveness*, the presence of symbolic management has no discernible effect on *CPLI*. For a given level of *Attentiveness* (all other factors held constant), firms that engage in symbolic disclosure are no more likely to achieve a higher or lower *CPLI* performance band than firms that do not. Model 2 results provide strong support for Hypothesis 1. Moreover, taking the results from models 1 and 2 into context with the correlation analysis of *Attentiveness* and *CPLI* noted earlier shows that *Attentiveness* fully mediates the relationship between *Inconsistency* and *CPLI*; any variance in *CPLI* due to symbolic management can be fully explained by *Attentiveness*. Finally, comparing the within R^2 of the two models indicates that *Attentiveness* alone explains more than 20% of the variance in *CPLI* within an average firm over time. By failing to reject the null hypothesis that CDP does not differentiate between symbolic and substantive management, hypothesis 2 is supported.

Insert Table 2 about here.

Model 3 adds *Reasonable* and *Limited* assurance as explanatory variables, which show that obtaining reasonable assurance of GHG emissions inventories leads to roughly 17% greater likelihood of achieving a higher *CPLI* performance band, and obtaining limited assurance leads to roughly 39% greater likelihood. These results provide support for hypothesis 2a and partial support for hypothesis 2b. The two coefficients on assurance are significantly different from each

other with greater than 99% confidence, indicating that firms obtaining limited assurance tend to achieve higher CPLI performance bands than firms obtaining reasonable assurance. This counterintuitive result partly contradicts hypothesis 2b, which suggested that reasonable and limited assurance would be similarly rewarded by CDP, all else equal. To observe the degree to which the explanatory variables moderate the relationship of *Attentiveness* to *CPLI*, model 4 adds interaction terms between *Inconsistency*, both levels of assurance, and *Attentiveness*. Model 4 results provide further evidence of support for hypothesis 2, with both baseline and interaction term coefficients on *Inconsistency* not significantly different from zero. Perhaps more interestingly, either level of assurance leads to higher *CPLI* only over higher levels of *Attentiveness*, suggesting assurance is an additional expression of motivation to achieve higher level of endorsement. Furthermore, this effect is significantly more pronounced for limited assurance, relative to reasonable assurance. Figure 8 displays these marginal analyses graphically.

Insert Figure 7 about here.

Insert Figure 8 about here.

Of particular note among control variables, the presence of both climate-related management incentives and regulatory disclosures is consistently associated with higher CPLI over all four models. Firms that indicate performance incentives for executive managers linked to climate change management are roughly 9%, and other regulatory disclosure channels 6%, more likely to score a higher CPLI performance bands than firms that do not, all other factors held constant.

Several robustness checks confirmed the stability of results. Controlling for the presence of either level of assurance instead of both *Reasonable* and *Limited* produces results quantitatively similar to those on *Limited*; this is likely due to the substantially larger number of firms obtaining limited assurance than reasonable assurance. A quadratic term on *Attentiveness* (as well as all the relevant interaction terms) is significant, but the coefficients and marginal effects of the key

variables are relatively unchanged; only the linear *Attentiveness* models are reported here for ease of interpretation. Since inclusion of some other control variables (e.g. *ImpactRatio*, *GHGIntensity*) reduces the sample due to missing observations, we evaluated the results without these controls; the results do not change qualitatively.

Factors influencing symbolic management

Results of the second analysis – predictors of symbolic management – are shown in Table 3. All models take *Inconsistency* as the dependent variable and contain the same set of control variables. Models 1-4 employ a pooled logit regression without fixed effects; each successive model adds additional explanatory variables. A Hausman test indicates the pooled approach is consistent and contraindicates fixed effects, partly due to insufficient variation in the dependent variable within firms over time. First, model 1 demonstrates the strong association of *Attentiveness* with symbolic disclosure, consistent with the measure validity discussion above. Next, model 2 adds *LagRelativeCPLI*; its coefficient is negative and significant, suggesting that firms in a higher CPLI performance band than the average of all scored firms in the same industry are less likely to engage in symbolic disclosure. Model 3 adds *Reasonable* and *Limited* assurance as explanatory variables; both coefficients are negative and significant, and are not significantly different from each other, suggesting that firms that obtain either type of assurance are less likely to engage in symbolic disclosure.

Insert Table 3 about here.

Model 4 adds interaction terms between both types of assurance and *Attentiveness*, providing a more rigorous test of Hypotheses 4a and 4b. Marginal effects analysis on the interaction terms indicates that whereas obtaining limited assurance does not significantly signal the absence of symbolic management (providing support for hypothesis 4a), firms that obtain reasonable assurance are significantly less likely to engage in symbolic disclosure over most levels of

Attentiveness. The marginal effects are strongest in the mid-range of *Attentiveness*, with roughly 10% lower probability of symbolic disclosure. See Figure 9 for marginal effects plots.

Insert Figure 9 about here.

Among control variables, *MgmtIncentives* has a negative effect on probability of symbolic management, though only with roughly 83% confidence. Firms that report climate-related performance incentives for executive managers are somewhat less likely to engage in symbolic management through CDP. The magnitude of a firm's GHG emissions intensity (per unit revenue) is significant; firms with higher GHG emissions intensity are less likely to engage in symbolic management. Finally, firm accounting profitability (*ROA*) is positively associated with probability of symbolic management. Figure 11 revisits the theoretical model with effect sizes summarized; note that only the interaction term coefficients are listed on the assurance effects.

Insert Figure 10 about here.

Insert Figure 11 about here.

DISCUSSION

The results summarized above suggest a number of compelling observations about the prevalence of symbolic disclosure through VDEs. First, the finding that symbolic disclosure (*Inconsistency*) has no significant effect on CDP's level of endorsement indicates that firms engaging in symbolic management are generally successful at concealing their true performance despite the relatively strong requirements set forth by CDP's questionnaire. This finding is of significant importance; whereas prior research has suggested that CDP and other VDEs do not lead firms to a significantly higher level of performance on dimensions of concern (see Cho *et al.*, 2012;

Matisoff, 2013; Milne and Gray, 2013), our findings cast additional doubt on the ability of VDEs to consistently ensure a higher level of transparency. As CDP gained institutional credibility over time (see Figure 2), it arguably has inadvertently shifted from a powerful mechanism of transparency toward just another sustainability rating system. Given the broad awareness and deep penetration of CDP scores into evaluation criteria of institutional investors and other stakeholders, CDP's success has changed incentive structures for firms to strategically disclose information on the climate-related performance and risk management, and not always for the better. Institutional theory has suggested and provided support for Campbell's Law: as the use of a ratings system becomes more widespread, corruptive pressures begin to dissipate the substantive meaning that originally made the ratings credible (Espeland and Sauder, 2007); our results are consistent with this notion. We posit our theory of the VDE as a "credibility shield" as an explanation. Sophisticated firms recognize that unaudited and unsubstantiated voluntary disclosure of nonfinancial performance is subject to stakeholder scrutiny, and symbolic disclosure under such pretense carries risk of backfire (Ashforth and Gibbs, 1990). With a clear record of how disclosed performance will be rated (e.g., the CDP scoring methodology), enterprising firms are better able to identify opportunities for symbolic disclosure with lower risk of detection and thus seek to achieve CDP endorsement to enhance the credibility of their claims and reduce overall stakeholder scrutiny.

This study also contributes to our understanding of the role of external assurance in not only verifying corporate disclosures but also as an additional signal of credibility when a firm's "type" is not observable. The results of tests of both hypotheses 3a/3b and 4a/4b are perhaps best considered in reverse order. The second model analysis (hypotheses 4a/4b) indicates that while reasonable assurance has a significant negative relationship with symbolic management (as expected), limited assurance does not differentiate the presence of symbolic management. The former result provides empirical evidence consistent with recently developed economic theory; assurance serves primarily as a signaling mechanism, where substantive firms have sufficient incentive to incur the additional cost of obtaining a higher level of assurance in order to

differentiate from lower performing firms (Bagnoli and Watts, 2017). The latter result is comparable to the test of hypothesis 2; neither VDE endorsement nor lower quality of assurance are sufficient to credibly convey the substantiveness of a firm's disclosure. Moreover, the observation that the negative association between reasonable assurance and symbolic management is attenuated at high levels of motivation (see Figure ??) further corroborates the notion that strategic motivation for VDE endorsement may lead firms to respond to perverse incentives offered by the VDE's credibility shield. This has important implications for the practice of assurance and its interpretation by stakeholders, regulators, and other third party intermediaries. Whereas the shortcomings of assurance practices have long been scrutinized by academics (e.g., Gürtürk and Hahn, 2016), our study provides direct empirical evidence of the ability of firms to obtain assurance for symbolic purposes.

Meanwhile, the results of the first analysis (hypotheses 3a/3b) indicate that firms obtaining limited assurance – particularly if they are strategically motivated – tend to achieve higher CPLI scores, whereas firms obtaining reasonable assurance do not. Taken in context with the analysis discussed in the preceding paragraph, this suggests that limited assurance is potentially just another tool available to any firm seeking to enhance the credibility of its disclosure among stakeholders, regardless of whether those disclosures are symbolic or substantive. The comparatively minor association between reasonable assurance and CPLI score further suggests that obtaining reasonable assurance is of limited value to most firms, given the additional cost associated. Overall, the mirrored results between reasonable and limited assurance on these two analyses suggest a striking contrast in credibility and utility between the two levels. While reasonable assurance provides a credible signal of substantive management, this signal appears to be undervalued by stakeholders and unrecognized by intermediaries. Moreover, limited assurance can augment the credibility shield for symbolic disclosure and help firms to achieve higher levels of VDE endorsement.

These results have significant implications for the credibility of CDP and VDEs in general. The promise of VDEs is to enhance transparency and truth in disclosure of corporate nonfinancial

performance, particularly in terms of social and environmental impacts. Many VDEs, including CDP, arguably deliver on that promise to a large extent (Matisoff, 2013; Fabrizio and Kim, 2016). However, all disclosure institutions – even regulated and audited financial disclosures – are imperfect in some way (Healy and Wahlen, 1999). Invariably, as such institutions achieve legitimacy and gain credibility, the institution’s endorsement of agent behavior becomes more valuable and frames incentives. The degree to which those incentives drive improved firm performance more than they motivate symbolic management is not addressed in this study; however, disclosure institutions must evolve to deal with these threats to credibility and ultimately legitimacy. For example, CDP has begun to overhaul its performance rating system, ostensibly raising the bar to attain its “A-List”, and arguably to mitigate the risk of manipulation highlighted by this study. Integrating other corroborating signals may further strengthen the value of a VDE’s data and assessments; CDP already engages with a number of other organizations (e.g., Global Reporting Initiative, RepRisk AG) to work toward integrated and interdependent performance assessments. Moreover, incorporating a validation model that rewards consistency not only internally, but with other channels of voluntary and regulated disclosure, can add credibility to assessments.

This study is not without limitations; whereas symbolic firms typically employ multiple diverse methods to manipulate disclosures (Healy and Wahlen, 1999), we derive a single measure of symbolic management. Our measure *Inconsistency* was relatively simple to derive and stands up to rigorous validation. Other methods of symbolic disclosure may yet be pervasive within the data but substantially more difficult to tease out. We suggest that future research might compare and verify self-reported data through VDEs against other public disclosures or information, and hope that this study may help motivate additional investigative efforts into the quantitative minutiae of disclosures. Furthermore, our sample is necessarily limited to CDP respondents; whereas firms endogenously select into this group, all analyses were designed within the context of already choosing to prepare a disclosure to CDP. As our interest is in evaluating propensity of symbolic disclosure through this specific VDE, non-disclosing firms are arguably not relevant.

We do note that some firms disclose to CDP but choose to keep their disclosures confidential; we categorize such firms as non-disclosers and necessarily omit them from the sample.

CONCLUSION

This study offers a number of theoretical and empirical contributions to knowledge of symbolic management in voluntary corporate disclosures. First, we synthesize a theory of voluntary disclosure evaluators based on two disparate branches of theory (institutional and economic) typically used in the literature to describe the phenomenon of voluntary disclosure. Our theory articulates the idea of VDEs as “credibility shields” for firms seeking to enhance stakeholder perceptions of nonfinancial firm performance, and also promotes the selection among different levels of assurance as different signals of firm motivations in strategic disclosure. In articulating the role of VDEs as credibility shields, we offer a novel analysis of VDEs that extends beyond the motivation to simply disclose generally covered in the literature, and into the motivation to enhance the level of VDE endorsement obtained. Through forensic analysis of detailed firm disclosures to CDP, we develop empirical measures of both this motivation for endorsement and symbolic management. Our analytic results provide new empirical evidence both of symbolic management through VDEs and of the use of different quality levels of third party assurance by firms to either signal substantive management or provide additional external credibility for symbolic management. The study offers useful guidance both for design of VDE measures and methods and for stakeholders that make use of VDE endorsements that may reduce the incidence of symbolic management and its resulting inefficiencies.

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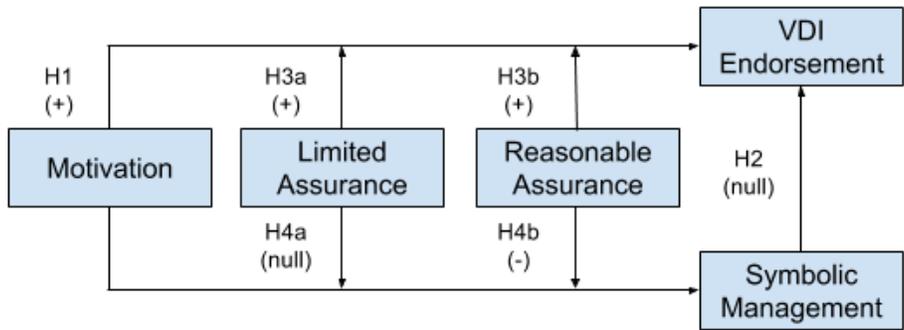


Figure 1: Theoretical model

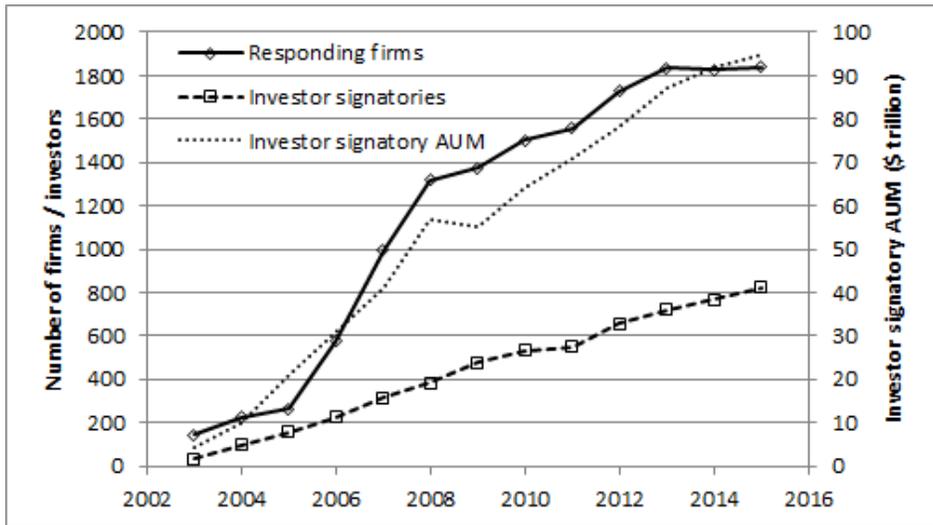


Figure 2: Corporate disclosures and investor signatories to CDP

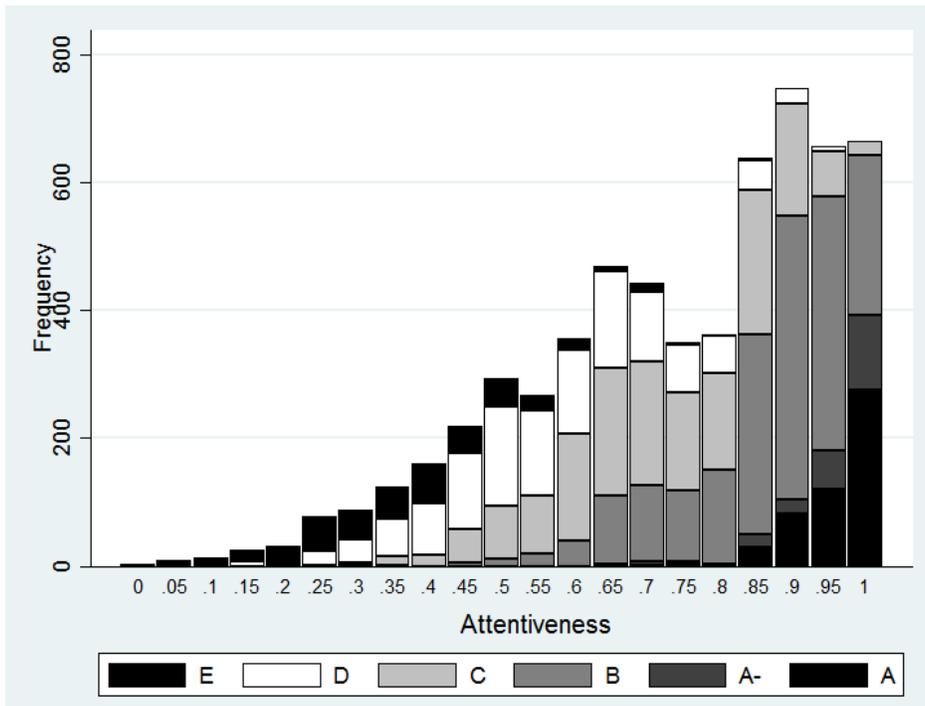


Figure 3: Stacked histogram of CPLI performance bands by attentiveness

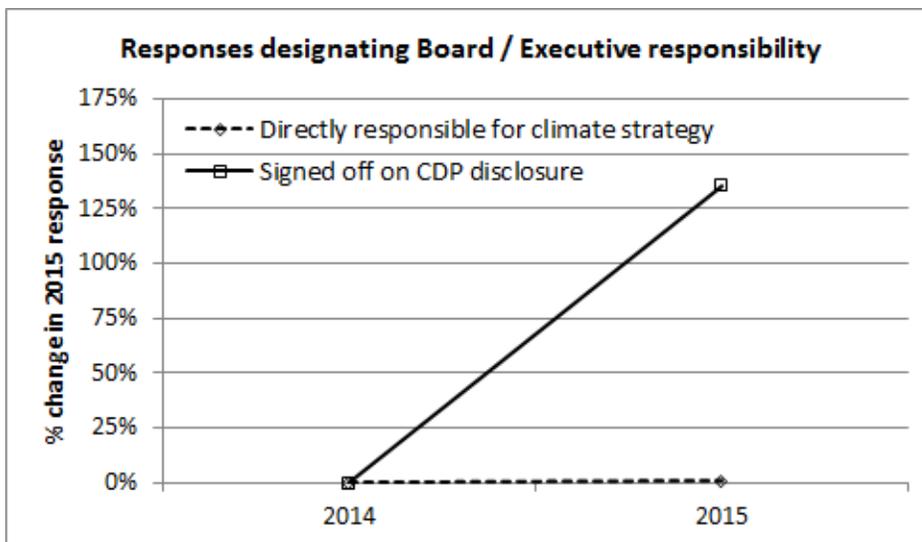
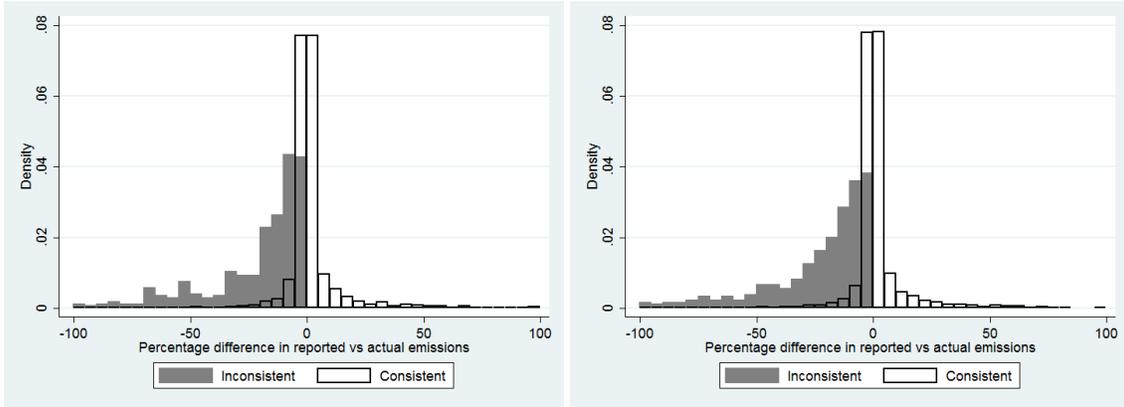


Figure 4: Quasi-experiment demonstrating attentiveness to changes in scoring method



(a) Revenue intensity of emissions

(b) Employment intensity of emissions

Figure 5: Magnitude of inconsistency in emissions reduction claims

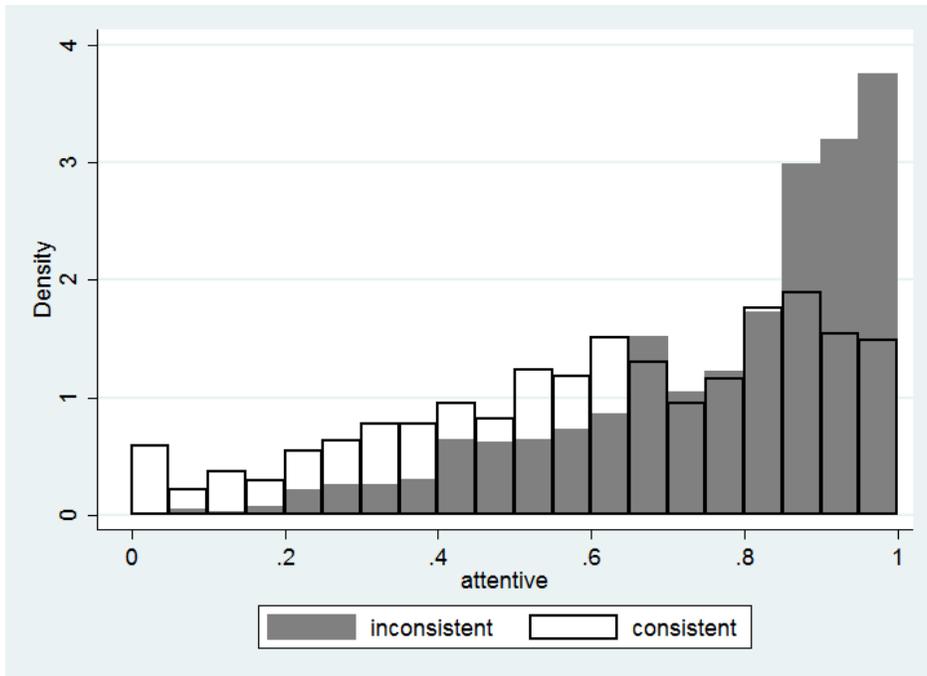


Figure 6: Firms that make inconsistent emission reduction claims are more attentive

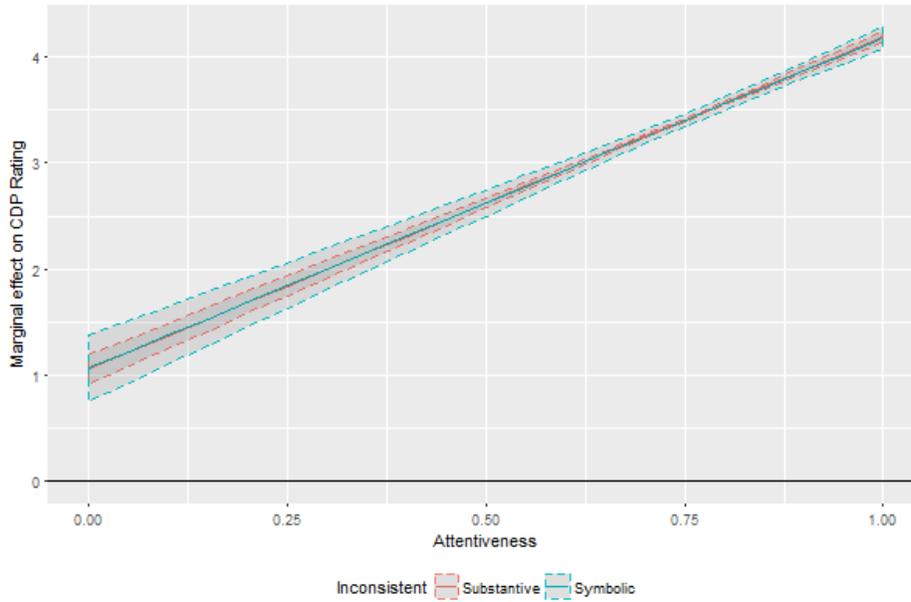


Figure 7: Marginal effects of inconsistency on CPLI, over attentiveness

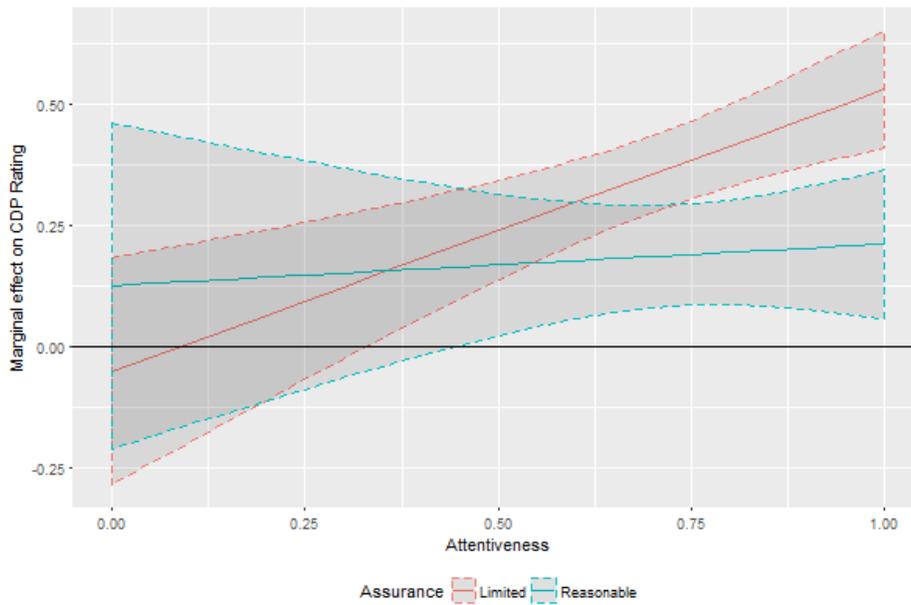
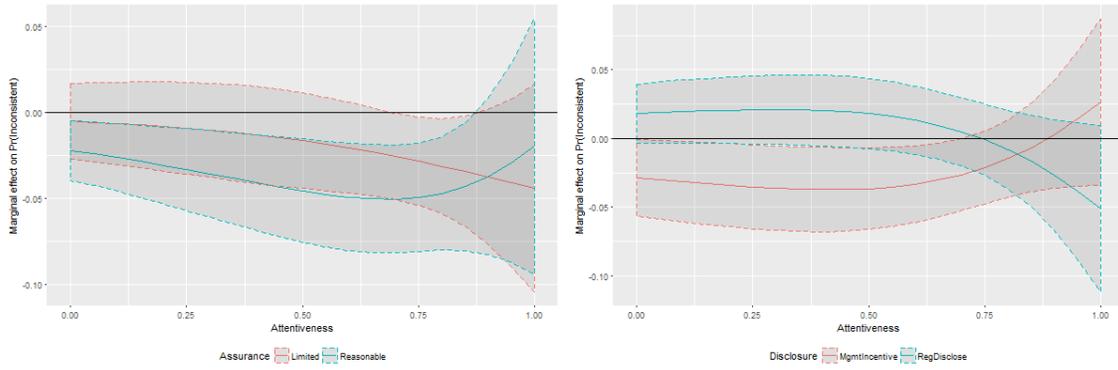


Figure 8: Marginal effects of assurance on CPLI, over attentiveness



(a) Reasonable vs Limited Assurance (b) Regulated Disclosure and Mgmt Incentives

Figure 9: Marginal effects on inconsistency, over attentiveness

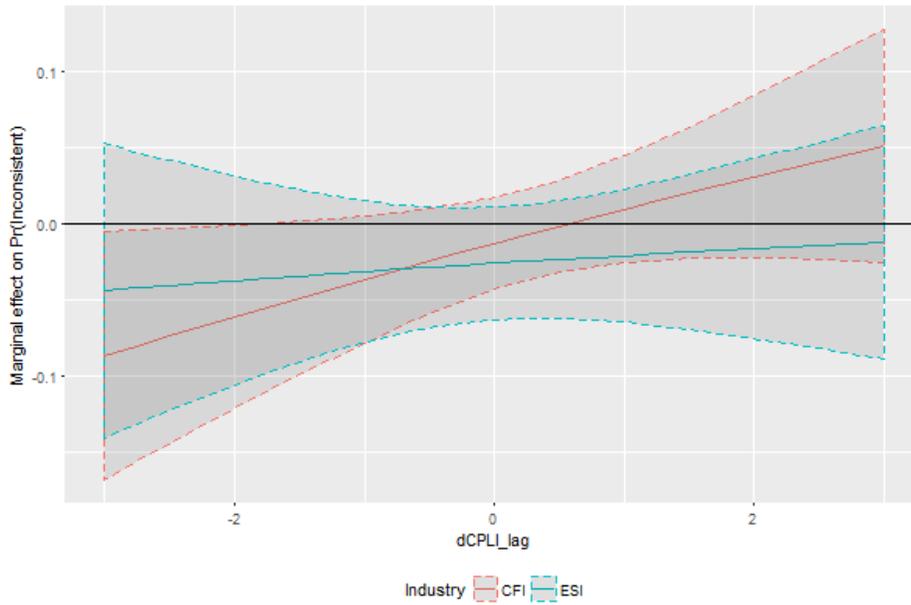


Figure 10: Marginal effects of industry on inconsistency, over relative CPLI rating

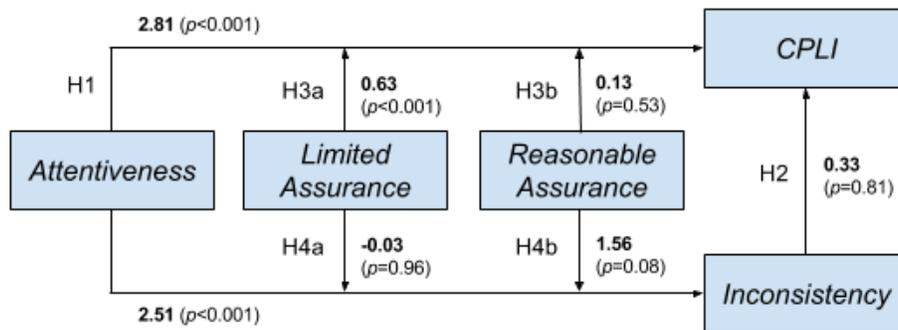


Figure 11: Effect sizes

Table 1: Covariate summary statistics and correlations

| | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------------------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 1 <i>CPLI</i> | 3.27 | 1.28 | 1.00 | | | | | | | | | | | |
| 2 <i>Attentive</i> | 0.64 | 0.26 | 0.74 | 1.00 | | | | | | | | | | |
| 3 <i>Inconsistency</i> | 0.06 | 0.25 | 0.09 | 0.15 | 1.00 | | | | | | | | | |
| 4 <i>Reasonable</i> | 0.14 | 0.35 | 0.13 | 0.13 | 0.01 | 1.00 | | | | | | | | |
| 5 <i>Limited</i> | 0.38 | 0.49 | 0.40 | 0.31 | 0.03 | -0.33 | 1.00 | | | | | | | |
| 6 <i>RegDisclose</i> | 0.28 | 0.45 | 0.20 | 0.21 | 0.04 | 0.06 | 0.14 | 1.00 | | | | | | |
| 7 <i>MgmtIncentive</i> | 0.52 | 0.50 | 0.36 | 0.44 | 0.04 | 0.10 | 0.14 | 0.14 | 1.00 | | | | | |
| 8 <i>ESI</i> | 0.14 | 0.35 | -0.02 | -0.03 | -0.04 | 0.06 | -0.07 | 0.10 | 0.07 | 1.00 | | | | |
| 9 <i>CFI</i> | 0.13 | 0.33 | -0.00 | 0.02 | 0.00 | -0.05 | 0.01 | -0.01 | -0.02 | -0.29 | 1.00 | | | |
| 10 <i>ln Assets</i> | 15.9 | 1.84 | 0.29 | 0.24 | 0.02 | 0.09 | 0.19 | 0.01 | 0.13 | -0.02 | -0.14 | 1.00 | | |
| 11 <i>ROA</i> | 5.68 | 8.23 | -0.03 | -0.03 | 0.02 | -0.02 | -0.01 | -0.03 | -0.02 | -0.07 | 0.13 | -0.25 | 1.00 | |
| 12 <i>ln GHGIntensity</i> | 3.94 | 1.86 | 0.03 | 0.03 | -0.03 | 0.04 | -0.05 | 0.08 | 0.11 | 0.63 | -0.10 | -0.18 | -0.02 | 1.00 |

Table 2: Factors influencing VDE endorsement (*CPLI*)

| | (1) | (2) | (3) | (4) | (5) |
|------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| <i>Inconsistency</i> | 0.104 (0.010) | -0.008 (0.828) | -0.006 (0.876) | -0.020 (0.894) | 0.009 (0.951) |
| <i>Attentiveness</i> | | 3.179 (0.000) | 3.094 (0.000) | 3.092 (0.000) | 2.849 (0.000) |
| <i>Reasonable</i> | | | 0.168 (0.002) | 0.168 (0.002) | 0.125 (0.467) |
| <i>Limited</i> | | | 0.376 (0.000) | 0.376 (0.000) | -0.053 (0.660) |
| <i>Attentiveness*Inconsistency</i> | | | | 0.018 (0.925) | -0.019 (0.923) |
| <i>Attentiveness*Reasonable</i> | | | | | 0.085 (0.701) |
| <i>Attentiveness*Limited</i> | | | | | 0.582 (0.000) |
| <i>RegDisclose</i> | 0.076 (0.063) | 0.074 (0.036) | 0.063 (0.068) | 0.063 (0.068) | 0.059 (0.085) |
| <i>MgmtIncentive</i> | 0.378 (0.000) | 0.134 (0.003) | 0.115 (0.009) | 0.115 (0.009) | 0.114 (0.010) |
| <i>ESI</i> | 0.080 (0.821) | -0.063 (0.811) | -0.055 (0.820) | -0.055 (0.819) | -0.036 (0.884) |
| <i>CFI</i> | 0.069 (0.569) | -0.043 (0.711) | 0.001 (0.990) | 0.001 (0.993) | -0.007 (0.952) |
| <i>ln Assets (lag)</i> | 0.024 (0.832) | 0.030 (0.748) | 0.006 (0.949) | 0.006 (0.948) | 0.016 (0.857) |
| <i>ROA (lag)</i> | -0.001 (0.694) | -0.000 (0.899) | -0.001 (0.785) | -0.001 (0.784) | -0.001 (0.812) |
| <i>ln GHGIntensity (lag)</i> | -0.072 (0.196) | -0.009 (0.853) | -0.004 (0.935) | -0.004 (0.935) | 0.001 (0.987) |
| Constant | 2.945 (0.125) | 0.322 (0.838) | 0.540 (0.719) | 0.539 (0.720) | 0.503 (0.741) |
| Observations | 5,098 | 5,098 | 5,098 | 5,098 | 5,098 |
| Within R^2 | 0.167 | 0.369 | 0.386 | 0.386 | 0.389 |
| Number of firms | 1,475 | 1,475 | 1,475 | 1,475 | 1,475 |

p-value in parentheses, based on two-tailed *t*-statistics

Robust standard errors (not displayed) clustered on firm

All models include firm and year fixed effects

Table 3: Factors influencing symbolic management (*Inconsistency*)

| | (1) | (2) | (3) | (4) | (5) |
|--------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| <i>Attentiveness</i> | 2.491 (0.000) | 2.643 (0.000) | 2.488 (0.000) | 2.555 (0.000) | 2.577 (0.000) |
| <i>LagRelativeCPLI</i> | -0.119 (0.010) | -0.088 (0.065) | -0.091 (0.058) | -0.091 (0.057) | -0.134 (0.013) |
| <i>Reasonable</i> | | -0.335 (0.018) | -1.658 (0.030) | -1.505 (0.055) | -1.499 (0.056) |
| <i>Limited</i> | | -0.291 (0.009) | -0.257 (0.606) | -0.140 (0.781) | -0.109 (0.830) |
| <i>Attentiveness * Reasonable</i> | | | 1.575 (0.077) | 1.396 (0.130) | 1.388 (0.133) |
| <i>Attentiveness * Limited</i> | | | -0.017 (0.977) | -0.165 (0.792) | -0.212 (0.738) |
| <i>RegDisclose</i> | -0.069 (0.523) | -0.041 (0.708) | -0.047 (0.670) | 0.790 (0.074) | 0.786 (0.075) |
| <i>MgmtIncentive</i> | -0.147 (0.147) | -0.141 (0.165) | -0.136 (0.181) | -1.136 (0.030) | -1.145 (0.029) |
| <i>Attentiveness * RegDisclose</i> | | | | -1.063 (0.053) | -1.062 (0.054) |
| <i>Attentiveness * MgmtIncentive</i> | | | | 1.284 (0.048) | 1.285 (0.048) |
| <i>ESI</i> | -0.187 (0.240) | -0.197 (0.215) | -0.202 (0.205) | -0.203 (0.203) | -0.212 (0.182) |
| <i>CFI</i> | -0.067 (0.582) | -0.073 (0.547) | -0.072 (0.556) | -0.080 (0.514) | -0.106 (0.397) |
| <i>LagRelativeCPLI * ESI</i> | | | | | 0.029 (0.794) |
| <i>LagRelativeCPLI * CFI</i> | | | | | 0.180 (0.069) |
| <i>ln Assets (lag)</i> | -0.003 (0.912) | 0.012 (0.701) | 0.013 (0.676) | 0.016 (0.598) | 0.017 (0.586) |
| <i>ROA</i> | 0.020 (0.002) | 0.021 (0.001) | 0.021 (0.001) | 0.021 (0.001) | 0.021 (0.001) |
| <i>ln GHGIntensity</i> | -0.031 (0.356) | -0.030 (0.373) | -0.030 (0.369) | -0.028 (0.405) | -0.025 (0.449) |
| Observations | 3,836 | 3,836 | 3,836 | 3,836 | 3,836 |
| Number of firms | 1,307 | 1,307 | 1,307 | 1,307 | 1,307 |

p-value in parentheses, based on two-tailed *t*-statistics. All coefficients are pooled logit log-odds. Robust standard errors (not displayed) clustered on firm.