Organization Science

Publication details, including instructions for authors and subscription information:
http://pubsonline.informs.org

Greenwash vs. Brownwash: Exaggeration and Undue Modesty in Corporate Sustainability Disclosure

Eun-Hee Kim, Thomas P. Lyon

To cite this article:
Eun-Hee Kim, Thomas P. Lyon (2014) Greenwash vs. Brownwash: Exaggeration and Undue Modesty in Corporate Sustainability Disclosure. Organization Science

Published online in Articles in Advance 19 Dec 2014

. http://dx.doi.org/10.1287/orsc.2014.0949

Organization Science

Articles in Advance, pp. 1–19
ISSN 1047-7039 (print) | ISSN 1526-5455 (online)

http://dx.doi.org/10.1287/orsc.2014.0949

Greenwash vs. Brownwash: Exaggeration and Undue Modesty in Corporate Sustainability Disclosure

Eun-Hee Kim
School of Business, George Washington University, Washington, DC 20052, eunheek@gwu.edu

Thomas P. Lyon
Ross School of Business, University of Michigan, Ann Arbor, Michigan 48109, tplyon@umich.edu

Corporate greenwashing has accelerated in recent years, bringing in its wake growing skepticism about corporate green claims. Although a theory of the drivers and deterrents of greenwashing has begun to emerge, it is static in nature and does not incorporate the full range of ways in which firms can misrepresent their environmental performance. Our contribution is threefold. First, we extend the theory of organizational information disclosure to incorporate the possibility of undue modesty about a firm's environmental, social, and governance practices. Second, we hypothesize about the drivers of exaggeration and undue modesty based on which of a firm's stakeholders are salient at a given point in time; to do so, we place the firm within a dynamic context that has largely been missing in the prior literature. Third, we test our hypotheses using a data set that allows us to directly compare corporate green claims against actual performance. Results reveal that corporate output growth, deregulation, and low profits under deregulation significantly affect the choice between greenwashing and brownwashing. The effects of growth and profits are mitigated by external scrutiny.

Keywords: greenwash; brownwash; symbolic management; information disclosures; sustainability; greenhouse gas emissions
History: Published online in *Articles in Advance*.

Introduction

Pressure for companies to behave responsibly toward the environment has grown dramatically in recent years. Sales of "green" products are mushrooming, reaching more than $40 billion in 2011 (Neff 2012), and "sustainable and responsible investments" reached over $3 trillion in 2012 (U.S. SIF Foundation 2013). As social expectations for corporate responsibility have risen, many scholars and consultants have argued that it "pays to be green" (Porter and van der Linde 1995, Hart and Ahuja 1996, King and Lenox 2001).

The notion that it pays to be green actually runs counter to a large literature finding that environmental regulations are costly for firms (for a thorough and influential review, see Palmer et al. 1995). Indeed, the entire environmental regulatory paradigm is built on the idea that firms must be forced to make environmental improvements because they will find it costly and unprofitable, and thus they not do so on their own.[1] The U.S. Environmental Protection Agency (EPA) regulates greenhouse gases under the Clean Air Act, providing a valuable reminder that firms have fought climate regulation vigorously because they believe it will increase their costs (Shear 2013). Indeed, there is a large body of research finding that carbon regulation will impose costs on firms (Nordhaus 2007, Stern 2007, Aldy and Stavins 2011). Moreover, recent financial event studies confirm that under some circumstances, it may "pay be to be brown." Several more recent papers find that firms may experience negative abnormal returns when it is disclosed that they took environmentally friendly actions or won green awards (Jacobs et al. 2010, Fisher-Vanden and Thorburn 2011, Lyon et al. 2013). These papers do not advance and test specific mechanisms linking environmental performance and negative investor responses. However, they suggest that green firms incur unduly high costs, for which investors punish them. This inference is consistent with the large earlier literature that found it is costly for firms to be green. Apparently, Milton Friedman's dictum that the social responsibility of business is to maximize profits still has many adherents, who may sell shares of a firm seemingly engaged in what he called "hypocritical window-dressing" (Friedman 1970).

If being green is not always a "win–win" proposition, and firms face a tension between the demands of shareholders and pressures from secondary stakeholders, then they may have incentives to exaggerate their environmental accomplishments through their information disclosure strategies, i.e., to *greenwash* (Bansal and Clelland 2004, Ramus and Montiel 2005, Delmas and Burbano 2011, Kim and Lyon 2011, Lyon and Maxwell 2011, Lyon and Montgomery 2013, Marquis and Toffel 2013, Bowen 2014). Indeed, market research suggests that a very high percentage of corporate green claims are misleading (Terrachoice 2010), and revered advertising agency Ogilvy & Mather says that greenwashing

has reached "epidemic proportions" (Hsu 2011). The emerging literature on greenwash focuses on corporate decisions to (1) exaggerate favorable environmental performance so as to improve the opinion of one or more stakeholders, rather than (2) fully disclose both the negative and positive aspects of environmental performance or (3) simply remain silent (Delmas and Burbano 2011, Lyon and Maxwell 2011).

In this paper, we extend the theory of greenwash to include a fourth option: firms may choose to *brownwash* by issuing communications that *understate* their environmental achievements. Ullmann (1985) suggests that in view of the costs associated with social responsibility programs, firms may systematically underreport their activities in this area, but he does not conduct empirical tests, and the idea has not been explored in the subsequent literature. In light of the recent empirical research documenting that green credentials can harm share prices (Jacobs et al. 2010, Fisher-Vanden and Thorburn 2011, Lyon et al. 2013), it is thus important to expand the discussion to incorporate this possibility. Indeed, a recent article in *Forbes* magazine discusses why companies continue to struggle to implement sustainable approaches to doing business and mentions the possibilities of both greenwashing and brownwashing (Epstein-Reeves 2012):

> Investors, consumers, academics, non-governmental organizations (NGOs), reporters, and employees all have their own perspectives on what companies should and should not be doing. A company can be returning a profit to shareholders, only to find protesters at its door or lawsuits filed. . . . Companies struggle to inform employees, shareholders and stakeholders about how they are managing material, social and environmental issues. . . . Some companies overstate their impact. Other companies, out of fear of being attacked, understate their accomplishments or wind up not communicating at all.

Although the term "brownwash" has an environmental flavor, it should be apparent that our analysis applies to social and governance disclosures more broadly (as the quote above suggests), as well as environmental ones. Firms—especially if they are under financial pressure—might understate their charitable contributions, their expenditures on employee benefits, or their costly community development efforts. Similarly, firms might understate governance changes such as requiring the board to include union members or reflect racial or gender diversity.

Our analysis focuses on information disclosure decisions, but it is also relevant for the literature on the "decoupling" of organizations' formal structures and policies from actual implementation (Meyer and Rowan 1977, Pfeffer 1981, DiMaggio and Powell 1983, Westphal and Zajac 1998). Much of this literature studies situations where there is a lack of alignment between organizational policies and practices. For example, when there is a gap between the time of the commitment and the time implementation takes place (which might never happen), the organization is said to decouple its practice from its policy. This leads to a series of possibilities that parallel the first three disclosure options that we earlier identified in the greenwash literature. First, organizations may appear to be exaggerating their performance during the period before implementation, which parallels greenwashing. Second, over time, firms may tightly couple their rhetoric and their actions (Fiss and Zajac 2006, Hallett 2010, Tilcsik 2010, Bromley and Powell 2012, Sandholtz 2012), which parallels full disclosure.[2] Third, it is also possible for an organization not to announce a commitment at all, but rather to remain silent about a practice it has adopted (Bromley and Powell 2012). For example, the adoption of high-powered financial incentives for executives may be popular in the board room and among investors but not among labor unions or the general public; firms may thus have incentives not to highlight such an adoption publicly (Snellman 2012).

To the best of our knowledge, the fourth option, undue modesty, has not been explored in either the disclosure or the decoupling literatures. Thus, our analysis offers a new window on the relationship between rhetoric and reality in firm behavior. First, we show that firms have a broader range of options for communicating their social and environmental accomplishments than previously recognized—which, importantly, includes understating them. Second, we emphasize that stakeholders' preferences may change over time and that they interact with changing firm characteristics (such as output growth and profitability) to determine a firm's mix of rhetoric and real action.

To better understand when firms greenwash and when they brownwash, we offer a theory that explicitly includes investor pressures and that accounts for the dynamics of output growth and decline and their associated effects on the changing salience of different stakeholder groups over time (Mitchell et al. 1997). We hypothesize that stakeholders in the regulatory arena are more salient when the firm is growing and expects to face more frequent and more demanding interactions with them. In contrast, shareholders are the more salient stakeholder group when economic deregulation occurs and when profits are low.[3] Thus, firms highlight their favorable environmental performance when they are growing in order to build a green reputation that will improve stakeholder interactions, and they downplay their environmental commitments when investor pressure intensifies and profits are low. Empirically, we test these ideas using absolute growth and profits variables for each firm, and we conduct robustness checks using various relative measures (Aggarwal and Samwick 1999, King and Lenox 2000, Bizjak et al. 2008, Albuquerque 2009).

Of course, greenwashing is not without risk; if it is detected by external stakeholders, it may throw an organization's activities open to suspicion and reduce its

ability to obtain resources, legitimacy, or social support (Oliver 1991, Lyon and Maxwell 2011). On the other hand, brownwashing makes the firm look less environmentally friendly than it really is and may expose it to criticism from the media or from environmentalists. Thus, regardless of whether the firm is expanding or subject to greater shareholder pressure, we expect the firm to hew more closely to the truth when it experiences greater scrutiny from external stakeholders such as regulators or environmental activists.

Often, it is difficult or impossible to measure precisely the extent to which firms engage in greenwash. We overcome this challenge by focusing on U.S. electric utilities, for which we can construct greenhouse gas emissions estimates. We then compare reductions in firms' emissions over time to the reductions they reported to the U.S. Department of Energy (DOE) via the Voluntary Reporting of Greenhouse Gases Program. Kim and Lyon (2011) show that in the aggregate, participants in this program increased emissions over time but reported reductions, whereas nonparticipants actually reduced emissions. This paper explores the behavior of program participants in detail. A striking empirical observation emerges: although many participants overstate their emissions reductions performance, many others understate it. Our theory explains why this occurs and identifies the conditions in which undue modesty is to be expected.

A Dynamic Theory of Greenwash and Brownwash

As pressure for corporate environmentalism has grown, greenwashing has grown along with it, and a body of literature on greenwashing has begun to emerge (Ramus and Montiel 2005, Delmas and Burbano 2011, Kim and Lyon 2011, Lyon and Maxwell 2011, Lyon and Montgomery 2013, Marquis and Toffel 2013, Bowen 2014). This work can be seen as part of the larger literature on misleading corporate behavior. In organizational theory, this includes a large body of work on decoupling and symbolic management (Meyer and Rowan 1977; Pfeffer 1981; Westphal and Zajac 1998, 2013). In economics, there are large literatures on signaling (Spence 1973), partial disclosure (Milgrom 1981), and costly state falsification (Lacker and Weinberg 1989). In accounting and finance, there is a substantial body of work on selective disclosure (Verrecchia 1983, Shin 2003).

The literature suggests that greenwash is attractive when it can positively influence the opinions of consumers and investors regarding a firm or its products, but it is deterred by scrutiny from external stakeholders such as environmental activists who can detect and punish greenwashing (Lyon and Maxwell 2011, Lyon and Montgomery 2013) and by regulatory pressures (Delmas and Burbano 2011). In addition, firm characteristics (such as size, profitability, incentive structure, and organizational inertia) and individual characteristics of managers (such as optimistic bias and narrow decision framing) may influence greenwashing behaviors (Delmas and Burbano 2011).

However, the literature to date has ignored the possibility that greenwash may not necessarily influence the opinions of shareholders in a positive way. This is somewhat surprising given that Friedman (1970) long ago pointed out that managers might divert resources away from shareholder wealth maximization to indulge their own preferences for socially responsible actions. Thus, especially during difficult economic times, managers might prefer to divert attention from costly social and environmental initiatives. We expand the theory of greenwash by including brownwash in the portfolio of strategies that organizations may adopt in response to stakeholder pressure. To clarify when each response is observed, we also expand the existing literature's static depiction of the drivers of greenwash and present a theory that emphasizes the dynamic path of firm production and profitability, as well as their impact on the salience of particular stakeholder groups.

We theorize that a firm's output growth is an important and underappreciated factor that affects the incentives of stakeholders in the regulatory arena to monitor corporate behavior, and hence affects greenwashing.[4] Growth has been treated as a primary challenge for firms as they evolve (Penrose 1959, Mishina et al. 2004, Chen et al. 2012). Among the impediments to growth identified in the literature is a changing technological regime (Tushman and Anderson 1986, Dowell and Swaminathan 2006). We posit that with increasing expectations and requests for corporate social responsibility, growing firms are especially subject to stakeholder pressures to use the most advanced socially responsible technologies in their productions and operations, and that they respond in part by decoupling. That is, growing firms experience a particularly strong tension between external pressures for social conformity and internal needs for operational efficiency, and this in turn increases their incentives to greenwash. Earlier work argued that firms gain more from greening themselves substantively when industry growth is higher because investment in pollution prevention, organizational capabilities, reputation, and political acumen all have higher payoffs in fast-growing industries (Russo and Fouts 1997). We shift the focus from industry growth to the growth of the individual firm, and from substantive greening to greenwash.

We hypothesize that growing firms are more likely to engage in greenwashing because of their exposure to pressures arising from the need to maintain their "license to operate" as they expand. These include, for example, pressures from local zoning regulations and environmental regulations, both of which provide opportunities for a variety of stakeholders to provide input into the social

licensing process (Ingram et al. 2010). Enhanced support from external stakeholders can reduce opportunistic holdup by stakeholders with whom the firm has no explicit buyer or supplier contracts but whose cooperation is nevertheless required in order for the firm to create and capture value, thus increasing the probability that a business plan will proceed on schedule and on budget (Henisz et al. 2014). Thus, from a high-level perspective, because growing firms must maintain their license to operate, and because a green image can help in this regard, they have incentives to greenwash. In particular, when firms expand, through either modifying existing facilities or building new facilities, they must go through various regulatory approval processes (Environmental Law Institute 2007). These include the New Source Review (NSR) program as part of the Clean Air Act, under which new and modified air pollution sources are subject to preconstruction review and permitting (Decker 2003). When a firm wishes to expand or modify an existing plant, an NSR permit is required. Because NSR permits are issued on a project-by-project basis, depending on the frequency of modifications, a single plant can have several different NSR permits over the course of its operating life (Decker 2003). Evidence suggests that government regulators treat firms more favorably in the regulatory process when they have taken voluntary actions to improve their environmental performance, especially through participation in government-initiated programs. In particular, regulators ease the issuing of NSR permits for modification projects or new facilities (Decker 2003). Regulators also lessen the extent of scrutiny for firms that make voluntary environmental improvements, reducing the frequency of costly environmental inspections and enforcement actions (Innes and Sam 2008). Overall, growing firms thus have a greater need of strategies to build positive environmental reputations and regulatory relationships and stronger incentives to greenwash, especially via corporate involvement in programs that are under the aegis of government.

HYPOTHESIS 1. *Growing firms are more likely to engage in greenwashing.*

Given a firm's rate of growth, however, we also expect that closer scrutiny by external stakeholders lessens the extent of greenwashing (Delmas and Burbano 2011, Lyon and Maxwell 2011, Lyon and Montgomery 2013, Bowen 2014). Empirical evidence supports this notion as well. Firms were less likely to participate in the DOE's misleading voluntary greenhouse gas registry when they were headquartered in states with a higher density of Sierra Club members (Kim and Lyon 2011). Firms disclosed their environmental footprints more completely when they were headquartered in countries with a higher density of environmental NGO members (Marquis and Toffel 2013). Firms produced more substantive corporate social responsibility reports when they were more likely to be monitored by government authorities (Marquis and Qian 2014). In a similar fashion, we expect that firms will be less likely to engage in greenwashing when external stakeholders such as regulators and environmental groups exert greater scrutiny over the firm's representations.

An important question is whether increased scrutiny should have a direct effect on greenwashing or should serve as a moderator of the effect of growth on greenwashing. The papers cited in the previous paragraph find evidence of a direct effect of scrutiny on greenwashing, but they do not allow for the possibility of brownwashing. If external scrutiny pressures firms to connect rhetoric and reality more closely, then scrutiny should moderate both incentives to greenwash and incentives to brownwash. Thus, the direct effect of scrutiny on greenwashing and the direct effect of scrutiny on brownwashing will tend to cancel one another out, and it will be impossible to identify a direct effect of scrutiny. Instead, the specification needs to condition the effect of scrutiny on whether the firm is growing—hence tending to greenwash rather than brownwash—and we therefore treat scrutiny as a moderator of the effect of growth.

HYPOTHESIS 1A. *The effect of growth on greenwashing is attenuated by scrutiny from external stakeholders.*

Next, we identify circumstances under which brownwashing is more likely to occur. It has been suggested in the literature that firms may systematically underreport their social activities in order to disguise their associated costs (Ullmann 1985). Shareholders may suspect that the manager is pursuing social responsibility programs at the expense of other programs that can more directly further shareholders' interests (Friedman 1970, Ullmann 1985). Previous studies suggest that social responsibility programs are likely to have negative implications for firm performance in the short run, even if they are beneficial in the long run (Khanna and Damon 1999). Furthermore, recent empirical findings demonstrate that shareholders may respond negatively to a firm's environmentally friendly practices, echoing the large earlier literature that making environmental improvements is costly. For example, Jacobs et al. (2010) find that corporate voluntary emissions reductions generated on average a statistically significant negative return of -0.95% and that non-governmental awards met with a statistically significant negative abnormal return of -0.26%. Similarly, Fisher-Vanden and Thorburn (2011) find that the stock market responded negatively by -1% to corporate announcements of voluntary reductions in greenhouse emissions, as well as to announcements that a firm had joined the EPA's voluntary Climate Leaders program. Finally, Lyon et al. (2013) find that the Chinese stock market as well as the Hong Kong stock market responded negatively by roughly -0.8% to announcements that a privately owned firm had received a green

company award. In light of these findings, we posit that as investor pressure intensifies, shareholders become the most salient stakeholder, thereby creating pressure to avoid disclosing information about social and environmental practices that could raise the firm's costs.

One circumstance under which shareholders become a markedly more salient stakeholder group is when a firm undergoes a change from governance by rate-of-return regulation on capital investment to governance by competition. How firms manage the transition from a regulated to a deregulated environment has been a topic of interest in strategy research (Mahon and Murray 1980, 1981; Delmas et al. 2007; Kim 2013). In a regulated environment, firms are relatively shielded from pressure from shareholders because they are essentially governed by one or more industry-specific regulatory authorities. For example, electric utility companies are regulated by the Federal Energy Regulatory Commission (FERC) and by the state public utility commissions. Regulators can allow or forbid firms' actions that affect profitability, and they also directly determine the allowed rate of return on capital investment. Under these circumstances, regulators are inevitably the most salient stakeholder group. Deregulation, however, changes the scenario and exposes firms to greater uncertainty and risks, in particular with respect to rate of return. These increased risks naturally draw the attention of investors and force firms to weigh social and environmental spending more carefully and less favorably. Indeed, prior research has found that deregulation leads firms to reduce their substantive capital-intensive investments in environmental protection (Fowlie 2010). Thus, we expect shareholders to become the most salient stakeholder group under deregulation, and we hypothesize that this in turn pressures firms to withhold disclosure of costly social and environmental practices.

HYPOTHESIS 2. *Firms operating in a deregulated environment are more likely to brownwash.*

In a deregulated environment, salience of shareholders increases even further when profits are low because firms with low profitability face increased market scrutiny (Morrow et al. 2007). In Mitchell et al. (1997), shareholders are ordinarily classified as a "dominant stakeholder" because they possess power and legitimacy. But when the firm's profits are low, the urgency of responding can make shareholders the "definitive stakeholder," as was the case for several firms in 1993 when their performance plummeted, prompting the replacement of top managers at IBM, General Motors, and other firms (Mitchell et al. 1997). We thus hypothesize that incentives for firms to brownwash are enhanced when the firm's profits are low in a deregulated environment because the salience of shareholders as a group increases.

HYPOTHESIS 2A. *Low profits in a deregulated environment make a firm more likely to brownwash.*

Whereas shareholders become more salient when profits are low, external stakeholders are likely to become less salient (Mitchell et al. 1997). For example, when a firm's sales quantity declines, its environmental footprint automatically shrinks, just as a drop in U.S. greenhouse gas emissions created a modest silver lining to the Great Recession of 2008–2009 (Broder 2011). Thus, the urgency of the claims of environmental advocates is diminished. Nevertheless, these stakeholders remain relevant, and hence the definitiveness of shareholders during a period of low profits will be mitigated by the intensity of scrutiny from external stakeholders. Because brownwashing makes the firm look less environmentally friendly than it really is, it runs the risk of exposing the firm to criticism from the media or from environmentalists (Bansal and Roth 2000, Bansal and Clelland 2004, King 2008). Thus, even when profits are low, we expect the firm to hew more closely to the truth when it experiences greater scrutiny from external stakeholders such as regulators or environmental activists.

HYPOTHESIS 2B. *The effect of investor pressure on brownwashing is attenuated by scrutiny from external stakeholders.*

The Voluntary Greenhouse Gas Registry

The Voluntary Reporting of Greenhouse Gases Program was established by §1605(b) of the Energy Policy Act of 1992. The 1605(b) program provides a formal vehicle for companies to report their greenhouse gas emissions and their reductions of emissions over time. It allows public electronic access so that the public as well as government and firms can access the program's database.[5]

According to the DOE's voluntary greenhouse gas registry website,[6] the benefits of participation for firms are primarily in the form of publicity and improved relationships with regulators. A more strategic motivation, consultants advised, was that a "proactive stance that includes voluntary greenhouse gas emissions reduction efforts may delay regulatory action" (Trexler and McFall 1993, p. 69). Should regulatory action be unavoidable, participation would also be advantageous because it could establish a basis for requesting consideration of prior actions in a possible future 'credit for early reductions' program (U.S. Energy Information Administration 2005).

An important aspect of the voluntary greenhouse gas reporting program is that it was designed with few hard and fast rules about how to report reductions. Voluntary reporters could choose to report reductions at the "entity level" (entire firm) or at the "project level" (individual reduction project), and they could define the boundary of the entity or project. Voluntary reporters also had

leeway in either choosing a historical baseline emissions level or calculating a hypothetical one. Reporters could either report reductions in absolute emissions or report reductions in emissions intensity, and they could report indirect reductions or sequestration as well as direct reductions.[7] All this flexibility gave firms substantial ability to shape the presentation of their emissions profile.

The projects reported range from reducing emissions at the electric power generation, transmission, and distribution stages to demand-side management and carbon sequestration. Abatement strategies at the generation stage include switching from high- to low-carbon fuel sources, improving plant availability at low-carbon generators such as nuclear and hydro, plant efficiency improvement, increases in low- or zero-emitting generation capacity, decreases in high-emitting capacity, and retirement of high-emitting plants. Reductions at the transmission and distribution stages involve reduced losses in the delivery of electricity from power plants to end use through the use of high-efficiency transformers, transmission line improvements, etc. Demand-side management projects aim to improve end-use energy efficiency of both stationary and mobile sources in the industrial, commercial, residential, agricultural, and transportation sectors. Carbon sequestration projects report carbon fixing through afforestation, reforestation, etc. Projects on other greenhouse gases such as methane are also reported to the Voluntary Reporting of Greenhouse Gases Program.

Data and Methods

We have compiled U.S. investor-owned electric utility companies' data over the period 1995–2003 from various sources. The self-claimed greenhouse gas emissions reductions data were collected from the DOE's Voluntary Reporting of Greenhouse Gases Program website.[8] This program was established in 1994, went through a prolonged modification process starting in 2004, and has been suspended as of 2011 because of reductions in budget appropriations. Thus, the 1995–2003 period gives us the longest period over which the voluntary reporting data are both available and consistent.

Our sample is limited to those who participate in the DOE's Voluntary Reporting of Greenhouse Gases Program.[9] Firm-specific financial, operational, and fuel consumption and environmental performance-related data are based on the FERC Form 1 electric utilities report to the FERC and obtained from Platts, a company specializing in energy industry data. State-level variables were collected from a variety of sources, including the Sierra Club, the League of Conservation Voters, the U.S. Census Bureau's Government Employment and Payroll, the Environmental Protection Agency, and the Database of State Incentives for Renewable Energy. When firms operate in more than one state, we weight the state-level variables by the percentage of the firm's revenues that come from each state. The total number of participants is 54 investor-owned electric utilities over the period 1995–2003, with a total of 396 firm-year observations.

The biggest advantage of this database is that it allows us to directly compare firms' reported and actual greenhouse gas emissions reductions. As mentioned, we collected reported greenhouse gas emissions reductions from the DOE's Voluntary Registry website. We calculated actual greenhouse gas emissions reductions based on fuel consumption disclosed to the FERC. The FERC Form 1 data form the basis for most empirical work on electric utilities. They have been collected for decades, must be signed and certified as true by a corporate officer, and must be independently certified by a certified public accountant. Significant penalties can be applied to the corporate officer in charge of certifying the FERC Form 1 information, as well as to the company more broadly. None of this is true for the voluntary greenhouse gas reporting program, which thereby makes it inherently much less credible than the FERC Form 1.

To translate fuel consumption disclosed to the FERC to actual greenhouse gas emissions reductions, we first calculate the total carbon input using carbon coefficients (in million metric tons per quadrillion Btu): 25.97 for coal, 14.47 for natural gas, 17.51 for refinery gas, 19.95 for distillate fuel, 21.49 for residual fuel, and 27.85 for petroleum coke (U.S. Energy Information Administration 2004, p. 189). These estimates are then converted to carbon dioxide (CO_2) emissions by multiplying by 3.7, the molecular weight of CO_2 relative to carbon. This variable thus captures fossil fuel-based greenhouse gas emissions such as CO_2 and methane (CH_4) as CO_2 equivalents.

We take this approach rather than using direct observations from the continuous emissions monitoring system (CEMS) for two reasons. First, despite increasing interest in carbon capture and storage technologies to reduce carbon emissions from fossil fuel power plants, these technologies were not technologically or economically viable during our sample period.[10] Without end-of-pipe technology to reduce carbon emissions for the electric power industry, what goes in comes out. Accordingly, by using data on how much carbon content each type of fuel has and how much each type of fuel was used, we can calculate actual carbon emissions. Second, the Natural Resources Defense Council (NRDC) reported that turbulent flow in the emissions stack could bias the CEMS estimates upward by 10%–30%.[11] NRDC also found cases where the CEMS data deviate from the emissions estimates from the U.S. Energy Information Administration or the FERC when the latter two agreed for the most part. In these cases of discrepancies, NRDC used the FERC-based estimates. In cases where fuel consumption data were not available,

Table 1 Summary of Variables

Variables	Summary
Dependent variable	
Deviation between reported and actual emissions reductions	Continuous variable that indicates the difference between reported and actual emissions reductions (expressed as a percentage).
Independent variables	
Growth in output	Continuous variable that indicates percentage growth in output relative to year $t-1$.
Net income	Continuous net income variable.
Deregulation	Dummy variable that takes a value of 1 if the state enacted retail deregulation legislation or issued a regulatory order that year or in prior years and 0 otherwise. For each firm, it is weighted by the share of the electricity sales in each state.
Deregulation × *Net income*	Continuous net income variable interacted with deregulation.
Growth × *LCV*	Continuous growth variable interacted with *LCV score*.
Growth × *Sierra*	Continuous growth variable interacted with *Sierra Club density*.
Growth × *Enforcement*	Continuous growth variable interacted with *Enforcement*.
Deregulation × *Net income* × *LCV*	Continuous net income variable interacted with deregulation and *LCV score*.
Deregulation × *Net income* × *Sierra*	Continuous net income variable interacted with deregulation and *Sierra Club density*.
Deregulation × *Net income* × *Enforcement*	Continuous net income variable interacted with deregulation and *Enforcement*.
Control variables	
Sierra Club density	Sierra Club membership per thousand people at the state level.
Capacity factor	The ratio of energy generated to the maximum that could have been generated.
LCV score (average)	Average of the League of Conservation Voters scores for the U.S. Senate and House.
RPS index	State-level renewable portfolio standards.
Operating revenue	Revenue from sales of electricity ($ billion).
Changes in CO_2 emissions	Continuous variable that indicates percentage change in CO_2 (equivalent) emissions relative to $t-1$.
Number of subsidiaries	Number of subsidiaries.
Number of states	Number of states in which the firm operates.
Mergers and acquisitions	Dummy variable that indicates whether the firm is undergoing mergers and acquisitions.
State environmental spending	Percentage of state budget allocated to environmental issues.
State environmental employee	Percentage of state employees allocated to environmental issues.
Enforcement	State-level five-year formal enforcement actions associated with environmental issues normalized by the number of major facilities.

we supplemented the fuel consumption-based estimates with adjusted CEMS estimates to increase the number of observations.[12] Below we describe our variables in detail. Table 1 summarizes them.

Dependent Variable

Deviation Between Reported and Actual Emissions Reductions. We focus on the accuracy with which a firm's reported emissions reductions correspond to the actual change in its greenhouse gas emissions. To do so, we compute the difference between reported and actual emissions reductions, normalized by the firm's level of reported reductions. That is, we compute

$$X = \frac{R - A}{R},$$

where R is the reported level of reductions and A is the actual level of reductions. Compared with a simple measure of the gap between reported and actual emissions, which might be skewed by the presence of a few large firms, our measure is normalized by the size of the firm's reported emissions reductions. We could have normalized by dividing through by actual emissions reductions, but we chose to normalize by reported reductions because A can be negative if net emissions increased over time.

Using the continuous variable that measures the deviation between reported and actual emissions reductions as our dependent variable, we test the hypotheses related to the drivers of greenwash and brownwash. We use a specification with firm-level fixed effects because firm-level dummies are jointly significant ($F(53, 321) = 7.85$, P-value $= 0.0$), and the Sargan–Hansen statistic—the modified version of the Hausman test for clustered data—rejects the null hypothesis in favor of the fixed-effects specification (Sargan–Hansen statistic $=$ 867.923, $\chi^2(20)$, P-value $= 0.0$).[13] The residuals of our fixed-effects regressions show significant cross-sectional dependence (Pesaran's test of cross-sectional independence $= 14.899$, P-value $= 0.0$), and thus we estimate fixed-effects regressions with Driscoll–Kraay standard errors that are robust to cross-sectional dependence as well as robust to common panel problems,

i.e., autocorrelation and heteroskedasticity (Driscoll and Kraay 1998, Hoechle 2007).[14]

Independent Variables

Firm Growth. We focus on growth in output, which basically captures the growth in the amount of electricity generated. This measure has the advantage relative to sales revenue that it is not confounded by changes in price in measuring growth over time. Growth in output is calculated as percentage changes in annual output—that is, percentage changes in annual net generation for each electric utility (Gollop and Roberts 1983).

Profits. We hypothesize that underreporting of social activities is more likely to occur when firm profits are low in a deregulated environment. We measure firm profits with net income. Net income represents managers' primary fiscal responsibility and reflects bottom-line performance (Voss et al. 2006). In regulated markets, the central focus is on a firm's rate of return on assets, which can lead firms to overcapitalize (Averch and Johnson 1962). However, in deregulated markets, investors are free to pursue profit maximization directly (Fabrizio et al. 2007), which is better captured by net income. Since Hypothesis 2A focuses on deregulated markets, we use net income as an explanatory variable.

Deregulation. The U.S. Energy Information Administration provides the status of retail deregulation in each state, which has been used in prior studies (Delmas et al. 2007, Kim 2013).[15] To take into account the possibility that firm behavior may be affected earlier than the actual implementation of retail deregulation legislation (Fabrizio et al. 2007), we create a dummy variable that indicates either the enactment of legislation or the issuance of a regulatory order, whichever came earlier. Following Delmas et al. (2007) and Kim (2013), for each company we weight the dummy variable by the share of the firm's electricity sales in each state. For example, if a company sells 50% of its electricity sales in a deregulated state and the remaining 50% in a regulated state, the weighted deregulation variable for this company takes the value of 0.5.[16]

Interactions with External Scrutiny. We measure external scrutiny using three variables. The first is the average of the League of Conservation Voters (LCV) scores for political representatives in a firm's state. The LCV scores are based on the voting records of the representatives and senators in the U.S. Congress in favor of an environmental agenda, ranging from 0 to 100, with 100 being the highest score. Thus, the LCV scores measure the preferences of a state's elected representatives (Delmas and Montes-Sancho 2010) and to the extent legislators represent their constituents' preferences (Kassinis and Vafeas 2006), LCV scores also embody the citizens' general sentiment toward environmental issues (Delmas et al. 2007, Doshi et al. 2013).

The second variable is membership in one of the major environmental NGOs, the Sierra Club, at the state level. The Sierra Club is the largest and most influential grassroots environmental organization in the United States. Some Sierra Club chapters run websites titled "Don't be duped by greenwashing."[17] And the Sierra Club, along with Greenpeace, recently attacked greenwash ads from the oil sands industry.[18] This variable thus measures the extent of NGO pressure (Maxwell et al. 2000, Innes and Sam 2008, Sine and Lee 2009) and may also be considered to represent the environmental preferences of the population of the state in which a firm operates (Kassinis and Vafeas 2006, Delmas and Montes-Sancho 2010). We obtain this variable directly from the Sierra Club.

The third variable makes use of the number of state-level formal enforcement actions associated with environmental issues in the last five years, which is available from the EPA's Enforcement and Compliance History Online (ECHO) database. The five-year enforcement history has been frequently used in previous studies (see, e.g., Broulhle et al. 2009). We normalize the number of state-level formal enforcement actions associated with environmental issues by the number of EPA-regulated major facilities in the state, which comes from the ECHO database. This variable measures the extent to which a state inspects polluting facilities and takes enforcement actions against violators, thus indicating the intensity of regulatory scrutiny to which facilities are actually subjected in each state (Gray and Shimshack 2011).

Control Variables

We include a set of control variables to reflect important dimensions of firm heterogeneity and external environmental factors that may affect the deviation between reported and actual emissions reductions.

Firm Size/Visibility. Visible firms are more likely to be subject to external pressures (Meznar and Nigh 1995, Delmas and Montes-Sancho 2010). We thus explicitly control for firm size and visibility as measured by revenues (Patten 2002, Albuquerque 2009). In addition to being subject to greater pressures, large firms may enjoy economies of scale in compliance or have better access to capital markets and hence lower costs of new investments (Khanna and Damon 1999, Innes and Sam 2008).

Intrafirm Communication. Delmas and Burbano (2011) discuss how a lack of effective intrafirm communication can lead to greenwashing. Thus, we consider factors that might hinder effective intrafirm communication: the number of subsidiaries of a firm, the number of states in which a firm operates, and a dummy variable that indicates whether a firm is undergoing mergers and acquisitions. For firms with many subsidiaries, those operating

in many states, or those making adjustments between an acquiring firm and a target firm, effective intrafirm communication may be more challenging than it would be otherwise.

State's Resource Allocation. We control for a state's resource allocation for environmental issues generally, as represented in state budgets and employment (Kassinis and Vafeas 2006); specifically, we measure the ratio of state environmental budget relative to total state budget and the ratio of state natural resources employees to total state employees. The first variable captures the priority assigned to environmental issues and the second captures a state's long-term commitment to environmental protection and to building institutional capacity to support that commitment (Kassinis and Vafeas 2006). State employment data are collected from the U.S. Census Bureau's Government Employment and Payroll.[19] State budget data come from the Council of State Governments.[20] Because these variables include funds and employees devoted to a wide range of natural resources and environmental activities, we use them as indicators of overall state commitment to the environment, rather than scrutiny specifically.[21]

Renewable Portfolio Standards. Although there was no federal mandate to reduce greenhouse gas emissions during our sample period, for the electric power industry, the closest state-level regulatory restrictions are renewable portfolio standards (RPSs). An RPS typically requires that a certain percentage of electric utilities' electricity generation come from renewable energy sources. The variable we use is calculated by dividing the percentage goal stipulated in a state's RPS by the difference between the goal year and the enacted or effective year, whichever comes first (Kim 2013). State RPS data are obtained from the Database of State Incentives for Renewables and Efficiency (http://www.dsireusa.org).

Other Firm Characteristics. We include two variables designed to capture other potential sources of heterogeneity across firms related to carbon emissions. The capacity factor refers to the ratio of energy generated to the maximum that could have been generated; it is calculated by dividing net generation (in megawatt-hours) by nameplate capacity (in megawatts) times 8,760 (the number of hours in a year). Changes in CO_2 emissions refer to changes in CO_2 equivalent emissions; that is, the variable includes carbon-based pollutants other than CO_2. This variable captures changes in the overall portfolio of electricity generation from the perspective of greenhouse gas emissions.

Results

Table 2 provides summary statistics for the variables used in our analysis along with the correlations between each of the variables.

Most correlations are relatively low. Two measures of a state's resource allocation for environmental issues, percentage of state budget allocated to environmental issues and percentage of state employees allocated to environmental issues, are highly correlated with each other. We ran regressions alternating the two variables instead of including them together and the results are very similar. Interaction terms involving the external scrutiny variables are highly correlated. We thus include interaction terms separately in regressions.

Figure 1 shows the extent of decoupling for firms participating in the DOE's Voluntary Reporting of Greenhouse Gases Program, with the horizontal axis presenting the difference between reported and actual emissions reductions measured on a percentage basis and the vertical axis giving the corresponding probability density. The mean of the distribution is 2.5% and the median is 5.5%. The most frequent deciles of the difference between reported and actual emissions occur around zero. Thus, many firms engage in neither greenwashing or brownwashing.

We turn now to an empirical analysis of the drivers of greenwashing and brownwashing. Table 3 shows regression results using firm-level fixed effects with standard errors robust to autocorrelation, heteroskedasticity, and cross-sectional dependence.

We find support for Hypothesis 1, that growing firms are likely to overreport emissions reductions, with the coefficient consistently significant at the 1% level except in two models where the interaction term between growth and deregulation is included. Growing firms are likely to face more interactions with stakeholders in the regulatory arena and to participate in voluntary environmental actions to soften environmental regulatory pressures. Regarding Hypothesis 1A, we ran regressions with interactions between growth and our external scrutiny

Figure 1 (Color online) Deviation Between Reported and Actual Emissions Reductions

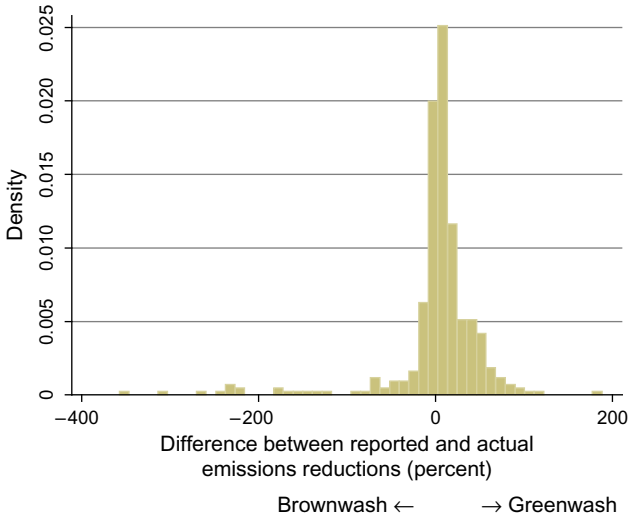

Table 2 Summary Statistics and Variable Correlations

Variable	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
(1)	2.475	53.58	1.00																						
(2)	1.722	1.119	0.12	1.00																					
(3)	37.81	21.146	0.16	0.47	1.00																				
(4)	0.112	0.310	−0.10	0.16	0.06	1.00																			
(5)	0.091	0.078	−0.01	0.25	0.40	0.30	1.00																		
(6)	1.835	0.807	0.02	0.15	0.01	0.03	−0.08	1.00																	
(7)	3.733	1.122	0.03	−0.05	−0.12	0.13	−0.12	0.65	1.00																
(8)	0.521	0.155	0.23	0.10	−0.04	−0.12	−0.22	−0.13	−0.21	1.00															
(9)	1.721	1.728	0.06	0.54	0.22	0.11	0.30	0.17	−0.05	0.07	1.00														
(10)	5.682	3.819	−0.14	−0.42	−0.26	−0.03	−0.18	−0.39	−0.15	0.18	−0.25	1.00													
(11)	1.429	0.924	0.09	0.16	0.00	0.07	−0.03	0.29	0.24	0.15	0.18	−0.12	1.00												
(12)	0.098	0.298	0.04	0.03	0.01	−0.04	−0.04	−0.08	−0.08	0.07	0.04	0.05	0.04	1.00											
(13)	0.007	0.170	0.18	−0.04	−0.02	−0.05	−0.09	0.05	0.02	0.12	−0.10	0.01	0.01	−0.07	1.00										
(14)	0.061	0.367	0.08	−0.01	0.04	−0.06	−0.06	0.07	0.04	−0.15	−0.07	−0.01	−0.03	−0.03	0.12	1.00									
(15)	0.166	0.288	0.08	0.27	0.11	0.13	0.13	0.13	−0.07	−0.01	0.58	−0.21	0.06	0.04	−0.07	−0.06	1.00								
(16)	0.352	0.460	−0.03	0.14	0.01	0.20	0.29	−0.48	−0.27	0.10	0.08	0.16	−0.08	0.07	−0.08	−0.06	−0.05	1.00							
(17)	0.051	0.172	−0.01	0.14	0.08	−0.02	0.20	−0.16	−0.15	−0.08	0.32	−0.02	0.00	0.05	−0.14	−0.07	0.49	0.39	1.00						
(18)	0.212	8.291	0.11	−0.07	−0.06	0.02	−0.11	0.05	0.06	0.08	−0.13	0.05	0.01	−0.07	0.87	0.09	−0.10	−0.07	−0.19	1.00					
(19)	0.004	0.335	0.11	−0.11	−0.06	0.02	−0.12	0.02	0.01	0.08	−0.14	0.03	0.00	−0.05	0.86	0.15	−0.10	−0.08	−0.22	0.89	1.00				
(20)	−0.001	0.029	0.09	−0.06	−0.05	0.01	−0.08	0.04	0.03	0.09	−0.11	0.03	0.01	−0.06	0.76	0.04	−0.09	−0.05	−0.18	0.90	0.76	1.00			
(21)	−0.004	0.132	0.10	−0.02	−0.01	−0.04	−0.05	0.02	0.03	0.04	−0.12	−0.01	0.00	−0.13	0.81	0.13	−0.08	−0.04	−0.16	0.71	0.73	0.72	1.00		
(22)	2.226	11.457	−0.04	0.18	0.18	−0.04	0.25	−0.08	−0.11	−0.12	0.31	−0.07	0.01	0.06	−0.14	−0.06	0.50	0.26	0.96	−0.21	−0.23	−0.19	−0.17	1.00	
(23)	0.116	0.761	0.00	0.18	0.11	−0.03	0.17	−0.01	−0.02	−0.08	0.24	−0.07	0.04	0.04	−0.10	−0.05	0.49	0.20	0.92	−0.14	−0.20	−0.14	−0.12	0.96	1.00
(24)	0.007	0.043	−0.03	0.17	0.16	−0.01	0.25	−0.05	−0.08	−0.14	0.28	−0.07	0.02	0.04	−0.13	−0.06	0.50	0.23	0.94	−0.19	−0.23	−0.18	−0.16	0.99	0.97

Note. (1) *Deviation between reported and actual emissions reductions*, (2) *Sierra Club density*, (3) *LCV score* (average), (4) *RPS index*, (5) *Enforcement*, (6) *State environmental spending*, (7) *State environmental employee*, (8) *Capacity factor*, (9) *Operating revenue*, (10) *Number of subsidiaries*, (11) *Number of states*, (12) *Mergers and acquisitions*, (13) *Growth in output*, (14) *Changes in CO_2 emissions*, (15) *Net income*, (16) *Deregulation*, (17) *Deregulation* × *Net income*, (18) *Growth* × *LCV*, (19) *Growth* × *Sierra*, (20) *Growth* × *Enforcement*, (21) *Deregulation* × *Growth*, (22) *Deregulation* × *Net income* × *LCV*, (23) *Deregulation* × *Net income* × *Sierra*, (24) *Deregulation* × *Net income* × *Enforcement*.

Table 3 Regressions with Firm-Level Fixed Effects

	DV = *Deviation between reported and actual emissions reductions* (%)												
Variable	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)	Model (13)
Sierra Club density	6.597	5.684	1.71	7.427	6.544*	6.917	6.015	2.434	7.635	6.755*	6.588	7.731*	8.138
	(4.515)	(4.545)	(4.734)	(4.645)	(3.569)	(4.543)	(4.575)	(4.862)	(4.657)	(3.578)	(4.342)	(4.589)	(5.072)
LCV score (average)	−0.0233	−0.0625	−0.0747	−0.0355	−0.0223	−0.0695	−0.104	−0.107	−0.0782	−0.0668	0.12	0.0683	0.0416
	(0.143)	(0.148)	(0.134)	(0.143)	(0.145)	(0.142)	(0.145)	(0.135)	(0.142)	(0.144)	(0.141)	(0.139)	(0.140)
RPS index	−9.01	−6.85	−5.436	−8.087	−8.994	−4.5	−2.762	−2.157	−3.89	−4.434	−7.314	−5.86	−4.325
	(9.765)	(9.884)	(10.26)	(9.796)	(9.837)	(8.583)	(8.735)	(8.864)	(8.629)	(8.712)	(9.761)	(9.419)	(9.164)
Enforcement	−5.032	29.7	54.08	−2.574	−4.892	14.17	46.13	63.84	15.47	14.67	29.26	4.28	31.83
	(171.3)	(181.2)	(178.4)	(170.6)	(172.7)	(178.9)	(188.4)	(185.7)	(177.7)	(180.3)	(193.1)	(181.2)	(188.4)
State environmental spending (%)	−1.548	−1.758	−1.133	−1.815	−1.534	−0.385	−0.674	−0.239	−0.673	−0.337	−0.638	−1.447	−0.449
	(4.275)	(4.459)	(4.482)	(4.258)	(4.107)	(4.112)	(4.297)	(4.220)	(4.052)	(3.931)	(4.163)	(4.624)	(4.171)
State environmental employee (%)	5.521	5.533	6.338	5.352	5.519	5.085	5.129	5.91	4.956	5.077	5.401	5.158	4.728
	(7.725)	(7.491)	(7.687)	(7.683)	(7.777)	(7.685)	(7.472)	(7.757)	(7.650)	(7.760)	(7.544)	(7.640)	(7.789)
Capacity factor	139.9***	134.4***	140.8***	138.3***	140.0***	141.5***	136.2***	142.0***	140.0***	141.8***	137.2***	136.4***	131.6***
	(36.56)	(34.68)	(38.88)	(37.47)	(37.65)	(36.80)	(35.11)	(38.98)	(37.78)	(37.70)	(34.12)	(33.93)	(31.92)
Operating revenue	2.131	2.246*	2.418	2.358	2.131	1.702	1.845	2.046	1.922	1.7	0.762	0.656	0.372
	(1.442)	(1.295)	(1.541)	(1.476)	(1.441)	(1.438)	(1.287)	(1.578)	(1.491)	(1.435)	(1.369)	(1.423)	(1.478)
Number of subsidiaries	−15.30*	−16.07**	−16.18**	−15.30*	−15.31*	−15.15**	−15.90**	−15.97**	−15.15**	−15.17*	−15.40*	−15.70*	−16.07*
	(7.778)	(7.585)	(7.439)	(7.675)	(7.863)	(7.535)	(7.356)	(7.206)	(7.453)	(7.613)	(7.932)	(7.839)	(8.138)
Number of states	18.67***	17.39***	17.55***	18.46***	18.67***	15.13***	14.17***	14.82***	15.11***	15.12***	17.96***	16.52***	17.21***
	(2.137)	(1.761)	(2.008)	(2.214)	(2.128)	(1.331)	(1.151)	(1.182)	(1.370)	(1.312)	(2.999)	(2.584)	(2.668)
Mergers and acquisitions	3.423	3.661	3.405	3.649	3.462	2.649	2.936	2.786	2.883	2.768	3.704	3.036	3.402
	(5.005)	(5.238)	(4.763)	(5.079)	(5.133)	(5.040)	(5.284)	(4.876)	(5.109)	(5.205)	(5.071)	(5.602)	(5.338)
Growth in output	23.51***	64.04***	63.16***	36.22***	22.96	23.85***	62.81***	59.64***	35.04***	22.14	23.18***	24.08***	24.46***
	(6.916)	(18.49)	(15.20)	(8.276)	(16.15)	(6.744)	(17.52)	(14.84)	(7.926)	(15.82)	(6.032)	(6.334)	(6.331)
Change in CO_2 emissions	5.188	4.637	6.094	4.867	5.186	5.505	4.952	6.262	5.208	5.5	5.231	5.663	5.371
	(5.330)	(5.414)	(5.289)	(5.272)	(5.326)	(5.110)	(5.178)	(5.085)	(5.046)	(5.112)	(5.212)	(4.829)	(5.200)
Net income	−0.698	−1.634	−1.874	−1.038	−0.706	−11.02***	−11.15***	−10.05**	−10.86***	−11.09***	−11.55**	−10.88**	−12.14***
	(3.459)	(3.489)	(2.886)	(3.266)	(3.606)	(3.736)	(3.574)	(3.801)	(3.775)	(3.994)	(4.380)	(4.414)	(4.268)
Deregulation	−13.35**	−13.13**	−14.41**	−13.27*	−13.34**	−19.14**	−18.49**	−18.96**	−18.81**	−19.13**	−26.86***	−28.69***	−26.65***
	(6.486)	(6.336)	(6.022)	(6.655)	(6.619)	(7.741)	(7.480)	(7.377)	(7.968)	(7.761)	(9.223)	(9.903)	(8.825)

Table 3 (cont'd)

	DV = *Deviation between reported and actual emissions reductions* (%)												
Variable	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)	Model (13)
Growth × *LCV*		−0.945*** (0.338)					−0.909*** (0.312)						
Growth × *Sierra*			−23.53*** (6.493)					−21.28*** (6.685)					
Growth × *Enforcement*				−94.65*** (26.90)					−83.43*** (29.76)				
Growth × *Deregulation*					0.896 (21.70)					2.77 (21.71)			
Deregulation × *Net income*						26.73** (12.25)	24.72** (11.46)	21.46 (13.58)	25.52** (12.46)	26.83** (12.51)	192.5** (90.10)	188.1* (95.03)	155.8* (79.85)
Deregulation × *Net income* × *LCV*											−2.403** (1.187)		
Deregulation × *Net income* × *Sierra*												−31.76* (17.23)	
Deregulation × *Net income* × *Enforcement*													−477.0* (266.2)
Year effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−62.23 (49.13)	−53.55 (48.63)	−54.33 (46.39)	−61.99 (48.62)	−62.22 (49.24)	−58.01 (48.37)	−49.99 (47.90)	−51.71 (46.25)	−57.99 (48.03)	−57.97 (48.56)	−65.94 (47.61)	−58.33 (49.07)	−56.42 (50.38)
Observations	396	396	396	396	396	396	396	396	396	396	396	396	396
R^2	0.174	0.182	0.182	0.176	0.174	0.178	0.185	0.184	0.18	0.178	0.188	0.188	0.185

Notes. Robust standard errors are in parentheses. DV, dependent variable.
*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

variables. The three interaction variables are significant and work in the direction of reducing the extent of overreporting. For example, based on Model (3), in a state with no Sierra Club members, a 1% increase in a firm's growth rate leads to 63.2% more greenwashing. However, if the state had 1.722 Sierra Club members per thousand citizens (the sample mean), the effect of a 1% increase in the growth rate would be reduced to 22.6%.

We find support for Hypothesis 2, that deregulation is likely to lead to brownwashing. In a regulated environment, firms are relatively shielded from pressure from shareholders because they are essentially governed by regulatory authorities. With deregulation, this shield is lifted, and regulators are no longer the most salient stakeholder group. Instead, the salience of shareholders increases, driving brownwash. Also consistent with this argument, the coefficients for the interaction variable between net income and deregulation are positive and significant in most specifications, and they outweigh the size of the coefficients for the negative net income variable. Since the deregulation dummy takes the value of 1 in a deregulated environment, these findings provide support for Hypothesis 2A, that lower profits increase the likelihood of underreporting in a deregulated environment. More specifically, based on Model (6), in a deregulated environment, a \$1 billion decrease in net income leads to 15.7% more underreporting. Regarding Hypothesis 2B, we ran regressions with interactions between net income and our external scrutiny variables and found that they are significant in the direction we hypothesized, although the significance is not as strong as in the case of the growth variable. That is, the effect of investor pressure on brownwashing is weakly attenuated by scrutiny from external stakeholders. For example, based on Model (12), in a deregulated state with no Sierra Club members, a \$1 billion decrease in net income leads to 188.1% more brownwashing. However, if the state had 1.722 Sierra Club members per thousand citizens (the sample mean), the effect of a \$1 billion decrease in net income would be reduced to 133.4% more brownwashing.

As we mentioned in the introduction, we performed a set of robustness checks for our main effects using various relative performance variables. Based on our theory development, the importance of growth comes from increased interactions with stakeholders in the regulatory arena. Thus, absolute growth matters, whereas relative growth compared with peer firms does not necessarily matter. On the contrary, under the circumstances where investor pressure intensifies, both absolute and relative profits matter, because the importance of profits comes from increased salience of shareholders who can shift their investments to more profitable firms. Thus, to provide further support for our theory, we created various relative growth and profits variables based on the prior literature,[22] and we ran regressions replacing the absolute growth and profits variables in Table 3. For simplicity, only the regression coefficients for the relative growth and profits variables and their interactions with deregulation are shown in Tables 4 and 5. The results for the other variables are similar to those shown in Table 3. As expected, the relative growth variables in Table 4 are mostly not significant, and the relative profit variables in Table 5 show similar results as the absolute profit variable. This supplementary evidence provides additional confidence

Table 4 Robustness Checks: Relative Growth

Variable	
Growth relative to industry mean	25.34***
	(8.430)
Deregulation × Growth relative to industry mean	−2.242
	(2.495)
Growth relative to industry median	23.17
	(16.29)
Deregulation × Growth relative to industry median	0.569
	(22.63)
Growth relative to small/large firms mean[a]	3.535
	(4.638)
Deregulation × Growth relative to small/large firms mean	2.178
	(2.499)
Growth relative to small/large firms median[b]	24.39
	(15.57)
Deregulation × Growth relative to small/large firms median	−0.71
	(21.81)
Growth relative to quartile mean[c]	1.875***
	(0.407)
Deregulation × Growth relative to quartile mean	0.592
	(1.540)
Growth relative to quartile median[d]	25.03
	(16.96)
Deregulation × Growth relative quartile median	−1.391
	(22.33)
Growth relative to revenue[e]	20.46
	(15.47)
Deregulation × Growth relative to revenue	5.005
	(21.02)
Growth relative to revenue and revenue squared[f]	25.18*
	(13.40)
Deregulation × Growth relative to revenue and revenue squared	−3.051
	(16.39)

Notes. Shown are the results of replacing the growth variable and the interaction variable between growth and deregulation in Model (5) of Table 3 with relative growth measures (refer to the Results section for more details). Standard errors are in parentheses.

[a]The industry mean is calculated separately for small and large firms based on firm revenue.

[b]The industry median is calculated separately for small and large firms based on firm revenue.

[c]The mean is calculated separately for four quartiles based on firm revenue.

[d]The median is calculated separately for four quartiles based on firm revenue.

[e]The residual obtained by OLS regression of growth on firm revenue.

[f]The residual obtained by OLS regression of growth on firm revenue and the square of firm revenue.

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Table 5 Robustness Checks: Relative Net Income

Variable	
Net income relative to industry mean	−10.87*** (3.826)
Deregulation × *Net income relative to industry mean*	26.37** (12.31)
Net income relative to industry median	−10.95*** (3.760)
Deregulation × *Net income relative to industry median*	26.61** (12.29)
Growth relative to small/large firms mean[a]	−7.00 (5.097)
Deregulation × *Growth relative to small/large firms mean*	19.32* (10.08)
Growth relative to small/large firms median[b]	−8.116* (4.739)
Deregulation × *Growth relative to small/large firms median*	21.42** (10.30)
Net income relative to quartile mean[c]	−12.93*** (2.813)
Deregulation × *Net income relative to quartile mean*	22.18** (8.859)
Net income relative quartile median[d]	−10.81*** (3.970)
Deregulation × *Net income relative to quartile median*	22.44** (10.61)
Net income relative to output[e]	−8.054 (5.122)
Deregulation × *Net income relative to output*	21.36* (11.82)
Net income relative to output and output squared[f]	−8.32 (5.000)
Deregulation × *Net income relative to output and output squared*	21.92* (11.92)
Net income relative to revenue[g]	−10.59*** (3.333)
Deregulation × *Net income relative to revenue*	23.41** (11.39)
Net income relative to revenue and revenue squared[h]	−10.62*** (3.326)
Deregulation × *Net income relative to revenue and revenue squared*	23.46** (11.44)

Note. Shown are the results of replacing the income variable and the interaction variable between income and deregulation in Model (6) of Table 3 with relative income measures (refer to the Results section for more details).

[a]The industry mean is calculated separately for small and large firms based on firm revenue.

[b]The industry median is calculated separately for small and large firms based on firm revenue.

[c]The mean is calculated separately for four quartiles based on firm revenue.

[d]The median is calculated separately for four quartiles based on firm revenue.

[e]The residual obtained by OLS regression of income on firm output.

[f]The residual obtained by OLS regression of income on firm output and the square of firm output.

[g]The residual obtained by OLS regression of income on firm revenue.

[h]The residual obtained by OLS regression of income on firm revenue and the square of firm revenue.

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

that our empirical results are capturing the hypothesized effects in a robust manner.

It is worth noting that our sample is restricted to firms that chose to participate in the voluntary greenhouse gas reporting program. Kim and Lyon (2011) study the decisions of electric utilities to either join the program or not join. That paper found that participants tended to be large firms facing strong regulatory pressure, and that pressure from environmental groups reduced the likelihood of participation. Nonparticipants were more likely to be shrinking, so according to Hypothesis 1, they should have been more likely to brownwash. We obviously cannot test this because they did not join the program, but their decision to not participate is broadly consistent with the hypothesis, since they were effectively understating their environmental improvements by remaining silent. Thus, our empirical findings in this paper may understate the frequency of brownwashing in the general population of firms.

Discussion and Conclusion

The decoupling literature has argued that decoupling is especially likely when institutional environments are multifaceted and conflicting institutional demands for conformity exist (Oliver 1991, Seo and Creed 2002, Marquis and Lounsbury 2007, Kraatz and Block 2008, Purdy and Gray 2009, Pache and Santos 2010, Smith and Lewis 2011). The direction of decoupling identified in the literature, however, is limited to *exaggeration* ("greenwash") of organizational actions, with the exception of Ullmann (1985). We have proposed the possibility of undue modesty ("brownwash") about organizational actions as another decoupling possibility, especially as they relate to environmental, social, and governance issues. We have further proposed that which form of decoupling is more prevalent depends on the balance of power among competing stakeholder groups (Mitchell et al. 1997), emphasizing that stakeholders' preferences may change over time, and that they interact with changing firm characteristics, to determine the direction of decoupling.

In the context of environmental disclosure, we have shown that firm growth leads to greenwashing as a result of an anticipation of increased interactions with stakeholders in the regulatory arena. We have also shown that deregulation leads to brownwashing as a result of increased salience of shareholders, and that this effect is exacerbated by lower profits. That is, in a deregulated environment, lower profits lead to more brownwashing. As one would expect, this relationship holds for both absolute and relative profits compared with peer firms. We further show that the extent of both greenwashing and brownwashing is attenuated by external scrutiny in the form of NGO and regulatory pressures.

Whereas our results suggest that certain stakeholders are important drivers of greenwashing and brownwashing, other stakeholders we have not examined might be relevant as well. For example, in marketing, it has been noted that companies have to tread a fine line in marketing their social activities to customers:

> If they don't say enough about their charity links consumers believe the companies are hiding something and if they say too much they believe charities are being exploited by the big corporations. It makes the promotion of such schemes one of the most delicate jobs in marketing. (O'Sullivan 1997, p. 22)

Whether customer pressure drives greenwashing or brownwashing is likely to depend on the nature of the product and its production process, as well as customer beliefs about them. Large marketing and environmental economics literatures find that social performance influences consumers' product perceptions, consumers' product responses, and consumers' willingness to pay (e.g., Roe et al. 2001, Loureiro and Lotade 2005, Eicholtz et al. 2010). The rapidly growing number of "green claims" made on product packaging suggests that companies believe some final consumers prefer green products.[23] At the same time, customers may have concerns that a greater emphasis on social and environmental impacts may degrade product performance. A 2007 study of 7,751 consumers around the world identifies negative perceptions toward environmentally friendly products as one of the barriers to buying green products (Bonini and Oppenheim 2008). For example, early hybrid cars had less power than nonhybrid cars. Compact fluorescent light bulbs also had to overcome problems: early versions were slow to light up, had weak light when they did illuminate, and did not fit properly into most normal light fixtures (Bonini and Oppenheim 2008). Identifying circumstances under which stakeholders such as customers drive greenwashing or brownwashing is an interesting topic for future research.[24]

One reason the voluntary greenhouse gas reporting program we studied can be said to facilitate greenwashing or brownwashing is that its requirements were intentionally loose to encourage wide firm participation. For example, the program gave firms the choice of whether to report on the basis of specific emissions reductions projects or on the basis of the overall entity footprint (Kim and Lyon 2011). We conducted two-stage regressions to explore the impact of these alternative reporting modes on greenwash and brownwash, but they were statistically insignificant and did not affect other coefficients in the regression results. In fixed-effects models, of course, the alternative reporting modes drop out because they are time-invariant. One interesting result that emerged in the process, however, was a tendency of firms located within the same region of the North American Electric Reliability Council to adopt similar reporting modes. Normative pressures to adopt business practices deemed to be legitimate may be transmitted through such professional organizations (DiMaggio and Powell 1983), and under this circumstance, strategic choice may be important at the collective level, not at the level of single firm (Astley and Fombrun 1983). Our results provide some evidence of the existence of such a process, but it did not play a significant role in determining the difference between reported and actual emissions reductions, so we do not report these results here.

Our empirical analysis was conducted for an environmental issue in an industry in which regulatory institutions place serious constraints on corporate behavior, and one may wonder whether our results are likely to generalize to other settings. We note that although economic regulation of utilities is a relatively special case, most heavily polluting industries—such as chemicals, steel, pulp and paper, and oil refining—are subject to significant environmental regulation, which in itself can create a threat of external scrutiny. Furthermore, growth in any industry with environmental impacts typically requires permits issued through government institutions. Thus, we expect that the growth effect that we have identified—and the mitigating impact of external scrutiny—will generalize to environmental issues in other industry settings. Furthermore, social issues such as sweatshop labor and equal employment opportunity are amenable to pressure from secondary stakeholders (Harrison and Scorse 2010) and are likely to generate dynamics similar to those for environmental issues. Corporate relationships with shareholders are also likely to be similar in less heavily regulated industries, with their salience increasing with decreasing profits. Thus, although our empirical setting is special in some respects, we expect the main relationships we identify to hold in other settings; nevertheless, further research confirming the generality of our findings would be worthwhile.

Acknowledgments

The authors appreciate comments from senior editor Christopher Marquis and anonymous reviewers. Special thanks go to James Westphal for helpful suggestions and insightful comments.

Endnotes

[1] If environmental regulations were costless (or even carried a negative cost), it would be unnecessary to justify and measure the presumed social benefits of environmental programs and to make the case for incentive-based policy instruments that emphasize the incentives that these approaches provide for firms to innovate in abatement technology (Palmer et al. 1995).

[2] Some papers use the term "recoupling" to describe a situation where coupling is finally accomplished after a period of time, but as Tilcsik (2010) points out, this mistakenly implies that there was an original coupling, followed by decoupling, so we avoid the use of the term.

[3]Deregulation lifts the government guarantee of a fair rate of return on capital investment, and thus it requires firms to deal more directly with their investors. We provide more details in the next section.

[4]Other stakeholders such as customers may also be relevant. We address this subject in the discussion section.

[5]For details about the program, see Kim and Lyon (2011).

[6]See http://www.eia.doe.gov/oiaf/1605/frntvrgg.html, accessed June 2007.

[7]Direct reductions refer to greenhouse gas reductions from sources owned by the reporter such as power plant emissions reductions at the electricity generation stage. Indirect reductions refer to greenhouse gas reductions from sources not owned by the reporter but somehow affected by reporter actions such as from end users via demand-side management programs. Sequestration refers to the removal and storage of carbon from the atmosphere in carbon sinks such as trees and plants. See U.S. Energy Information Administration (2005).

[8]We use only direct reductions reported to the program, which is comparable to what is reported to the FERC Form 1.

[9]Kim and Lyon (2011) study the factors affecting firms' decisions to participate in the program.

[10]See http://sites.epri.com/refcard/tech_ccs.html (accessed July 2013).

[11]See http://www.nrdc.org/air/energy/rbr/append.asp (accessed November 2007).

[12]An adjustment factor is calculated to convert CEMS-based CO_2 emissions data to fuel-based CO_2 estimates. The fuel-based estimates are regressed on CEMS data; the inverse of the coefficient, 0.7527, is used as an adjustment factor. This aligns well with NRDC's report that continuous emissions monitoring data could be biased upward by 10%–30% relative to fuel-based estimates. See http://www.nrdc.org/air/energy/rbr/append.asp for more details.

[13]For simplicity, in this paragraph we provide statistical test results for the first model in Table 3. The test results are similar for other models.

[14]The procedure is implemented using the Stata command xtscc.

[15]See http://www.eia.doe.gov/cneaf/electricity/chg_str/restructure.pdf (accessed July 2011).

[16]Deregulation at the state level started in the late 1990s, so our sample provides an appropriate period to study the effect of deregulation. In our sample, 22 of the 54 firms were operating in one or more states that went through deregulation during the period studied. These states were Arizona, California, Illinois, New Jersey, New York, Ohio, Oregon, Pennsylvania, and Texas.

[17]See http://www.sangorgonio.sierraclub.org/mountains/greenwash.htm (accessed June 2012).

[18]See http://www.sierraclub.org/environmentallaw/tarsands/ (accessed June 2012).

[19]See http://www.census.gov/govs/apes (accessed January 2013).

[20]We thank Jay Shimshack for generously sharing these data with us.

[21]We also tested whether the control variables for state resource allocation played a significant role in moderating the effect of growth on greenwashing, but the interaction terms were insignificant. The same was true for interaction effects with net income.

[22]Relative growth and relative profits are estimated in several ways: relative to industry (Aggarwal and Samwick 1999), relative to small or large firms (Bizjak et al. 2008), relative to size quartiles (Albuquerque 2009), and relative to revenue based on the residuals obtained by ordinary least squares (OLS) regressions (King and Lenox 2000). Relative profits are also estimated relative to firm output based on the residuals obtained by OLS regressions. Since the growth variable builds on firm output, this approach was not used for estimating relative growth.

[23]See the Terrachoice Group Inc. website (http://sinsofgreenwashing.org/) for more information on changes in the extent of green labeling over time.

[24]We conducted a series of regressions that included the fraction of sales to residential customers as an independent variable, since prior studies suggest that residential customers are more likely to be sensitive to environmental claims (see, e.g., Delmas et al. 2007). Unfortunately, this variable proved to be a constraint on sample size, reducing it by 45 firm-year observations. This changes the sample means for our key variables significantly (e.g., for the net income variable, $\chi^2(1) = 33.28$, P-value $= 0.0$) and causes the precision with which we are able to estimate our main independent variables to drop. Furthermore, the fraction of sales to residential customers variable is never statistically significant. Thus, we do not report these regressions in the paper.

References

Aggarwal RK, Samwick AA (1999) The other side of the tradeoff: The impact of risk on executive compensation. *J. Political Econom.* 107(1):65–105.

Albuquerque A (2009) Peer firms in relative performance evaluation. *J. Accounting Econom.* 48(1):69–89.

Aldy JE, Stavins R (2011) The promise and problems of pricing carbon. NBER Working paper, National Bureau of Economic Research, Cambridge, MA.

Astley WG, Fombrun CJ (1983) Collective strategy: Social ecology of organizational environments. *Acad. Management Rev.* 8(4): 576–587.

Averch H, Johnson LL (1962) Behavior of the firm under regulatory constraint. *Amer. Econom. Rev.* 52(5):1052–1069.

Bansal P, Clelland I (2004) Talking trash: Legitimacy, impression management, and unsystematic risk in the context of the natural environment. *Acad. Management J.* 47(1):93–103.

Bansal P, Roth K (2000) Why companies go green: A model of ecological responsiveness. *Acad. Management J.* 43(4):717–736.

Bizjak JM, Lemmon ML, Naveen L (2008) Does the use of peer groups contribute to higher pay and less efficient compensation? *J. Financial Econom.* 90(2):152–168.

Bonini S, Oppenheim J (2008) Cultivating the green consumer. *Stanford Soc. Innovation Rev.* (Fall) http://www.ssireview.org/articles/entry/cultivating_the_green_consumer.

Bowen F (2014) *After Greenwashing: Symbolic Corporate Environmentalism and Society* (Cambridge University Press, Cambridge, UK).

Broder JM (2011) Emissions fell in 2009, showing impact of recession. *New York Times* (February 16) http://www.nytimes.com/2011/02/17/science/earth/17emit.html?_r=0.

Bromley P, Powell WW (2012) From smoke and mirrors to walking the talk: Decoupling in the contemporary world. *Acad. Management Ann.* 6(1):483–530.

Broulhle K, Griffiths C, Wolverton A (2009) Evaluating the role of EPA policy levers. *J. Environment. Econom. Management* 57(2): 166–181.

Chen P-L, Williams C, Agarwal R (2012) Growing pains: Pre-entry experience and the challenge of transition to incumbency. *Strategic Management J.* 33(3):252–276.

Decker CS (2003) Corporate environmentalism and environmental statutory permitting. *J. Law Econom.* 46(1):103–129.

Delmas MA, Burbano VC (2011) The drivers of greenwashing. *Calif. Management Rev.* 54(1):64–87.

Delmas M, Montes-Sancho M (2010) Voluntary agreements to improve environmental quality: Symbolic and substantive cooperation. *Strategic Management J.* 31(6):575–601.

Delmas M, Russo MV, Montes-Sancho MJ (2007) Deregulation and environmental differentiation in the electric utility industry. *Strategic Management J.* 28(2):189–209.

DiMaggio P, Powell W (1983) The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *Amer. Sociol. Rev.* 48(2):147–160.

Doshi AR, Dowell GWS, Toffel MW (2013) How firms respond to mandatory information disclosure. *Strategic Management J.* 34(10):1209–1231.

Dowell G, Swaminathan A (2006) Entry timing, exploration, and firm survival in the early U.S. bicycle industry. *Strategic Management J.* 27(12):1159–1182.

Driscoll JC, Kraay AC (1998) Consistent covariance matrix estimation with spatially dependent data. *Rev. Econom. Statist.* 80(4): 549–560.

Eichholtz P, Kok N, Quigley JM (2010) Doing well by doing good? Green office buildings. *Amer. Econom. Rev.* 100(5):2492–2509.

Environmental Law Institute (2007) *Environmental Law Deskbook* (Environmental Law Institute, Washington, DC).

Epstein-Reeves J (2012) The "pain" of sustainability. *Forbes* (January 18) http://www.forbes.com/sites/csr/2012/01/18/the-pain-of-sustainability/.

Fabrizio KR, Rose NL, Wolfram CD (2007) Do markets reduce costs? Assessing the impact of regulatory restructuring on US electric generating efficiency. *Amer. Econom. Rev.* 97(4):1250–1277.

Fisher-Vanden K, Thorburn K (2011) Voluntary corporate environmental initiatives and shareholder wealth. *J. Environment. Econom. Management* 62(3):430–445.

Fiss PC, Zajac EJ (2006) The symbolic management of strategic change: Sensegiving via framing and decoupling. *Acad. Management J.* 49(6):1173–1193.

Fowlie M (2010) Emissions trading, electricity restructuring, and investment in pollution abatement. *Amer. Econom. Rev.* 100(3): 837–869.

Friedman M (1970) The social responsibility of business is to increase profits. *New York Times Magazine* (September 13).

Gollop FM, Roberts MJ (1983) Environmental regulations and productivity growth: The case of fossil-fueled electric power. *J. Political Econom.* 91(4):654–674.

Gray W, Shimshack J (2011) The effectiveness of environmental monitoring and enforcement: A review of the empirical evidence. *Rev. Environment. Econom. Policy* 5(1):3–24.

Hallett T (2010) The myth incarnate: Recoupling processes, turmoil, and inhabited institutions in an urban elementary school. *Amer. Sociol. Rev.* 75(1):52–74.

Harrison A, Scorse J (2010) Multinationals and anti-sweatshop activism. *Amer. Econom. Rev.* 100(1):247–273.

Hart SL, Ahuja G (1996) Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Bus. Strategy Environment* 5(1):30–37.

Henisz WJ, Dorobantu S, Nartey LJ (2014) Spinning gold: The financial returns to stakeholder engagement. *Strategic Management J.* 35(12):1729–1748.

Hoechle D (2007) Robust standard errors for panel regressions with cross-sectional dependence. *Stata J.* 7(3):281–312.

Hsu T (2011) Skepticism grows over products touted as eco-friendly. *Los Angeles Times* (May 21) http://articles.latimes.com/print/2011/may/21/business/la-fi-greenwash-20110521.

Ingram P, Yue LQ, Rao H (2010) Trouble in store: Probes, protests, and store openings by Wal-Mart, 1998–2007. *Amer. J. Sociol.* 116(1):53–92.

Innes R, Sam AG (2008) Voluntary pollution reductions and the enforcement of environmental law: An empirical study of the 33/50 program. *J. Law Econom.* 51(2):271–296.

Jacobs BW, Singhal VR, Subramanian R (2010) An empirical investigation of environmental performance and the market value of the firm. *J. Oper. Management* 28(5):430–441.

Kassinis G, Vafeas N (2006) Stakeholder pressures and environmental performance. *Acad. Management J.* 49(1):145–159.

Khanna M, Damon L (1999) EPA's voluntary 33/50 program: Impact on toxic releases and economic performance of firms. *J. Environment. Econom. Management* 37(1):1–25.

Kim E-H (2013) Deregulation and differentiation: Incumbent investment in green technologies. *Strategic Management J.* 34(10): 1162–1185.

Kim E-H, Lyon TP (2011) Strategic environmental disclosure: Evidence from the DOE's voluntary greenhouse gas registry. *J. Environment. Econom. Management* 61(3):311–326.

King BG (2008) A political mediation model of corporate response to social movement activism. *Admin. Sci. Quart.* 53(3):395–421.

King A, Lenox M (2000) Industry self-regulation without sanctions: The chemical industry's responsible care program. *Acad. Management J.* 43(4):698–716.

King A, Lenox M (2001) Does it really pay to be green? An empirical study of firm environmental and financial performance. *J. Indust. Ecol.* 5(1):105–116.

Kraatz MS, Block ES (2008) Organizational implications of institutional pluralism. Greenwood R, Oliver C, Sahlin-Andersson K, Suddaby R, eds. *The Sage Handbook of Organizational Institutionalism* (Sage, Thousand Oaks, CA), 243–275.

Lacker JM, Weinberg JA (1989) Optimal contracts under costly state falsification. *J. Political Econom.* 97(6):1345–1363.

Loureiro M, Lotade J (2005) Do fair trade and eco-labels in coffee wake up the consumer confidence? *Ecological Econom.* 53(1): 129–138.

Lyon TP, Maxwell JW (2011) Greenwash: Corporate environmental disclosure under threat of audit. *J. Econom. Management Strategy* 20(1):3–41.

Lyon TP, Montgomery AW (2013) Tweetjacked: The impact of social media on corporate greenwash. *J. Bus. Ethics* 118(4):747–757.

Lyon TP, Lu Y, Shi X, Yin Q (2013) How do shareholders respond to Green Company Awards in China? *Ecological Econom.* 94:1–8.

Mahon JF, Murray EA Jr (1980) Deregulation and strategic transformation. *J. Contemporary Bus*. 9(2):123–138.

Mahon JF, Murray EA Jr (1981) Strategic planning for regulated companies. *Strategic Management J*. 2(3):251–262.

Marquis C, Lounsbury M (2007) Vive la résistance: Competing logics and the consolidation of U.S. community banking. *Acad. Management J.* 50(4):799–820.

Marquis C, Qian C (2014) Corporate social responsibility reporting in China: Symbol or substance? *Organ. Sci.* 25(1):127–148.

Marquis C, Toffel MW (2013) Scrutiny, norms, and selective disclosure: A global study of greenwashing. Harvard Business School Working Paper 11-115, Harvard Business School, Boston.

Maxwell JW, Lyon TP, Hackett SC (2000) Self-regulation and social welfare: The political economy of corporate environmentalism. *J. Law Econom.* 43(2):583–617.

Meyer J, Rowan B (1977) Institutionalized organizations: Formal structure as myth and ceremony. *Amer. J. Sociol.* 83(2):340–363.

Meznar MB, Nigh D (1995) Buffer or bridge? Environmental and organizational determinants of public affairs activities in American firms. *Acad. Management J.* 38(4):975–996.

Milgrom PR (1981) Good news and bad news: Representation theorems and applications. *Bell J. Econom.* 12(2):380–391.

Mishina Y, Pollock TG, Porac JF (2004) Are more resources always better for growth? Resource stickiness in market and product expansion. *Strategic Management J.* 25(12):1179–1197.

Mitchell RK, Agle BR, Wood DJ (1997) Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Acad. Management Rev.* 22(4): 853–886.

Morrow JL Jr, Sirmon DG, Hitt MA, Holcomb TR (2007) Creating value in the face of declining performance. *Strategic Management J.* 28(3):271–283.

Neff J (2012) As more marketers go green, fewer consumers willing to pay for it: Being eco-friendly is a $40B business, but shoppers are growing resistant to premium pricing. *Advertising Age* (September 23) http://adage.com/print/237377.

Nordhaus WD (2007) A review of the "Stern review on the economics of climate change." *J. Econom. Literature* 45(3):686–702.

Oliver C (1991) Strategic responses to institutional processes. *Acad. Management Rev.* 16(1):145–179.

O'Sullivan T (1997) Why charity schemes need a delicate touch. *Marketing Week* (November 20) 22–24.

Pache A, Santos F (2010) When worlds collide: The internal dynamics of organizational responses to conflicting institutional demands. *Acad. Management Rev.* 35(3):455–476.

Palmer K, Oates WE, Portney PR (1995) Tightening environmental standards: The benefit-cost or the no-cost paradigm? *J. Econom. Perspect.* 9(4):119–132.

Patten DM (2002) The relation between environmental performance and environmental disclosure: A research note. *Accounting, Organ. Soc.* 27(8):763–773.

Penrose E (1959) *The Theory of the Growth of the Firm* (Oxford University Press, Oxford, UK).

Pfeffer J (1981) Management as symbolic action: The creation and maintenance of organizational paradigms. Cummings LL, Shaw BM, eds. *Research in Organizational Behavior*, Vol. 3 (JAI Press, Greenwich, CT), 1–52.

Porter ME, van der Linde C (1995) Towards a new conception of the environment-competitiveness relationship. *J. Econom. Perspect.* 9(4):97–118.

Purdy J, Gray B (2009) Conflicting logics, mechanisms of diffusion, and multilevel dynamics in emerging institutional fields. *Acad. Management J.* 52(2):355–380.

Ramus CA, Montiel I (2005) When are corporate environmental policies a form of greenwashing? *Bus. Soc.* 44(4):377–414.

Roe B, Teisl MF, Levy A, Russell M (2001) US consumers' willingness to pay for green electricity. *Energy Policy* 29(11): 917–925.

Russo MV, Fouts PA (1997) A resource-based perspective on corporate environmental performance and profitability. *Acad. Management J.* 40(3):534–559.

Sandholtz KW (2012) Making standards stick: A theory of coupled vs. decoupled compliance. *Organ. Stud.* 33(5–6):655–679.

Seo M, Creed WED (2002) Institutional contradictions, praxis, and institutional change. *Acad. Management Rev.* 27(2):222–247.

Shear MD (2013) Administration presses ahead with limits on emissions from power plants. *New York Times* (September 19) http://www.nytimes.com/2013/09/20/us/politics/obama-administration-announces-limits-on-emissions-from-power-plants.html.

Shin HS (2003) Disclosures and asset returns. *Econometrica* 71(1): 105–133.

Sine W, Lee B (2009) Tilting at windmills? The environmental movement and the emergence of the U.S. wind energy sector. *Admin. Sci. Quart.* 54(1):123–155.

Smith W, Lewis M (2011) Toward a theory of paradox: A dynamic equilibrium model of organizing. *Acad. Management Rev.* 36(2): 381–403.

Snellman KE (2012) Window-dressers and closet conformists: Organizational decoupling revisited. *Acad. Management Proc.* January(Meeting abstract supplement):1.

Spence AM (1973) Job market signaling. *Quart. J. Econom.* 87(3): 355–374.

Stern N (2007) *The Economics of Climate Change: The Stern Review* (Cambridge University Press, Cambridge, UK).

Terrachoice (2010) The sins of greenwashing: Home and family edition 2010. Report, Terrachoice/UL, Ottawa, ON, Canada. http://sinsofgreenwashing.org/index35c6.pdf.

Tilcsik A (2010) From ritual to reality: Demography, ideology, and decoupling in a post-Communist government agency. *Acad. Management J.* 53(6):1474–1498.

Trexler MC, McFall KS (1993) Building a CO_2 mitigation portfolio: The future is now for carbon sinks. *Electricity J.* 6(8):60–69.

Tushman ML, Anderson P (1986) Technological discontinuities and organizational environments. *Admin. Sci. Quart.* 31(3): 439–465.

Ullmann AA (1985) Data in search of a theory: A critical examination of the relationships among social performance, social disclosure, and economic performance of U.S. firms. *Acad. Management Rev.* 10(3):540–557.

U.S. Energy Information Administration (2004) Emissions of greenhouse gases in the United States. Report DOE/EIA-0573, U.S. Department of Energy, Washington, DC.

U.S. Energy Information Administration (2005) Voluntary Reporting of Greenhouse Gases 2003. Report DOE/EIA-0608, U.S. Department of Energy, Washington, DC.

U.S. SIF Foundation (2013) The impact of sustainable and responsible investment. Report, U.S. SIF Foundation, Washington, DC. http://www.ussif.org/files/publications/ussif_impactofsri_aug2013_final.pdf.

Verrecchia RE (1983) Discretionary disclosure. *J. Accounting Econom.* 5:179–194.

Voss ZG, Cable DM, Voss GB (2006) Organizational identity and firm performance: What happens when leaders disagree about "who we are?" *Organ. Sci.* 17(6):741–755.

Westphal J, Zajac E (1998) The symbolic management of stockholders: Corporate governance reforms and shareholder reactions. *Admin. Sci. Quart.* 43(1):127–153.

Westphal J, Zajac E (2013) A behavioral theory of corporate governance: Explicating the mechanisms of socially situated and socially constituted agency. *Acad. Management Ann.* 7(1): 607–661.

Eun-Hee Kim is assistant professor of strategic management and public policy at the School of Business, George Washington University. She received her Ph.D. from the University of Michigan at Ann Arbor. Her research interests include corporate governance (symbolic management), information disclosure, business and government, energy and sustainability, green technology, and innovation.

Thomas P. Lyon holds the Dow Chair of Sustainable Science, Technology and Commerce at the University of Michigan, with appointments in both the Ross School of Business and the School of Natural Resources and Environment. His current research focuses on environmental information disclosure, greenwash, and ecolabels. He is exploring these issues using economic theory and empirical analysis, especially in the context of the energy industry.