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In response to stakeholders' growing concerns, companies are joining voluntary environmental programs to signal their superior environmental management capabilities. In contrast to the literature's focus on certification programs that require a third-party audit, we show that corporate participation in programs that lack certification but instead incorporate civil society scrutiny can, under certain conditions, serve as a credible signal of environmental management capabilities by discouraging firms with inferior capabilities from joining. Specifically, we hypothesize that (a) institutional environments that support civil society scrutiny and (b) organizational characteristics that increase the impact of that scrutiny enhance the credibility of the signal. We find empirical support for these hypotheses by examining the decisions by nearly 2,600 companies in 44 countries whether to participate in the United Nations Global Compact.

A growing number of investors, buyers, employees, and communities are seeking information about how effectively companies manage their environmental risks and impacts. Effective management of environmental risks and impacts involves developing some type of environmental management system (EMS) that identifies and assesses information on environmental risks and impacts and includes a process of continuous improvement (World Bank Group, 2016). In practice, however, while it is easy enough for a company to publish its environmental policies, it can be genuinely hard to convey to others whether those policies have actually been implemented.¹ Because implemented management systems rarely

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¹ On the use of self-auditing to signal environmental quality, see Earnhart and Leonard (2016).

eliminate all environmental risks and impacts, it is difficult to infer EMS implementation from casual observation of a company's environmental performance. Although some companies issue corporate sustainability reports that provide some indication of management system effectiveness by reporting improvements in environmental performance, these reports "are often not that easy to read" and tend not to be "digestible" (KPMG, 2013: 9). These reports have also been criticized as "greenwash," meaning that they mislead readers by emphasizing positive attributes while neglecting to mention negative issues (Delmas and Burbano, 2011; Lyon and Maxwell, 2011; Bowen, 2014; Lyon and Montgomery, 2015) and that they create "a false impression of transparency and accountability" (Marquis, Toffel, and Zhou, 2016). In this paper, we explore the conditions under which companies can signal their capabilities to manage environmental risks and impacts by joining a specific form of voluntary program.

Such signals are actions that succinctly convey information that demonstrates that the company possesses certain characteristics that may be too complex to convey directly (Spence, 1973). For a costly action taken by a firm, such as joining a voluntary program, to signal environmental capabilities embodied in the implementation of an EMS, two conditions must hold. First, any firm that had implemented such a system would find that the signaling action was profitable; that is, the benefits of signaling would outweigh the costs. Second, any company that had not implemented such an EMS would find that the cost of signaling outweighed the benefits, even if the signal misled stakeholders into believing that the firm had implemented an EMS. To ensure that the signal is unable to mislead stakeholders in this way, any firm joining the voluntary program must be required to fully implement its mandates. Under these two conditions, only firms that have indeed implemented an EMS would take the signaling action. Stakeholders would know that firms taking the signaling action did possess superior environmental capabilities (embodied in having implemented an EMS) and those not taking the signaling action possessed inferior environmental capabilities. Firms that signal a strong capability to manage environmental risks and impacts can benefit by reducing regulatory scrutiny, increasing consumer demand for their products, and attracting investors concerned about environmental quality (Johnstone and Labonne, 2009; Toffel and Short, 2011; Earnhart and Leonard, 2016).

To signal superior environmental capabilities, firms can join a voluntary program that requires third-party certification such as the ISO 14001 Environmental Management System Standard or joining a voluntary program that relies on civil society scrutiny to ensure adherence to the program's stated goals. Certification auditors must be sufficiently trained and free of conflicts of interest to ensure that firms joining the certification program have actually fully implemented its mandates (Montiel, Husted, and Christmann, 2012; Short and Toffel, 2015). However, because certification programs require third-party audit fees of up to tens of thousands of dollars and these fees depend on a company's size and complexity and are *not* on its environmental management capabilities, these fees diminish the signaling value of certified voluntary programs by deterring some firms that have the required environmental capabilities but that do not care to pay the fee.²

In this paper, we examine a different type of program that companies could join to signal their environmental capabilities. Instead of relying on third-party auditors, these programs rely on civil society scrutiny to ensure adherence to their requirements. They facilitate such scrutiny by requiring participants to publicly commit to the program's goals and to publicly and regularly report their implementation status. Just as joining a certification program constituting a signal depends on the ability and commitment of its third-party auditors to enforce the standard, whether joining a voluntary program based on public scrutiny constitutes a signal depends on the ability and commitment of civil society to assure that participants comply with the program's goals. When civil society is effective in this regard, firms can signal their superior environmental management capabilities by joining such programs because they would find it profitable to do so whereas firms with inferior capabilities would not.

The previous literature on signaling environmental capabilities through voluntary actions assumes that the conditions under which the actions work as signals hold, and seeks to find evidence of their use when knowing a firm's capabilities is more valuable (Christmann and Taylor, 2002; King, Lenox, and

² This is akin to Spence's (1973) observation that tuition costs might deter highly productive but poor people from pursuing a college degree. Naveh, Marcus, Allen, and Koo Moon (1999) observed firms that had implemented the measures required by the ISO 9001 Quality Management System Standard eschewed certification to avoid third-party audit fees.

Terlaak, 2005; Johnstone and Labonne, 2009; Montiel, Husted, and Christmann, 2012; Earnhart and Leonard, 2016). Our study differs from these previous studies in that we theorize about the conditions under which firms may effectively signal their environmental capabilities by taking a voluntary action, and we then empirically test our theory. Specifically, we develop hypotheses about when firms with inferior capabilities (i.e., those lacking a EMS) would be deterred from joining a voluntary program with civil society scrutiny and then we determine whether there is empirical support for our theory. The equivalent approach with respect to the use of a certification program would be to test whether firms with inferior environmental capability were deterred from joining a voluntary certification program when certifiers were more effective (e.g., better trained).³

We hypothesize that certain institutional and organizational attributes will contribute to the effectiveness of civil society scrutiny and will thus enhance the likelihood that joining these programs can serve as a signal. First, we hypothesize that institutional environments that feature a greater potential for civil society scrutiny—and are therefore more likely to detect a firm’s failure to meet the program’s goals—will be more effective in deterring companies with inferior environmental capabilities from participating in programs that encourage such scrutiny. Second, we hypothesize that institutional environments that hold higher expectations of corporate socially responsible behavior—and therefore threaten worse consequences when companies fail to exhibit such behavior—will also be especially effective in deterring companies with inferior capabilities from participating. Our final hypothesis highlights the fact that the costs of joining a program with civil society scrutiny—that is, the cost of meeting the program’s goals—may vary with firm size. Specifically, we hypothesize that the cost of joining a voluntary program will be relatively greater for smaller companies with inferior capabilities than for larger companies with inferior environmental capabilities. This is because the costs of meeting

³ While taking a less direct approach to the one we suggest, other studies have cast doubt on the signaling value of certification by illustrating that under conditions of weak enforcement firms fail to follow through on substantive changes (Aravind and Christmann, 2011; Christmann and Taylor, 2006; Potoski and Prakash, 2005) or by illustrating diminished use of certification when corrupt diminishes the expectation of enforcement (Montiel, Husted, and Christmann, 2012).

program goals are likely to involve significant managerial effort, the cost of which will be proportionally higher for smaller firms.

We test our theory by empirically analyzing companies' decisions whether or not to join the United Nations Global Compact, which has a set of environmental and social principles that participants publicly commit to implement, but which does not have an auditing requirement to ensure that they actually do. Unlike programs that require third-party certification, the UN Global Compact imposes no certification costs. Instead, it requires participants to submit annual reports on their progress implementing the principles. Specifically, the United Nations requires participants "to communicate their progress to their own stakeholders on an annual basis and to post a copy on the UN Global Compact's website" (UN Global Compact, 2016b), which enables external stakeholders such as nongovernmental organizations (NGOs) to monitor these reports.

We assess whether and when UN Global Compact participation can signal a company's environmental management capabilities. Using a sample of 2,604 companies headquartered in 44 countries, we find evidence to support our three hypotheses. We find that companies with inferior environmental management capabilities are particularly deterred from participating in the Global Compact in institutional settings in which (a) the threat of civil society scrutiny is greater and (b) the expectations for corporate socially responsible behavior are higher. We also find greater deterrence for smaller companies with inferior environmental management capability than for larger companies with comparable environmental management capability. After presenting our theory, analysis, and results, we conclude by discussing our study's implications for scholarship on signaling theory and on self-regulation.

THEORY AND HYPOTHESES

Designers of voluntary programs that rely on third-party certification audits, such as ISO 14001, encourage firms to improve their environmental performance by undertaking the actions necessary to pass these audits (Johnstone and Labonne, 2009). Other voluntary programs with similar goals are designed

differently. They encourage firms to publicly commit to goals such as environmental performance improvement but they rely on civil society scrutiny to ensure that participating firms adhere to those commitments. They encourage that civil society scrutiny by publishing participants' names on their websites. Some go further, requiring participants to report on their efforts to meet the program's goals and publishing these reports on the programs' websites. Examples include the chemical industry's Responsible Care, the ski industry's Sustainable Slopes Climate Challenge, and the UN Global Compact (the focus of this study). The American Chemistry Council (ACC), the chemical industry association that manages the Responsible Care program in the United States, notes that "[t]his public reporting is meant to enhance transparency and accountability and drive performance" of companies that join Responsible Care and that "ACC uses these reported metrics to openly demonstrate the commitment of ACC members" (American Chemistry Council, 2016).⁴

Prior research has already investigated whether firms can use the requirements embodied in environmental standards programs that rely on third-party certification audits to signal their environmental capabilities to stakeholders such as customers and regulators (e.g., Potoski and Prakash, 2005; Johnstone and Labonne, 2009). We investigate whether and when firms may make similar use of programs incorporating civil society scrutiny to signal their environmental capabilities.

Companies know more about their capabilities than do their external stakeholders. This information asymmetry creates a transaction cost of identifying companies with desirable characteristics (Akerlof, 1970; Williamson, 1985). Thus, it is in the best interest of a company with characteristics that are desirable to its stakeholders to reduce information asymmetries by sending a signal; that is, an action that succinctly conveys information demonstrating that the company possesses a desirable characteristic that may be too complex to convey directly (Spence, 1973). An action will function as a signal of the desirable characteristic only if (a) the companies that have that characteristic take that action and (b)

⁴ King and Lenox (2000) examined the program through 1996 and found that Responsible Care was plagued by adverse selection. Responsible Care began requiring public reporting in 2005, which subjected participants to civil society scrutiny.

companies that do not have that characteristic do not take that action because they find that the costs of doing so outweigh the benefits.

We theorize that firms with superior environmental capabilities may be able to use the decision to join programs that incorporate civil society scrutiny to signal their capabilities for reasons similar to those embodied in the decision to join certification programs. Specifically, we propose that program participants will have to uphold program goals when civil society scrutiny is effective. Under this condition, for a given level of benefit accruing to participation, firms with superior environmental capabilities will find it less costly to uphold program goals than firms with inferior environmental capabilities. Program participation will thus serve as an accurate signal of those capabilities. The logic behind our theory is the same as the logic explaining why joining a certification program may serve as a signal. If third-party auditors are effective in ensuring participants' implementation of the program's requirements, the differential costs of doing so will bring about the desired separation: firms with superior capabilities will join while those with inferior capabilities will not.

Our work addresses Connelly et al.'s (2011: 61) call for research on how penalties inflicted by third parties for sending "false signals" might act as a substitute for more formal signaling costs, such as those imposed by third-party certification auditors. In our context, civil society scrutiny serves this role, imposing sanctions such as reputational damage on companies that attempt to send a "false signal" by joining the program but failing to implement its goals. We hypothesize three circumstances that will deter false signals and thus render program participation a more trustworthy signal of environmental capabilities.

The critical role of civil society scrutiny

For companies, as for individuals, the ability to signal information to uninformed parties hinges on the perceived costs and benefits. The value of signaling superior environmental capabilities is the additional profits expected once the signal makes the company's superior capabilities known in the marketplace. These profits may come from new customers with environmental preferences (Arora and Gangopadhyay,

1995), from reduced regulatory oversight in the form of shorter permitting delays (Decker, 2003) and fewer inspections (Toffel and Short, 2011), or from the ability to attract more highly motivated employees (Brekke and Nyborg, 2008).

The literature on social movements and nonmarket strategies has long understood that civil society scrutiny can damage a firm's reputation (e.g., Baron, 2001; Baron and Diermeier, 2007; King and Pearce, 2010; Bartley and Child, 2011) and consequently its value (King and Soule, 2007). In line with this logic, others have theorized that the threat of such criticism can cause companies to "clam up" (Lyon and Maxwell, 2011: 21) and dissuade them from publicly committing to environmental improvements (Bansal and Clelland, 2004; Bowen, 2014).

In essence, we argue that joining programs that encourage civil society scrutiny functions as a signal because such scrutiny can result in reputational harm if the participant fails to uphold the program's commitments. If the decision to join, then, is to serve as a signal, the participant's institutional context must support effective civil society oversight. Institutional contexts that increase the likelihood of public criticism for failing to implement a program's requirements will more effectively deter companies with inferior environmental capabilities from joining that program. We therefore hypothesize:

H1: Companies with inferior environmental capabilities will be less likely to participate in a voluntary program incorporating scrutiny from civil society, especially in institutional contexts that provide greater support for such scrutiny.

A company's decision to join a program featuring scrutiny from civil society will depend not only on the likelihood that such scrutiny will result in sanctions in the form of criticism by civil society, but also on the impact of those sanctions. That impact, in turn, will depend on the extent to which stakeholders expect companies to behave in a socially responsible manner, which varies considerably across countries (e.g., Chapple and Moon, 2005; Doh and Guay, 2006; Matten and Moon, 2008). Companies headquartered in institutional contexts that have greater expectations for socially responsible behavior are held to higher standards (Rowley and Moldoveanu, 2003) and face greater punishments when they fall short (Campbell, 2007; Pelozo and Papania, 2008). We propose that companies with

inferior environmental capabilities will be less likely to participate in a program incorporating scrutiny from civil society when they face these heightened expectations because the expected cost of failure, in the form of negative attention, is greater. We therefore hypothesize:

H2: Companies with inferior environmental capabilities will be less likely to participate in a voluntary program incorporating scrutiny from civil society, especially in institutional contexts with greater expectations for socially responsible behavior.

Companies with inferior capabilities can join programs incorporating civil society scrutiny and implement the required measures. But they are more likely to be deterred from joining such programs for any given level of civil society scrutiny because they face higher costs of implementing these measures than firms with superior capabilities face. As noted earlier, these costs involve managerial effort to reduce the firms' environmental risks and impacts and to produce progress reports that can withstand civil society scrutiny.

Smaller companies with inferior environmental capabilities are likely to incur especially high proportional costs because they cannot leverage economies of scale (across production units or employees) to the extent that larger companies with equally poor capabilities can (Khanna, 2001; Khanna et al., 2007). Moreover, compared to their smaller counterparts, larger firms with inferior capabilities are likely "to have more personnel to meet the administrative and technical requirements of participation" (Khanna, 2001: 310). Finally, because larger firms tend to already have more skilled and productive managers and employees (Oi and Idson, 1999; Bloom and Van Reenen, 2010), such firms should be better equipped to more efficiently implement the management systems needed to achieve the voluntary program's goals. We therefore predict that participating in a program incorporating scrutiny will be a stronger signal for smaller companies, as evidenced by smaller companies with inferior capabilities being especially deterred from participating.

H3: Smaller companies with inferior environmental capabilities will be especially unlikely to participate in a voluntary program incorporating scrutiny from civil society.

DATA AND METHODOLOGY

Empirical context

To test our hypotheses, we examined participation in the UN Global Compact, a program that requires participants to publicly commit to upholding and implementing a set of environmental and social principles. Companies have described several benefits from participating. For example, the French multinational automotive supplier Valeo has touted its UN Global Compact participation as part of a corporate social responsibility strategy that supports its “global strategy for winning new customers, expanding into new regions, and securing future growth” (Valeo, 2016). Moreover, some UN Global Compact participants have announced their desire to seek suppliers that are fellow participants, which increases the incentives for companies to join. For example, Trelleborg, a Global Compact participant since 2007, reports its “objective is to work only with suppliers who support our quality requirements and business principles. It is important for us that our suppliers share the principles that underpin our Code of Conduct... We actively support the UN Global Compact’s principles, and we encourage our suppliers to align with the same principles” (Trelleborg, 2016).

Unlike certifications programs such as the ISO 14001 standard and the Leadership in Energy and Environmental Design (LEED) green building standard, the UN Global Compact does not require companies to hire third-party auditors to ensure that they implement the program’s requirements. The lack of a certification requirement has promoted concerns that the UN Global Compact allows some companies to “bluewash”; that is, to illegitimately benefit from their association with the United Nations (and its blue logo) without truly committing to or carrying out the program’s requirements (Bigge, 2004; Nolan, 2005; Deva, 2006; Waddock and McIntosh, 2011; Lim and Tsutsui, 2012). For example, an op-ed in the *New York Times* observed that “[a] coalition of critics, including Greenpeace International and the Third World Network,” denounced the “Global Compact as threatening the integrity of the United Nations” because it contains “**no mechanism to make adherence to the compact's principles binding in any way**” (Karlner and Bruno, 2000). In fact, the UN Global Compact is designed to

promote civil society scrutiny to ensure that participants implement and uphold its principles. The Compact not only publicizes the names of all participants, but it also requires them to report every year on their progress in implementing the principles and makes these progress reports readily available on its website in order to “protect the integrity of the initiative and the UN from key risks associated with the potential for misrepresentation” and to promote “greater public accountability and transparency of participants for their corporate sustainability performance” (UN Global Compact, 2016a).

Several NGOs have emerged specifically to hold UN Global Compact participants accountable, including the Global Compact Critics website run by the Amsterdam-based Centre for Research on Multinational Corporations and the Global Compact Compliance Watch website. In addition, Sustainalytics, a company that conducts research and analysis for investors, operates its Global Compact Compliance Service, which assesses how well companies adhere to the Compact’s principles. The Compact also allows NGOs to become participants themselves, both to work with the business participants and to help “hold business accountable with respect to their commitments to the UN Global Compact and its ten principles” (UN Global Compact, 2015).

Sample

Our sampling frame was determined by the coverage of Trucost Plc, a company that produces and sells corporate environmental profiles to socially responsible investors and is the source of several of our key variables. Trucost collected data on all 4,819 public companies that were listed on any of the following major stock indices during 2004 through 2008: ASX 200, Dow Jones STOXX Europe 600, FTSE All Share, MSCI Asia ex Japan, MSCI World, Nikkei 225, Russell 1000, and S&P 500. We omit from our sample companies in industries whose direct environmental impacts are typically inconsequential, as others have done (e.g., Cho and Patten, 2007; Clarkson et al., 2008). In particular, we omit the 1,901 companies in service-related industries and focus on the remaining 2,918 companies that are in manufacturing, resources, and the other industries listed in Table 1.

Our outcome of interest is participation in the UN Global Compact. By 2008, its membership

included 2,811 companies from 107 countries and a wide array of industries. Of the 730 publicly traded companies that had joined by 2008, 264 were in industrial-related industries and in the Trucost sample. This includes 145 that joined during our sample period (2004–2008) and 119 that had joined before our sample period and that we therefore omitted.

Linking the remaining 2,799 companies to our other data sources—the UN, the World Bank, the World Economic Forum’s Executive Opinion Survey, the World Values Survey, Worldscope, and the *Yearbook of International Organizations*—resulted in a loss of 195 more companies. In sum, restricting our sample to the firms within the Trucost universe that were in industrial-related industries, had not joined the UN Global Compact before 2004, and were linked to our other data sources yielded an estimation sample of 2,604 companies headquartered in 44 countries.

Tables 1 and 2 report the industry and headquarters country distributions of the estimation sample.

[Insert Tables 1 and 2 here]

Dependent variable

We measure *UN Global Compact participation* as an annual binary variable coded 1 starting in the year a company joined and 0 otherwise.⁵ For nonparticipants, it is always 0. We obtained a list of participants and the dates they joined from the UN Global Compact secretariat.

Independent variables

To proxy for a company’s capabilities to manage its environmental risks and impacts, which is difficult to measure directly, we rely on the quality of its environmental disclosures, which has been shown to be a compelling proxy. In particular, prior research has shown that companies that issue higher-quality environmental disclosures are viewed by the investment market as being more capable of managing environmental risks (Blacconiere and Patten, 1994; Blacconiere and Northcut, 1997). Our use of this proxy is consistent with the accounting literature’s discretionary disclosure theory, which posits

⁵ As described below, our analysis omits a Global Compact participant’s observations in the years after it joined.

that companies with superior environmental capabilities will disclose more information regarding their environmental impacts in order to convey those capabilities to stakeholders (Verrecchia, 1983; Dye, 1985). Because it is difficult for companies with inferior capabilities to reveal equally positive information, stakeholders can use disclosures as an indicator of a company's environmental capabilities.⁶

We measure *quality of environmental disclosure* by relying on Trucost's weighted disclosure ratio (Trucost Plc, 2008). This ratio is the proportion of a company's relevant environmental indicators for which it disclosed worldwide quantitative figures, where each indicator is weighted to reflect the cost of environmental damage associated with it. To construct this ratio, Trucost first identified the subset of 464 industries from which each company derived revenues each year, based on the FactSet Fundamentals database, financial disclosures, and company feedback. From a comprehensive list of environmental indicators (such as sulfur dioxide emissions and hydrofluorocarbons), Trucost identified the subset that it deemed relevant to each industry, based on lifecycle assessment and economic input-output tables.

Second, Trucost reviewed each company's annual reports, sustainability reports, and websites to determine for which of the relevant indicators the company publicly disclosed quantitative figures. To weight these disclosures, Trucost multiplied each indicator by a damage cost factor; for example, \$31 per ton of greenhouse gas emitted. Trucost obtains these damage cost factors from the environmental economics literature. The sum of these products is the numerator of the weighted disclosure ratio: how much environmental damage was disclosed.

To construct the denominator, Trucost estimated the environmental damage that would have been reported had the company made complete disclosure; that is, its total *environmental damage*. To do so, Trucost estimated the relevant indicators which the company did not disclose, based on economic input-output data and lifecycle assessment data from various sources. It multiplied each of those indicators by

⁶ Some stakeholder groups, such as investment analysts, might be able to assess a company's capabilities directly from its disclosures and would not need to rely on voluntary programs as signals. Other stakeholders, such as potential buyers concerned with supply chain risk as well as current and potential employees, will often find it too difficult or time-consuming to obtain or digest complex environmental disclosures. We argue that participation in an environmental program can be a simple way to convey the gist of such information to these stakeholders.

its damage cost factor and added the sum of those products to the numerator. The weighted disclosure ratio thus captures the extent to which a company disclosed its more environmentally damaging or less environmentally damaging indicators.⁷

We measured institutional support for civil society scrutiny as *NGO participants*, the number of global NGOs in a company's headquarters country that were participants in the UN Global Compact in a given year, based on data from the Compact's website. Examples of such participants include Amnesty International, CERES, Conservation International, the Indian chapter of Leadership for Environment and Development (LEAD), and the Vietnamese chapter of ActionAid. According to the UN Global Compact (2015), the role of such NGO participants is to hold business participants accountable for their commitments to implement its principles. Of all civil society organizations, these NGOs are the most likely to understand the Compact's principles and objectives and to scrutinize its participants. Whereas others have used the number of NGOs in a company's headquarters country to measure NGO scrutiny (Prakash and Potoski, 2007; Berliner and Prakash, 2012; Marquis, Toffel, and Zhou, 2016), we believe that the number of global NGOs that are members of the UN Global Compact in a given country is a more precise measure of the potential scrutiny that participant companies face.

We measured stakeholder expectations of responsible behavior, or *ethical context*, based on data from the World Economic Forum's annual Executive Opinion Survey, which is a part of the World Competitiveness Report. Data from these surveys have been used by many other scholars examining international datasets (e.g., Johnson, Kaufmann, and Zoido-Lobaton, 1998; van Stel, Carree, and Thurik, 2005; Yuan, Low, and Tang, 2010; Aggarwal and Goodell, 2014).⁸ Business leaders were asked, "In your country, how would you rate the corporate ethics of companies (ethical behavior in interactions with public officials, politicians, and other firms)?" Responses ranged from 1 ("extremely poor—among the

⁷ For example, if a company disclosed quantitative data for 10 of its 20 relevant indicators but those 10 indicators collectively represented a mere 10% of the company's overall environmental damage, then its *quality of environmental disclosure* would be 0.1. If those 10 disclosed indicators instead collectively represented 90% of the company's overall environmental damage, then its *quality of environmental disclosure* would be a much more impressive 0.9.

⁸ These surveys are available at <http://www.weforum.org/issues/global-competitiveness> [accessed February 2015].

worst in the world”) to 7 (“excellent—among the best in the world”). This question was not asked in the 2003–2005 surveys, which prevents us from using annual figures. Instead, we use average country values based on surveys conducted in 2006–2008. We assign these country average values to companies based on their headquarters location. A company’s key stakeholders—including employees, regulators, and investors—tend to be concentrated in its headquarters country, which makes this institutional environment especially influential (Guler, Guillén, and Macpherson, 2002).

We measure company size using its annual sales, a common approach to capturing a company’s visibility to its stakeholders (e.g., Hackston and Milne, 1996; Patten, 2002; Cho and Patten, 2007; Elsayed and Hoque, 2010). We obtained *sales* in millions of US dollars from Worldscope, standardized them by country to account for the fact that the mean and variation differ substantially by country,⁹ and then winsorized (top coded) at the 99th percentile to reduce the impact of large outliers within each country.

Control variables

Performance in a voluntary program’s domain has been found to be an important predictor of participation (Arora and Cason, 1995; King and Lenox, 2000; Short and Toffel, 2008). We therefore control for a company’s *environmental damage* using the previously described metric provided by Trucost, which is reported in millions of US dollars. As with *sales*, we standardize *environmental damage* by country to account for the fact that the mean and variation of environmental damage differs substantially by country and we winsorize at the 99th percentile to account for outliers within each country.

To control for performance along the other dimensions associated with the UN Global Compact, particularly those regarding human rights and labor conditions, we created two variables based on data from the Business and Human Rights Research Centre’s (BHRRC) library of global news articles (Business and Human Rights Research Centre, 2015). We measure the extent to which a company’s

⁹ For example, a \$500-million-a-year company in Malaysia is large relative to its peers and will attract more scrutiny from its stakeholders than would a company of that size in the United States. To standardize by country, we mean-center observations based on their country, then divide these observations by their country’s standard deviation.

activities result in *any human rights concerns* based on whether the company had been mentioned in any article in the BHRRC database in a given year which BHRRC had tagged as addressing an “abuse” such as beatings and violence, denial of freedom of association, and sexual harassment.¹⁰ Similarly, we coded *any labor rights concerns* based on whether this database contained any articles in a given year associated with the company which BHRRC had tagged as addressing a “labor condition” such as child labor or forced labor or a “discrimination” issue such as pregnancy or racial/ethnic/caste origin.¹¹ Because only four percent of the companies in our sample were tagged in more than one such article in a given year, we measure these as dichotomous variables at the company-year level rather than as counts to avoid undue influence of outliers, which is akin to top-coding at the 96th percentile.

To account for the possibility that peer pressure or mimetic institutional forces might influence a company’s decision to participate in the UN Global Compact (Bennie, Bernhagen, and Mitchell, 2007; Perez-Batres, Miller, and Pisani, 2011) and for the fact that the popularity of the UN Global Compact varies considerably across countries, we control for peer participation. To calculate *peer participation per million population* for each company, we take the number of companies sharing its headquarters country and industry classification (that is, Industry Classification Benchmark [ICB] supersector) that were already participating in the UN Global Compact the prior year and divide that number by the country’s population in millions.

We also include several country-level variables. We control for the prevalence of ISO 14001 certifications in the company’s headquarter country because factors that increase the certification rate might also impose more pressure to participate in the UN Global Compact (Berliner and Prakash, 2012). We measure *ISO 14001 prevalence* as the (logged) number of ISO 14001 certifications received annually

¹⁰ BHRRC tags articles related to labor abuse for referring to abduction, arbitrary detention, beatings and violence, complicity, deaths, death penalty, death threats, denial of freedom of association, denial of freedom of expression, denial of freedom of movement, disappearances, displacement, genocide, injuries, intimidation and threats, killings, rape and sexual abuse, sexual harassment, slavery, torture and ill-treatment, and unfair trial.

¹¹ BHRRC tags articles related to labor conditions for referring to child labor, export processing zones (which are sometimes exempt from legal labor protections), forced labor, labor (general), living wage, and prison labor. It tags articles related to discrimination based on age, disability, diversity, gender, HIV/AIDS, marital status, political opinion, pregnancy, racial/ethnic/caste origin, religious, and sexual orientation.

in each company's headquarters country per million population. This is gathered from the ISO Surveys for 2005 and 2007, which provide historic annual data on the number of ISO 14001 certifications per country for the years 2004 to 2007.¹²

Like Berliner and Prakash (2012), we control for the *total number of NGOs* in each company's headquarters country each year to account for general NGO scrutiny, including scrutiny by the vast majority that do not participate in the UN Global Compact. We measure this based on data from the annual *Yearbook of International Organizations*.¹³

We control for the wealth of a company's headquarters country because this might affect the benefit a company accrues from participating in the UN Global Compact. We obtained each country's annual gross domestic product per capita in 2005 US dollars based on data from the US Department of Agriculture's Economic Research Service. For ease of interpretation, we report *GDP per thousand population*.¹⁴

UN Global Compact participation might be more valuable in countries that are more supportive of the United Nations (Berliner and Prakash, 2012); the program is likely to be more recognizable and stakeholders are likely to view participation more favorably (Bennie, Bernhagen, and Mitchell, 2007). Therefore, we control for the extent to which the population of each company's headquarters country generally supports the United Nations and its mission. We measured this with data from the World Values Survey, a series of national surveys conducted by social scientists every few years in nearly 100 countries to gather data on values and beliefs. We measure *UN support* as the percentage of respondents from each country that responded "a great deal" or "quite a lot" to the question: "Could you tell me how much confidence you have in [the United Nations]: is it a great deal of confidence, quite a lot of confidence, not

¹² The ISO Surveys are available at <http://www.iso.org/iso/survey2005.pdf> and <http://www.iso.org/iso/survey2007.pdf> [accessed May 2015].

¹³ The *Yearbook of International Organizations* is available at <http://www.uia.org/yearbook> [accessed August 2013]. We used values from the 2003 through 2007 editions because we lag all independent and control variables one year.

¹⁴ US Department of Agriculture Economic Research Service (ERS), ERS International Macroeconomic Data Set, last updated December 18, 2015, <http://www.ers.usda.gov/data-products/international-macroeconomic-data-set.aspx> [accessed March 2016]. ERS has subsequently updated its GDP data and reports it in 2010 US dollars.

very much confidence, or none at all?”¹⁵ Because the World Values Survey launches a new version (“wave”) of its survey every few years, which allows data to be collected from a subset of countries each year, it takes several years to gather data from all countries. We use data from the 2005–2008 survey wave, which provides us with a single average value per country.¹⁶

Summary statistics and correlations are reported in Table 3.

[Insert Table 3 about here]

EMPIRICAL MODEL AND RESULTS

Specification

We estimate the following model:

$$y_{i,j,c,t} = F(\beta_1[X1_{i,c,t-1} * Q_{i,t-1}], \beta_2 X1_{i,c,t-1}, \beta_3 Q_{i,t-1}, \beta_4 X2_{i,t-1}, \beta_5 X3_{j,c,t-1}, \beta_6 X4_{c,t-1}, \beta_7 X5_c, \lambda_j, \tau_t, \mu_{i,j,c,t}),$$

where $y_{i,j,c,t}$ refers to whether company i in industry j headquartered in country c participated in the UN Global Compact in year t (*UN Global Compact participation*). $X1_{i,c,t-1}$ refers to our key explanatory variables measured at the firm or country level, lagged one year: *NGO participants*, *ethical context*, and *sales*. The term $Q_{i,t-1}$ refers to firm i 's *quality of environmental disclosure*, lagged one year. $X2_{i,t-1}$ refers to several annual firm-level controls, each lagged one year, that might affect a company's decision to participate in the UN Global Compact: *environmental damage*, *any human rights concerns*, and *any labor rights concerns*. $X3_{j,c,t-1}$ refers to our controlling for *peer participation*, lagged one year. $X4_{c,t-1}$ refers to one-year-lagged values of the annual country-level controls: *total number of NGOs*, *ISO 14001 prevalence*, and *GDP per thousand population*. $X5_c$ refers to the time-invariant country-level measure of *UN support*. λ_j represents industry dummies (ICB supersector) to control for time-invariant industry differences in the propensity to participate in the UN Global Compact. τ_t refers to year dummies that

¹⁵ Responses range from 1 (“a great deal of confidence”) to 4 (“none at all”). The World Values Survey is available at <http://www.worldvaluessurvey.org/WVSDocumentationWV5.jsp> [accessed May 2014].

¹⁶ Because the World Values Survey does not collect data from four countries in our sample (Hong Kong, Israel, Singapore, and Sri Lanka), we recode these missing values of *UN support* to 0 and include a corresponding dummy variable coded 1 to denote these recoded observations (Maddala, 1977: 202; Greene, 2007: 62).

control for overall temporal trends that might affect participation, such as the UN Global Compact becoming more recognizable over time. Finally, the term $\mu_{i,j,c,t}$ represents the error term.

To ease interpretation and because hypothesized variables are interacted, we use standardized versions of *quality of environmental disclosure*, *NGO participants*, *ethical context*, and *total number of NGOs*. As mentioned above, we standardized *sales* and *environmental damage* by country because we expect the influence of those factors to be a function of their relative magnitude within the headquarters country.

The function $F(\cdot)$ refers to the logistic function. Like other studies that have tested signaling models and the adoption of voluntary programs (e.g., King and Lenox, 2000; Lenox and Nash, 2003; Montiel, Husted, and Christmann, 2012), we use logistic regression to predict participation in the UN Global Compact.¹⁷ Because we are interested in the determinants of participation, we drop participants from the sample after the year they join.

Results

Our diagnostic check for multicollinearity yielded no cause for concern, as the maximum variance inflation factor was 5.1, well below the conventional threshold of 10 (Belsley, Kuh, and Welsch, 1980). Regression results are reported in Table 4 along with the average marginal effects for Model 1, which includes only control variables. Models 2–4 test our hypotheses of the interactions between quality of environmental disclosure and our three moderators. For all models, we cluster standard errors by country because our explanatory variables are measured at the company or country level.

[Insert Table 4 and Figure 1 about here]

We begin interpreting results by focusing on the control variables from our initial model (Model 1). The significant positive coefficient on *quality of environmental disclosure* ($\beta = 0.35$; $p < 0.01$)

¹⁷ We were unable to use a firm fixed-effect model because our country-level variables vary little if at all during our sample period. We chose to use logistic regression rather than survival models because our interest is *whether* companies with particular attributes are more likely to participate in the Global Compact, not *when* companies are more likely to participate in the Global Compact.

suggests that, on average, companies with higher-quality disclosures are more likely to participate in the UN Global Compact and that those with lower-quality disclosures are deterred. We also find that companies with more *environmental damage* are significantly more likely to participate ($\beta = 0.21$; $p < 0.05$), a finding consistent with prior research on environmental programs (e.g., King and Lenox, 2000). Similarly, companies with *any labor concerns* are significantly more likely to participate ($\beta = 0.53$; $p < 0.01$), but we find no significant effect of *any human rights concerns*. *Peer participation* is a significant positive predictor ($\beta = 2.54$; $p < 0.01$), suggesting that mimetic pressure might encourage participation. The significant positive coefficient on *sales* ($\beta = 0.34$; $p < 0.01$) indicates that, within a given country, larger firms are more likely to participate. Turning to the institutional context, the significant negative coefficient on *GDP per thousand population* ($\beta = -0.03$; $p < 0.05$) indicates that companies headquartered in poorer countries are more likely to participate. Companies headquartered in countries with more *NGO participants* are significantly less likely to participate ($\beta = -0.43$; $p < 0.05$), as are those headquartered in more *ethical contexts* ($\beta = -0.22$; $p < 0.05$). These negative predictors are consistent with our theory that NGO presence and greater stakeholder expectations for ethical behavior create costs (in expectation) of participating in programs incorporating scrutiny. Companies headquartered in countries with higher *total number of NGOs* are significantly more likely to participate in the Compact ($\beta = 0.54$; $p < 0.01$). The coefficients on *UN support* and *ISO 14001 prevalence* are positive but not statistically significant.

Model 2 adds the interaction between *quality of environmental disclosure* and *NGO participants*. The positive significant coefficient on this interaction term ($\beta = 0.11$; $p < 0.05$) indicates support for H1: companies with lower-quality disclosures are especially unlikely to participate when headquartered in countries with more civil society engagement in the UN Global Compact. When companies are headquartered in countries that provide little support for civil society scrutiny, the average predicted probability of those with very high-quality disclosure participating in the UN Global Compact is nearly twice what it is for those with no environmental disclosures. Specifically, estimates based on setting *NGO participants* at the 5th percentile of the sample distribution—countries with zero *NGO participants*, such as Australia, Canada, and Japan—with all other variables at their original values indicate that the

predicted probability of participation in the UN Global Compact increases from 1.9 to 4.2 percent (a factor of 2.2) as *quality of environmental disclosure* increases from the 5th to the 95th percentile of the sample distribution. This relationship is depicted as the solid line in Figure 1.

In contrast, the corresponding increase is nearly fivefold among companies headquartered in countries with high levels of civil society scrutiny. That is, estimates based on setting *NGO participants* at the 95th percentile—countries with seven *NGO participants*, such as Spain and the United Kingdom—with all other variables at their original values indicate that the predicted probability of participation increases from 0.6 to 2.8 percent (a factor of 4.7) as *quality of environmental disclosure* increases from the 5th to the 95th percentile of the sample distribution. This is depicted as the dashed line in Figure 1.

The rising slopes of both lines indicate a greater propensity to participate in the UN Global Compact among companies with higher-quality environmental disclosures. The dashed line's steeper slope indicates that this positive relationship is more intensive for companies headquartered in countries more supportive of civil society scrutiny; the regression's interaction term indicates that the difference in slopes is statistically significant. The greater variation in the predicted probability of participation in countries with more civil society scrutiny—the increase by a factor of 4.7 versus 2.2—suggests that participation is a better signal of environmental capabilities in such countries.¹⁸

[Insert Figures 2 and 3 about here]

Model 3 includes the interaction between *quality of environmental disclosure* and *ethical context*. The significant positive coefficient ($\beta = 0.10$; $p < 0.05$) indicates that companies with lower-quality

¹⁸ As robustness tests, we reestimated Model 2 with two alternative measures of institutional support for civil society scrutiny. First, using the ratio of number of NGO participants in the Global Compact to the total number of NGOs in that country (obtained from the *Yearbook of International Organizations*) yielded a positive but slightly smaller coefficient on its interaction with *quality of environmental disclosure*, but with nearly the same standard error ($\beta = 0.093$; $p = 0.10$). We focus on NGOs in each company's headquarters country because it is easier for NGOs to research companies that operate (and release information) in the same language and because NGOs can more easily educate the local community and engage with local regulators (Billings, 1971; Sine and Lee, 2009). Our second alternative measure of civil society scrutiny is Internet usage, based on the premise that greater Internet penetration increases the threat of scrutiny from NGOs anywhere. Specifically, we obtained from the World Bank the number of Internet users per 100 people in the company's headquarters country to proxy the ease with which stakeholders can discover and disseminate a Compact member's violation of the Compact's principles. The results yielded a positive significant coefficient on the interaction between Internet users and *quality of environmental disclosure* ($\beta = 0.099$; $p < 0.05$). Together, these results provide supplemental support for H1, beyond our primary results.

disclosures are especially unlikely to participate when headquartered in countries with higher expectations for corporate ethical behavior. This supports H2.

Figure 2 depicts the average predicted probability of participating in the UN Global Compact estimated at varying levels of *quality of environmental disclosure*, as if the companies were headquartered in countries with weak and strong ethical contexts (that is, at the 5th or 95th percentile of the sample distribution of *ethical context*) but with the actual values of all other variables. The nearly flat solid line indicates that for companies headquartered in countries with a very weak *ethical context*—at the 5th percentile of the sample distribution, as in Argentina, Indonesia, the Philippines, and Russia—the probability of participation hardly changes with *quality of environmental disclosure*. Specifically, of companies headquartered in such countries, the predicted probability for those with very high-quality disclosures participating in the UN Global Compact is 3.8 percent, only 1.4 times the 2.8-percent probability predicted for those with no environmental disclosures at all.

In contrast, among companies headquartered in countries with a very strong *ethical context*—the 95th percentile of the sample distribution, as in Denmark, Finland, and New Zealand—the corresponding increase in the predicted probability of participating as *quality of environmental disclosure* increases from the 5th to the 95th percentile of the sample is from 0.8 to 3.4 percent (a factor of 4.3). This is depicted as the steeper-sloped dashed line in Figure 2. This greater increase in the predicted probability of participation in countries with stronger ethical contexts suggests that participation is a better signal of environmental capabilities in these countries than in others.¹⁹

Model 4 includes the interaction between *quality of environmental disclosure* and *sales*. The

¹⁹ As robustness tests, we reestimated Model 3 with two alternative measures of ethical context. First, we use annual values of *ethical context* starting in 2006, when the survey was launched, and use 2006 values for 2003–2006. The results yielded a coefficient on the interaction between *ethical context* and *quality of environmental disclosure* ($\beta = 0.115$; $p < 0.05$) that is very similar in magnitude and significance to our main effect. Second, we measured ethical context using the Corruption Perception Index of a company's headquarters country, obtained from Transparency International, which we reverse-coded—so that larger scores represent more corruption—and then standardized. The results yielded a coefficient on the interaction between *ethical context* and *quality of environmental disclosure* ($\beta = -0.103$; $p = 0.055$) that is similar in magnitude and significance to our main results except that the coefficient is negative because, as constructed, this variable measures *unethical* context, the reverse of our primary measure. Together, these results indicate that support for H2 is robust to several alternative measures.

negative significant coefficient ($\beta = -0.09$; $p = 0.08$) indicates that companies with lower *quality of environmental disclosure* are especially deterred from participation in the UN Global Compact when they are smaller in comparison to other companies in their country and thus presumably have fewer resources and less managerial capacity to bring to bear. Significant at the eight-percent level, this provides some support for H3 and indicates that participating in the Compact provides a stronger signal for smaller companies than for larger ones.

Figure 3 depicts the average predicted probability of participating in the UN Global Compact—estimated at varying levels of *quality of environmental disclosure*—for companies that are either small or large for their country (that is, at the 5th or 95th percentile of the sample distribution of *sales* standardized by country) and with the actual values of all other variables.

Figure 3 indicates that smaller companies (the solid line) exhibit a sharper increase than larger companies (dashed line) do in the average predicted probability of participating in the UN Global Compact as *quality of environmental disclosure* increases. Our model predictions indicate that among large companies—that is, those whose *sales* equal the 95th percentile in their country—the predicted probability of participating in the Compact doubles from 2.4 percent for those with very-low-quality disclosures (the 5th percentile of *quality of environmental disclosure*) to 4.9 percent for those with very-high-quality disclosures (the 95th percentile). In contrast, the corresponding increase for very small companies—those whose *sales* equal the 5th percentile in their country—almost quadruples from 0.9 to 3.3 percent (a factor of 3.7), given the same shift from low-quality to high-quality disclosures. The greater increase in the predicted probability of participation for smaller companies suggests that participation is a stronger signal of environmental capabilities for smaller companies than for larger companies; the coefficient on the interaction term indicates that this is significant at the eight-percent level.

DISCUSSION

Our analysis reveals that voluntary programs that lack certification but that promote civil society scrutiny can sometimes serve as a signal of environmental capabilities. Below, we discuss how our study

contributes to the literature, provide implications for managers, acknowledge limitations of our study, and offer suggestions for future research.

Contributions

The central contribution of our work is to the literature that examines whether participation in a voluntary program that lacks a third-party certification requirement can nevertheless signal a company's superior capabilities. Prior studies have concluded that a program lacking third-party certification cannot prevent adverse selection and therefore cannot serve as a signal (King and Lenox, 2000; Lenox and Nash, 2003; Rivera and de Leon, 2004; Darnall and Carmin, 2005). However, these studies were based on programs that differ from ours in two important respects. First, ours examines a voluntary program that features substantial oversight from civil society. Participation in the UN Global Compact, due to the program's size and connection to the UN, subjects firms to greater scrutiny and criticism than previously studied programs of this type. In contrast, King and Lenox (2000) found that the Responsible Care program was plagued with adverse selection, but their study was conducted before that program required participants to subject themselves to public scrutiny by publicly reporting their performance. Second, we theorize and empirically investigate how firms' decisions to join a voluntary program depend on their environmental capabilities and on the civil society scrutiny they face. Our global sample allows us to explore how both institutional factors and organizational characteristics that affect civil society scrutiny also affect voluntary program participation. Our study is thus among the first to show when firms can use voluntary program participation to signal their environmental capabilities.

Our theoretical and empirical approach to examining whether firm participation in voluntary programs may serve as a signal represents another important contribution to the literature on the potential signaling value of voluntary actions. Previous studies have sought to empirically investigate whether participation in voluntary programs increases when information asymmetries are high, when sending signals about environmental capabilities is more valuable. The maintained assumption in those studies is that participation in voluntary programs satisfies the necessary and sufficient conditions for a signal. We

offer a more direct approach by theorizing about when participation in voluntary programs satisfies the necessary and sufficient conditions to be a signal, and then investigating whether firms with inferior capabilities are indeed deterred from participating.

Another contribution is our focus on *ex post* factors (rather than *ex ante* factors) driving the signal. The management literature has used signaling theory to show how third-party certification seeks to ensure that participants follow through on a voluntary program's goals, but has largely ignored the role of penalties for failure to follow through, such as lawsuits or sullied reputations (Connelly et al., 2011: 61; Payne et al., 2013: 232). Our research expands this scholarship by revealing circumstances in which the threat of a penalty—criticism from civil society—can substitute for third-party certification to ensure that voluntary program participants follow through on the program's goals.

Implications for managers

Certifications have been proposed as a supplemental governance mechanism for companies operating in institutional contexts with lax regulatory enforcement and little social pressure for corporate social responsibility (Christmann and Taylor, 2006). Previous research has found that managers may use such programs to signal superior management capabilities. Our study provides evidence that programs that lack such certification requirements but that do incorporate civil society scrutiny can also be used to signal superior capabilities as long as there is institutional support for such scrutiny. Our results therefore suggest that managers considering suppliers that operate within countries that provide institutional support for scrutiny could screen candidates in part according to which ones participate in programs like the Compact that incorporate civil society scrutiny.

Furthermore, participation in programs that embody scrutiny might provide the opportunity to signal superior capabilities for companies that do possess superior capabilities but find the administrative and audit costs of third-party certification prohibitive (e.g., Darnall and Edwards, 2006). In his seminal paper, "Job Market Signaling," Spence (1973) notes a parallel possibility: the cost of an education might prevent highly capable but poor people from earning a degree. Because programs that embody civil

society scrutiny lack the administrative and audit costs of certification programs—costs unrelated to the quality of the company’s capabilities—they do not similarly dissuade highly capable companies from participating.

Limitations and future work

Our work has several limitations. We rely on companies’ disclosures as a proxy to measure their capabilities to manage environmental risks and impacts, but future researchers could develop datasets to measure such capabilities more directly.

Future research can examine voluntary programs that feature civil society scrutiny and that target participants from a single industry, such as the chemical industry’s Responsible Care program and the alpine ski industry’s Sustainable Slopes program, to identify whether their ability to provide a signal depends on additional circumstances, such as their relative prestige or reputation for quality. Research can also examine whether signaling works differently depending on whether a voluntary program is operated by a government regulator, an industry association, or a multi-stakeholder consortium (Darnall, Potoski, and Prakash, 2010). While data constraints limited our empirical analysis to relatively large, publicly listed companies, others could examine whether signaling operates similarly for smaller, privately held firms, which might not be subject to all the same pressures (such as investor pressure) that large public companies face.

CONCLUSION

Our study aimed to reveal the circumstances under which participation in voluntary programs that lack third-party certification requirements, but instead require participants to publicly commit to the program’s principles, can still serve as a signal of environmental management capabilities. We extend theory of signaling mechanisms in the management literature by demonstrating how the threat of a penalty—criticism from civil society—can deter companies with inferior environmental capabilities from participating in such a program.

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Table 1. Industry composition of sample

ICB supersector	Firms	Percent
Automobiles & parts	68	2.6
Basic resources	211	8.1
Chemicals	138	5.3
Construction & materials	164	6.3
Food & beverage	164	6.3
Industrial goods & services	715	27.5
Oil & gas	285	10.9
Personal & household goods	220	8.4
Technology	342	13.1
Telecommunications	112	4.3
Utilities	185	7.1
Total	2,604	

Table 2. Headquarters composition of sample

Country	Firms	Percent	Country	Firms	Percent
Australia	121	4.6	Luxembourg	7	0.3
Austria	13	0.5	Malaysia	38	1.5
Belgium	14	0.5	Mexico	15	0.6
Brazil	31	1.2	Netherlands	42	1.6
Canada	98	3.8	New Zealand	7	0.3
Chile	5	0.2	Norway	52	2.0
China	61	2.3	Pakistan	11	0.4
Czech Republic	2	0.1	Philippines	10	0.4
Denmark	18	0.7	Poland	4	0.2
Egypt	2	0.1	Portugal	6	0.2
Finland	34	1.3	Russia	17	0.7
France	37	1.4	Singapore	21	0.8
Germany	58	2.2	South Africa	19	0.7
Greece	13	0.5	South Korea	80	3.1
Hong Kong	61	2.3	Spain	15	0.6
Hungary	2	0.1	Sri Lanka	3	0.1
India	50	1.9	Sweden	46	1.8
Indonesia	19	0.7	Switzerland	29	1.1
Ireland	15	0.6	Thailand	23	0.9
Israel	18	0.7	Turkey	5	0.2
Italy	28	1.1	United Kingdom	384	14.7
Japan	324	12.4	United States	746	28.6
			Total	2,604	

Table 3. Summary statistics

Variable	Mean	SD	Min.	Max.	Correlations													
					(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		
(1) UN Global Compact participant (dummy)	0.02	0.13	0	1	1.00													
(2) Quality of environmental disclosure	0.17	0.32	0.00	1.00	0.08	1.00												
(3) NGO participants	3.56	3.76	0	9	-0.05	-0.07	1.00											
(4) Ethical context	5.46	0.58	3.36	6.54	-0.03	0.04	0.10	1.00										
(5) Sales	6,337	15,495	0	358,600	0.06	0.20	0.03	-0.06	1.00									
(6) Environmental damage	193	699	0	11,035	0.06	0.34	0.01	-0.10	0.28	1.00								
(7) Any human rights concerns (dummy)	0.06	0.24	0	1	0.03	0.12	0.03	-0.04	0.36	0.12	1.00							
(8) Any labor concerns (dummy)	0.09	0.29	0	1	0.04	0.13	0.10	-0.05	0.34	0.14	0.61	1.00						
(9) Peer participants per million population	0.04	0.09	0	1.66	0.06	-0.02	-0.02	0.20	-0.03	-0.05	-0.01	-0.03	1.00					
(10) ISO 14001 prevalence (log)	3.83	1.12	0.15	6.04	0.01	0.09	-0.34	0.61	-0.03	-0.09	-0.06	-0.09	0.21	1.00				
(11) Total number of NGOs	6,283	1,858	1,676	8,813	-0.01	0.02	0.73	0.40	-0.01	-0.04	0.00	0.02	0.09	0.04	1.00			
(12) GDP per thousand population	34.52	12.30	0.60	83.25	-0.04	0.02	0.47	0.69	0.03	-0.06	-0.01	0.03	0.06	0.34	0.61	1.00		
(13) UN support	0.46	0.16	0	0.85	0.04	0.09	-0.49	-0.04	0.01	-0.02	-0.01	-0.05	0.03	0.38	-0.15	-0.07	1.00	

This table reports summary statistics of the original variables for our sample of 8,338 firm-years (2,604 firms headquartered in 44 countries). The regression models reported in Table 4 use standardized versions of *quality of environmental disclosure* (ranging from a minimum of -0.52 to a maximum of 2.59), *NGO participants* (-0.94 to 1.45), *ethical context* (-3.64 to 1.88), and *total number of NGOs* (-2.42 to 1.35) and use versions of *sales* (-1.52 to 4.27) and *environmental damage* (-1.73 to 4.80) that are standardized within each country. Correlations with the standardized variables are identical to those displayed here.

Table 4. Logistic regression results

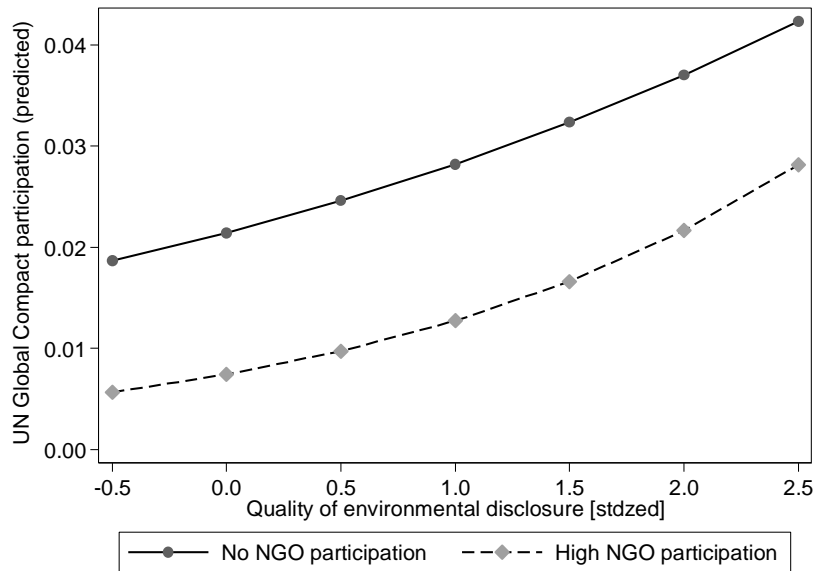
Dependent variable: UN Global Compact participation

		(1)		(2)	(3)	(4)	
	Coef	AME	AME/ Ave(Y)	Coef	Coef	Coef	
H1	Quality of environmental disclosure † x NGO participants †			0.109* [0.056]			
H2	Quality of environmental disclosure † x Ethical context †				0.109* [0.052]		
H3	Quality of environmental disclosure † x Sales ◇					-0.087+ [0.050]	
	Quality of environmental disclosure †	0.348** [0.089]	0.0058	33%	0.393** [0.064]	0.367** [0.087]	0.393** [0.077]
	NGO participants †	-0.380 [0.237]	-0.0063	-36%	-0.457+ [0.260]	-0.375 [0.235]	-0.379 [0.235]
	Ethical context †	-0.234* [0.096]	-0.0039	-22%	-0.236* [0.095]	-0.305** [0.100]	-0.232* [0.096]
	Sales ◇	0.336** [0.080]	0.0056	32%	0.335** [0.077]	0.329** [0.079]	0.412** [0.097]
	Environmental damage ◇	0.212* [0.095]	0.0035	20%	0.211* [0.094]	0.215* [0.092]	0.222* [0.092]
	Any human rights concerns	-0.412 [0.347]	-0.0068	-39%	-0.416 [0.340]	-0.403 [0.344]	-0.399 [0.338]
	Any labor concerns	0.527** [0.174]	0.0087	49%	0.505** [0.176]	0.538** [0.175]	0.536** [0.166]
	Peer participants per million population	2.544** [0.684]	0.0422	239%	2.510** [0.681]	2.582** [0.687]	2.499** [0.707]
	ISO 14001 prevalence (log)	0.150 [0.155]	0.0025	14%	0.142 [0.156]	0.172 [0.156]	0.152 [0.157]
	Total number of NGOs †	0.540** [0.120]	0.0090	51%	0.541** [0.117]	0.549** [0.121]	0.548** [0.116]
	GDP per thousand population	-0.034* [0.017]	-0.0006	-3%	-0.032+ [0.017]	-0.034* [0.017]	-0.034* [0.017]
	UN support	0.858 [1.162]	0.0142	81%	0.844 [1.145]	0.761 [1.159]	0.898 [1.157]
	Industry dummies	Yes			Yes	Yes	Yes
	Year dummies	Yes			Yes	Yes	Yes
	Observations	8,338			8,338	8,338	8,338
	Companies	2,604			2,604	2,604	2,604
	UN Global Compact participants	145			145	145	145
	Countries	44			44	44	44

† indicates variables that are standardized. ◇ indicates variables standardized within each country. Logistic regression coefficients with standard errors clustered by country in brackets. ** p<0.01, * p<0.05, + p<0.10. AME reports average marginal effects and AME/Ave(Y) reports the ratio of the average marginal effect to the average value of *UN Global Compact participation* (0.01763).

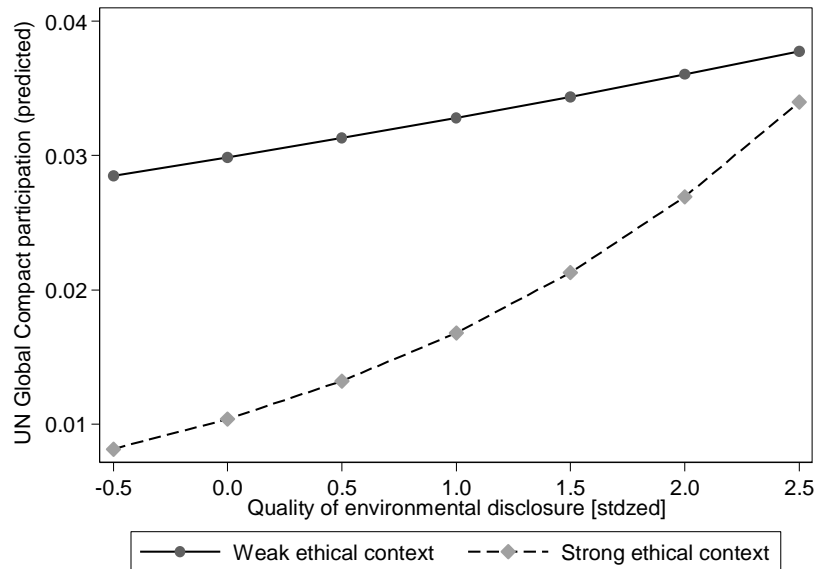
Environmental damage and *sales* are winsorized (top-coded) at the top-one-percent level to mitigate the influence of outliers. All models also include a dummy variable denoting the 332 instances in which *UN support* was coded to 0 to replace missing values.

Figure 1. Companies with low-quality disclosures are especially deterred from the UN Global Compact when headquartered in countries with many *NGO participants*.



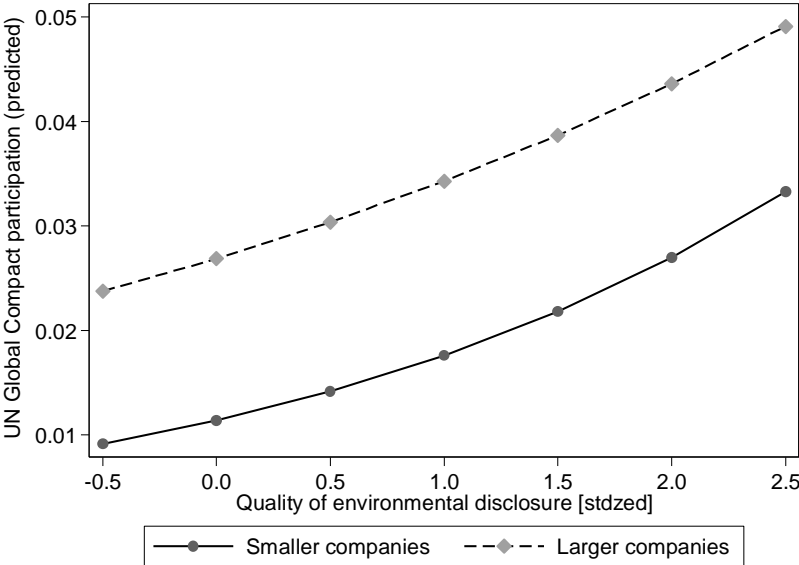
The solid line depicts average predictions from Model 2 for no *NGO participation* (the 5th percentile of that variable) and the dashed line depicts average predictions for high *NGO participation* (the 95th percentile, or seven *NGO participants*), based on varying levels of *quality of environmental disclosure* and with all other regressors at their actual values.

Figure 2. Companies with low-quality disclosures are especially deterred from the UN Global Compact when headquartered in countries with a strong *ethical context*.



The solid line depicts average predictions from Model 3 for weak *ethical context* (the 5th percentile) and the dashed line depicts average predictions for strong *ethical context* (the 95th percentile), based on varying levels of *quality of environmental disclosure* and with all other regressors at their actual values.

Figure 3. Companies with low-quality disclosures that are smaller in size are especially deterred from the UN Global Compact.



The solid line depicts average predictions from Model 4 for smaller companies (5th percentile of *sales*) and the dashed line depicts average predictions for larger companies (95th percentile of *sales*), based on varying levels of *quality of environmental disclosure* and with all other regressors at their actual values.