VOLUNTARY ASSURANCE OF VOLUNTARY CSR DISCLOSURE∗

by

Mark Bagnoli
and
Susan G. Watts

Krannert Graduate School of Management
Purdue University
West Lafayette, IN 47907

December 2015

Abstract: We study a firm’s decisions to engage in socially responsible activities, voluntarily report on them and purchase external assurance of the report. In our signaling model, neither firm type nor the level of activity is observed. We show that if voluntary assurance is not too expensive, the firm that engages in more socially responsible activities purchases external assurance and thus “selects” a separating equilibrium. As a result, CSR reports can be used to infer the level of activity and this causes all firms to engage in more socially responsible activity. Further, when voluntary assurance is required to support a separating equilibrium, greater monitoring by social activists increases the chosen quality of voluntary assurance—voluntary assurance and monitoring by social activists are complements, not substitutes.

Keywords: Corporate Social Responsibility, Sustainability, Assurance, Reporting, Signaling, Activists

JEL Classification Codes: D82, Q56 and M4

* We thank the Editor, Co–Editor and two anonymous referees for very helpful comments and suggestions. We also thank Rashad Abdel–Khalik, Anil Arya, Ramji Balakrishnan, Quintao Fan, PJ Hoffman, Tom Lyon, Bob Magee, Brian Mittendorf, Lin Nan, KoEun Park, Rick Young and participants at the 2014 Midwest Research Conference for helpful discussions. We gratefully acknowledge the financial support provided by the Krannert Graduate School of Management and Purdue University.
1. Introduction.

Many firms engage in socially responsible activities (e.g., reducing environmental damage, curbing water usage, ensuring safe working conditions, and supporting charitable or community activities). Disclosure of a firm’s socially responsible activities is not (generally) mandatory in the United States. However, some firms voluntarily provide these disclosures, and some also voluntarily hire third parties to assure some or all of the content of the disclosures. In their biannual survey, KPMG [2013] reports that 86% of their sample of U.S. firms report on their socially responsible activities, up from 83% in 2011, and that 23% received some type of independent assurance, up from 13% in 2011. These results are similar to those reported by Casey and Grenier [2015] who analyze 2,649 corporate social responsibility (CSR) reports published between 1993 and 2010. They find that only 230 are independently assured.

Of those CSR reports that are voluntarily assured, the quality of assurance seems to vary considerably in practice. Firms purchase assurance services from a wide variety of providers, and assurers offer various levels of assurance quality depending on the extent of their assurance (depth and breadth) and the quality (reputation) of the assurer itself.

The objective of this paper is to develop a model of a firm’s decisions to engage in socially responsible activities, provide a report on these activities, and have the report professionally assured if it is provided. We develop a role for these voluntarily provided corporate social responsibility (CSR) reports and the voluntary assurance of their contents by relying on a natural information asymmetry: the firm knows its chosen level of socially responsible activities but the audience for the report (investors, creditors, consumers, employees and/or supply chain partners) does not observe this choice. We show that this asymmetry provides the firm with incentives to voluntarily disclose

---

1 The Security and Exchange Commission (SEC) has just implemented a requirement that firms disclose their use of conflict minerals as mandated by the Dodd–Frank Act (http://www.sec.gov/News/PressReleaseDetail/PressRelease/1365171448400#.U4oJjiimU40) and has offered interpretative guidance regarding disclosure of climate change risks and other environmental risks (http://www.sec.gov/news/press/2010/2010-15.htm). Despite this, the vast majority of the information in a typical CSR report is not required to be disclosed in the United States.

2 The Global Reporting Initiative (GRI) finds that only 10% of GRI–based sustainability reports received independent assurance in 2011 (GRI 2013).

3 Companies offering assurance include international accounting firms (Deloitte, EY, KPMG and PwC), boutique or niche consulting firms and engineering services firms (e.g., Bureau Veritas, Environmental Resources Management Certification and Verification Services (ERM CVS), TruCost and Two Tomorrows). Some client firms choose a review rather than an examination rather than a verification, and some choose to purchase varying levels of assurance for different parts of their CSR reports.

4 In this paper we use the terminology "CSR report" even though in practice, firms use a variety of names for
its socially responsible activities but does not create sufficient incentives to report truthfully.

Despite this, the firm’s CSR report will have value if (at least) some of the audience can use it to infer the actual level of the firm’s socially responsible activities. We show that such a separating equilibrium is possible only if the probability of identifying any mischaracterization in the firm’s CSR report is sufficiently high. This can occur if there is sufficient monitoring by outsiders such as social activists, but when it does not, we show that there is an endogenous demand for voluntary third–party assurance of the voluntary disclosure.

Specifically, firm types with greater incentives to engage in socially responsible activities have incentives to purchase professional assurance of their CSR reports. Doing so raises the probability that any mischaracterizations of its activities are identified. Since assurance is costly, the firm benefits only if its payoff in a separating equilibrium exceeds its payoff in a pooling equilibrium. When assurance is not too expensive, we show that this type of firm does, in fact, acquire third–party assurance and “selects” the separating equilibrium. Further, it does so by choosing the quality of assurance just sufficient to support a separating equilibrium. In other words, the demand for voluntarily obtained professional assurance of a voluntary disclosure arises because it allows the purchasing firm to use its CSR report to distinguish itself from less socially responsible firms. These same incentives also motivate the firm to choose a sufficiently high quality of assurance to support its efforts to distinguish its level of socially responsible activities. Thus, if firms face different levels of monitoring by outsiders, our model suggests that some firms voluntarily assure their voluntary disclosures, others simply provide voluntary disclosures, and the rest choose not to offer any voluntary disclosure of their socially responsible activities.

Our analysis has a number of implications. First, we show that firms can and do distinguish themselves with their CSR reports. In the separating equilibrium, the CSR report’s audience appropriately infers that firms engage in more socially responsible activities when they claim to do so. Interestingly, the conditions that allow the audience to infer the firm’s activities from its CSR report also ensure that the most socially responsible firms exaggerate their activities in their report, consistent with the empirical findings in Marquis and Toffel [2014].

Second, in the separating equilibrium, every firm engages in more actual socially responsible
activities than they do when the audience cannot distinguish them. Further, the firms that voluntarily assure their reports engage in even more socially responsible activities than they would absent assurance, and the increase is greater the higher the quality of assurance they purchase. Thus, the firm seeking assurance motivates all types to engage in more socially responsible activities, and its own activities increase with the quality of the assurance it seeks.

Third, we show that the quality of assurance chosen by a firm that decides to externally assure its CSR report is increasing in the amount of monitoring by social activists. That is, monitoring by social activists and voluntary assurance are complements, not substitutes. Combining this result with the results described above suggests that increased monitoring by social activists increases the likelihood and quality of voluntary assurance of CSR reports and increases the actual level of socially responsible activity undertaken by both the firm and its peers.

Fourth, if a larger share of the firm’s audience makes sophisticated (Bayesian) inferences, the firm is more likely to purchase professional assurance for its CSR report and is more likely to purchase higher quality assurance. Such situations are likely to arise when the report’s audience is more responsive to its socially responsible activities, which in turn suggests that firms in extraction industries or those whose water usage is under scrutiny, whose production facilities are suspected of offering poor working conditions or that have become targets of social activists for other reasons are more likely to purchase assurance and more likely to purchase higher quality assurance. Conversely, if a larger share of the audience is composed of non–Bayesians, all firms engage in fewer socially responsible activities, are less likely to voluntarily assure their CSR reports and, when they do, purchase lower quality assurance.

Fifth, we show that the quality of the voluntarily purchased assurance is greater when competing firms’ costs of engaging in socially responsible activities are more similar. This suggests that the quality of assurance chosen by firms in industries that focus on charitable giving and community service, such as banks, other financial institutions and service industries, will be higher. Conversely, the quality of assurance chosen by firms in industries where the costs of socially responsible activities differ substantially, possibly because of the use of different production technologies

---

5 Note that these results do not imply that differences in third-party assurance will exhibit industry effects. Intuitively, in applying signaling models, it is important to recall that each industry would contain different types of firms and so how many firms in an industry engage in CSR activities and CSR reporting and assurance depends on the distribution of firm–types. Thus our results are in line with the lack of industry effects noted in the examination of U.S. firms’ CSR assurance decisions (Casey and Grenier 2015).
or different ages of the production facilities (e.g., firms in the extraction industries, technology industries and utilities), will be lower.

Finally, our results may also help to explain not only the decision to purchase third-party assurance of the firm’s CSR report but also the selection of which assurance provider(s) are chosen, particularly when the assurer’s identity (reputation) is associated with the quality of its work.

The remainder of the paper is organized as follows. Section 2 discusses the institutional background and related literature. We introduce our model in Section 3. We derive the separating equilibrium in Section 4 and the pooling equilibrium in Section 5 in the absence of assurance. We introduce the assurance decision in Section 6 and conclude in Section 7.

2. Background and Related Literature.

As noted in the introduction, many U.S. firms engage in socially responsible activities and, of those that do, some choose to publicly disclose these activities. Examples of socially responsible activities disclosed by firms include avoidance of production processes that damage the environment or involve the use or sale of conflict diamonds/minerals and child labor. Other examples include disclosures that the firm is expending resources to improve the environment, including reducing its carbon footprint, reducing water usage, using environmentally friendly packaging, providing a safe and healthy working environment or supporting a wide variety of charitable and community activities. Although disclosure of a firm’s socially responsible activities is not (generally) mandatory in the United States, some firms that do voluntarily provide these disclosures as CSR reports also voluntarily hire third parties to assure some or all of the content of the disclosures. Interestingly, the quality of assurance seems to vary considerably in practice (KPMG 2013).

The theoretical literature on voluntary assurance in CSR settings is limited and generally treats assurance as a strategic choice by an outsider rather than a decision made by the reporting firm (Lyon and Maxwell 2011, Kotowski, Weisbach and Zechhauser 2014). In these models, outside monitoring disciplines the voluntary disclosure decisions by the firms. Lyon and Maxwell [2011] show that outside monitoring creates a non-monotonic relation between the number of disclosures by a firm and the level of its socially responsible activities in expectation. Firms that engage in little socially responsible activity increase disclosures in the presence of an outside monitor but firms that engage in substantial socially responsible activity choose not to disclose at all.6

6 Recent empirical work (Mahoney, Thorne, Cecil and LaGore 2013 and Marquis and Toffel 2014) attempts
Kotowski, Weisbach and Zechhauser [2014] view outside monitoring as the activity of regulators and study whether regulators can signal their ability to identify misreporting by their choice of audit strategy. “Regulatory” monitoring is also studied in the literature on ecolabeling, when firms associate their product with socially responsible or “green” activities. A role for monitoring arises because firms have an incentive to inappropriately ecolabel their product and the idea is that outside monitoring enhances the credibility of the firm’s ecolabeling activities. Papers that focus on governmental monitoring of ecolabeling include Nimon and Beghin [1999], Liebi [2002], Greaker [2006], Baski and Bose [2007], Ben Youssef and Lahmandi–Ayed [2008]. Other papers focus on third-party monitoring by entities with no financial ties to the firm, often referred to as non–governmental agencies (NGOs), and include Heyes and Maxwell [2004], Bottega and De Freitas [2009], Baron [2011] and Manasakis, Mitrokostas and Petrakis [2013]. In all of these models, monitoring requires that the firm’s socially responsible activities be verifiable by an outside monitor. Otherwise, the monitor cannot determine the relation between the firm’s claims and its activities. Our model differs from these in that the firm’s claims and its decision to voluntarily purchase third–party assurance are used by the audience to infer its activities. Finally, Sinclair–Desgagne and Gozlan [2003] study a signaling model in which the firm’s management knows if it is a polluter and chooses the quality of a “test.” This choice is observed by the firm’s stakeholders (potentially its stockholders) who then choose whether or not to employ the test to determine if the firm is, in fact, a polluter. The “test” can be thought of as a form of monitoring whose quality is determined by the firm’s management but whose use is determined by the firm’s stakeholders. Our paper contributes to this literature by focusing on the disposer’s incentives to purchase third–party assurance itself and how this affects both the firm’s chosen level of socially responsible activities and its voluntary disclosure of those activities.

to identify whether greenwashing (i.e., the promotion of the firm’s socially responsible activities while not necessarily fully and accurately describing all of the firm’s activities) is an important feature of CSR reporting and what limits a firm’s willingness to greenwash.

7 Golden [2010] offers a nice overview of ecolabeling and monitoring.

8 Recently, Fischer and Lyon [2014] have extended this literature to examine the effects of competition among monitors of ecolabeling claims.

9 There are obvious situations in which a firm’s claims are verifiable without incurring significant monitoring costs but there are also many situations in which the firms claims are essentially unverifiable by outsiders without the firm’s cooperation. Assuming verifiability of the firm’s claims seems to be the appropriate modeling choice in the former case but when claims are not verifiable at a low enough cost, a signaling approach with voluntary assurance (as in our paper) seems to be the appropriate modeling choice. An interesting extension would be to follow Daughety and Reinganum [2008] who, in a model of a firm selling a product of unknown quality, examine the complementary use of verifiable disclosure and signaling. They show that when the cost of verifiable disclosure is neither too high nor too low, some types choose disclosure while other opt to reveal their firm’s product quality by signaling. We thank a referee for pointing out this interesting potential extension.
In contrast to the relatively limited theoretical literature, there is a growing literature that empirically examines assurance of a firm’s CSR report (Casey and Grenier 2015, Peters and Romi 2015, Moroney, Windsor and Aw 2012, Pflugrath, Roebuck and Simnett 2011, Kolk and Perego 2010, and Simnett, Vanstraelen and Chua 2009). These papers tend to use samples of CSR reports issued by U.S. and non–U.S. firms to study differences in stock market responses to the issuance of a CSR report with and without assurance or to identify firm characteristics associated with assurance of the firm’s CSR reports. Papers focused on market responses generally find that the response to assured CSR reports is stronger than to those lacking professional assurance.

Papers focused on factors associated with CSR report assurance find that firms that purchase assurance are generally larger, have better CSR or social performance ratings, stronger environmental corporate governance and are located in countries that are more stakeholder–oriented. However, these papers do not find consistent evidence of a relation between CSR reporting, assurance and industry membership. Our work complements this literature by theoretically examining all three decisions (the level of socially responsible activities, the issuance of a CSR report and the assurance of that report) and how they interact allowing us to examine why different firms in the same industry choose different approaches to voluntary CSR reporting and voluntary assurance.

There is also a growing empirical literature that revisits the market response to issuing CSR reports (Connors and Johnston 2013, Servaes and Tamoayo 2013, Lys, Naughton and Wang 2012, Griffin and Sun 2012, Dhaliwal, Li, Tsang and Yang 2011, Holder–Webb, Cohen, Nath and Wood, 2009, and Clarkson, Li, Richardson and Vasvari 2008, among others). While the original literature reports mixed results for the market response to CSR reporting, more recent work suggests that the market response is generally positive but depends on both the type of disclosure and on the firm’s information environment. Interestingly, Lys, Naughton and Wang [2012] offer evidence that CSR reporting is associated with better future firm performance. This result questions the direction of causality in the CSR reporting–firm value relation, and the authors interpret these results as suggesting that reported socially responsible activities may “signal” better future firm performance. Our paper complements this literature by developing a theoretical model that includes other relevant audiences and the associated benefits that accrue to the firm from engaging

---

10 See also the interview evidence reported in Jones and Solomon [2010].
11 The literature on the broad area of corporate social responsibility is voluminous. A nice introduction to this literature is the collection of papers assembled by Crane, McWilliams, Matten, Moon and Siegel [2008]. See also some recent surveys by Kitzmueller and Shimshack [2012], Moser and Martin [2012], and Aguinis and Glavas [2012].
those audiences. Further, we extend this literature by highlighting the interactions of the firm’s choices to engage in socially responsible activities, voluntarily disclose them in their CSR report and voluntarily purchase third-party assurance.

Finally, there are two recent papers that study voluntary assurance in non-CSR settings. Kamal and Sunder [2011] examine the impact of sellers of collectible baseball cards choosing to have their cards certified prior to selling them on eBay. They find that market participants pay a significant premium for certified cards and that the premium is greater if the seller uses a “higher quality” certifier. Kauser, Shroff and White [2014] study the impact of a firm’s decision to seek a voluntary audit of its financial statements following a change in British regulations that drops the requirement of a mandatory audit of the financial statements for smaller firms. They interpret their results as suggesting that the choice to obtain a voluntary audit conveys information to capital providers. We study a theoretical model focused on voluntary assurance of voluntarily disclosures and thus complement this work which focuses on voluntary assurance of baseball cards without voluntary disclosure or voluntary assurance of mandatory financial statements.

3. The Model.

Our model is designed to study three decisions by the firm: the decision to engage in socially responsible activities, the decision to provide a report on those activities (a CSR report) and the decision to seek voluntarily assurance of some or all of the contents of the report. A role for voluntary CSR reports and voluntary assurance of the content of the report is based on a natural information asymmetry: the firm knows its chosen level of socially responsible activities but the audience for the CSR report (investors, consumers, employees and/or supply chain partners) does not observe this choice. Specifically, we study a signaling model in which the firm has private information about its costs of engaging in socially responsible activities and simultaneously chooses the level of socially responsible activities it wishes to engage in, the type of CSR report it wishes to voluntarily provide and whether to voluntarily have the report assured. If the firm chooses to have its CSR report assured, it also chooses the quality of the assurance. The audience cannot observe the firm’s socially responsible activities but can observe both the firm’s CSR report and whether the report is assured. The audience uses these observables and its understanding of the firm’s incentives to infer as much as possible about the level of socially responsible activities the firm is engaging in.
There are many perspectives on a firm’s decision to engage in socially responsible activities. We adopt the view that such activities enhance the value of the firm — firms do well by doing good. Because our main focus is on the firm’s decisions to voluntarily offer a CSR report and whether to pay for professional assurance of the contents, we will adopt a “reduced form” model of the net benefits to socially responsible activities. In particular, let \( \rho_i \) represent the firm’s chosen level of socially responsible activities and assume that the firm obtains net benefits (benefits minus costs) of

\[
\alpha + \beta E[\rho_i \mid \Phi] - \frac{1}{2} \tau_i \rho_i^2,
\]

where the expectation reflects the underlying information asymmetry, \( \Phi \) represents the audience’s information and \( \tau_i \) for \( i = L, H \) parameterizes the firm’s marginal costs of socially responsible activities. We assume that \( \alpha, \beta \) and \( \tau_i \) are strictly positive and that \( \tau_i \) is part of the firm’s private information. Note that by adopting this “reduced form” model of benefits, we have combined the audience’s inference and actions given their inference into a description of the benefits that the firm receives from engaging in socially responsible activities.

In our model, the sources of benefits tend to depend on the audience. For example, if the audience is composed of investors, then the benefits would be associated with market perceptions of firm value and how that value is affected by the firm’s socially responsible activity (Dhaliwal, Li, Tsang and Yang 2011). If the audience is composed of the firm’s customers, then the benefits would be associated with any competitive advantage socially responsible activity creates for the firm in its product market (Bagnoli and Watts 2003, Besley and Ghatak 2007). If the audience is composed of the firm’s employees, Balakrishnan, Sprinkle and Williamson [2011] experimentally show that

---

12 This type of socially responsible activity is sometimes referred to as strategic CSR (Baron 2001). As mentioned above, the literature on socially responsible activities is voluminous (see Crane, McWilliams, Matten, Moon and Siegel 2008 for a recent survey). This literature initially appears to have focused on social responsibility as a moral obligation for companies. In contrast, Friedman [1970] argued that a firm’s sole responsibility is to increase shareholder value and suggested that socially responsible activity should be viewed as an agency cost. His opinion piece led to a large literature developing explanations for how socially responsible activities actually increase shareholder value (as well as a large literature illustrating how socially responsible activity can be viewed as an agency problem). Papers that discuss strategic CSR include Baron [2001], Bagnoli and Watts [2003], McWilliams, Siegel and Wright [2006], Besley and Ghatak [2007], Siegel and Vitaliano [2007], Baron [2009] and Fernandez-Kranz and Santalo [2010] among others. See also the survey by Lyon and Maxwell [2008] and the discussion of approaches to strategic CSR in Orlitzky, Siegel and Waldman [2011]. These papers generally assume that the firm benefits from socially responsible activities by influencing their customers. Balakrishnan, Sprinkle and Williamson [2011] experimentally examine the benefits that accrue to the firm from the effects of corporate charitable giving on employee effort. For an interesting new perspective see Arya and Mittendorf [2014] who show that strategic CSR benefits can arise from the influence of corporate charitable giving on the firm’s supply chain. Phillippe and Durand [2011] study the relation between a firm’s Fortune magazine reputation and its environmental disclosures. They find that the firm’s reputation is increasing in the environmental disclosures in both its annual report and its separate CSR report disclosures. When they restrict the firm’s reputation to the components related to its community and environmental activities, the reputation benefits accrue to the firm only when the disclosure is consistent with social norms.
a firm’s socially responsible activities create value by reducing costs as employees increase effort. Finally, if the audience is the firm’s supply chain, the benefits may flow through the supply chain from the preferences of end customers or, as modeled in Arya and Mittendorf [2014], may represent competitive benefits that arise from influencing supplier pricing decisions.

There are two features of this formulation of net benefits that merit discussion. First, firms differ only in terms of their costs of engaging in socially responsible activities (the magnitude of $\tau_i$) and not in terms of the magnitude of the benefits they receive from those activities ($\alpha$ or $\beta$). As a result, in our model, the firm’s type is defined by the value of $\tau$. This structure is imposed purely to simplify the analysis below. Our results would be qualitatively similar if we were to assume that firms differ only in terms of the benefits they receive from engaging in socially responsible activities (allow the magnitude of $\beta$ to vary between firms). Second, we have simplified the firm’s cost function by assuming that it is quadratic. This simplifies the analysis below without significantly affecting its implications.

We also assume that $\tau_i$, the firm’s type, can take one of two values, $\tau_L$ or $\tau_H$. Because our analysis would also apply if firms were distinguished by the parameter describing marginal benefits, $\beta$, we will label the type that chooses to engage in more socially responsible activity as the $H$–type and the type that engages in less socially responsible activity as the $L$–type. Thus, $\tau_H < \tau_L$.

In our model, the audience observes whether the firm voluntarily offers a CSR report, its contents if a report is provided and whether or not the firm purchased professional assurance. Notationally, let $r_i \geq 0$ represent the contents of the firm’s CSR report with $r_i = 0$ indicating that the firm either did not provide a report or provided a “minimal” one. Let $a_i \geq 0$ represent the “quality” or level of assurance chosen with $a_i = 0$ indicating that the firm did not choose to have its CSR report assured. Thus, $\Phi = \{r_i, a_i\}$.

Following Hirschleifer and Teoh [2003], we assume that the audience consists of a fraction, $\xi$, of fully-rational, Bayesian individuals and a fraction, $(1 - \xi)$, of individuals who employ heuristics (i.e., individuals who are not fully Bayesian). Specifically, we assume that $\mathbb{E}[\rho_i | \Phi] = \mathbb{E}[\rho_i | r_i, a_i]$.

---

13 If firms differ both in terms of the marginal benefits and marginal costs of socially responsible activities, we would need to add an additional assumption that ensured that the net effect (marginal benefits minus marginal costs) was monotone in firm type.

14 Models with not fully Bayesian actors have become common in the behavioral accounting, economics and finance literatures. For an excellent discussion of heuristics and, in particular, the type we use, see Hirschleifer and Teoh [2003]. See also the surveys in the fields of accounting, economics and finance by Birnberg [2011].
for the members of the audience who are Bayesian and that \(E[\rho_i | \Phi] = r_i\) for the members of the audience that are not Bayesian. That is, the non–Bayesians simply trust the firm’s CSR report as accurately describing the firm’s actual social responsibility activities.\(^{15}\) Collecting, the firm’s net benefits to its choice of socially responsible activities becomes

\[
\xi N(\alpha + \beta E[\rho_i | r_i, a_i]) + (1 - \xi) N(\alpha + \beta r_i) - \frac{1}{2} \tau_i \rho_i^2,
\]

where \(N\) is the size of the firm’s audience.

We introduce non–Bayesians for two reasons. First, inferences from signaling models are often quite challenging and being able to understand the effects of what Hirshleifer and Teoh [2003] refer to as limited attention in this context seems important. Second, as we will see more clearly below, if the audience is composed solely of Bayesians, the actual CSR report the company issues becomes irrelevant in the determination of the benefits the firm receives from its socially responsible activities. Instead, all of the benefits arise from the inferences the audience makes about the firm’s actual socially responsible activities, not the content of the CSR report.\(^ {16}\)

To complete the description of the model, we assume that hiring professionals to verify the contents of a firm’s CSR report (assurance) increases the probability that any differences between the actual level of socially responsible activities the firm engages in and the amount reported in the firm’s CSR report are uncovered. We model assurance in this way for two reasons. First, the required audit of a firm’s financial reports (which are predominantly hard information) has resulted in instances in which misleading financial reports are undetected. Second, CSR reports often contain a mixture of hard and soft information and receive varying levels of assurance.\(^ {17}\)

\(^{15}\) Qualitatively similar results would obtain if, instead, we had assumed that the non–Bayesians’ expectation was biased toward the firm’s CSR report. That is, for the non–Bayesians, if \(r_i > \rho_i\), then \(E[\rho_i | \Phi] > \rho_i\) and if \(r_i < \rho_i\), then \(E[\rho_i | \Phi] < \rho_i\).

\(^{16}\) In fact, absent assurance (or monitoring by social activists), if the audience is composed only of Bayesians (\(\xi = 1\)), then the firm’s CSR report is simply cheap talk with completely misaligned preferences (Crawford and Sobel 1982, Farrell and Rabin 1996). As a result, the report would be completely uninformative unless there are expected costs of mischaracterization.

\(^{17}\) For example, in the 2013 CSR report issued by UPS (http://sustainability.ups.com/sustainability-reporting/), UPS reports that it secured three types of third–party assurance. UPS engaged Deloitte & Touche LLP “to provide a reasonable level of assurance on our Statement of Greenhouse Gas emissions.” UPS also engaged Société Générale de Surveillance to conduct a verification designed “to provide a reasonable level of assurance that the reported GHG emissions for the period are fairly stated.” These disclosures suggest that different parts of UPS’s CSR report were subject to different levels of assurance but that, in all cases, there is room for failure to detect misreporting.
Specifically, we assume that the cost of assurance is $K$ and that the firm incurs an expected cost of exaggerating its socially responsible activities. Conversely, the firm receives expected benefits from understating those activities in its CSR report.\(^{18}\) Exaggerating the firm’s socially responsible activities, sometimes referred to as greenwashing, is understood to create potential costs if identified by “throw[ing] an organization’s activities open to suspicion and reduc[ing] its ability to obtain resources, legitimacy, or social support (Oliver 1991, Lyon and Maxwell 2011)” (Kim and Lyon 2015). Understating the firm’s socially responsible activities, sometimes referred to as brownwashing, should have the opposite effects and thus create benefits to the firm describing its activities modestly.\(^{19}\) Including these effects yields the following payoff for the firm:

\[
(1) \quad \xi N(\alpha + \beta E[\rho_i | r_i, a_i]) + (1 - \xi) N(\alpha + \beta r_i) - \frac{1}{2} \tau_i \rho_i^2 - p(a_i) \delta_k(r_i - \rho_i) - K,
\]

where $p(a_i)$ is the probability that mischaracterizations in the firm’s CSR report are uncovered, $p'(a_i) > 0$. The expected cost of exaggerating is represented by $\delta_1$ and the expected benefit of understating is represented by $\delta_2$. That is,

\[
\delta_k = \begin{cases} 
\delta_1 & \text{if } r_i - \rho_i > 0 \\
\delta_2 & \text{if } r_i - \rho_i < 0,
\end{cases}
\]

with $\delta_1 > \delta_2 \geq 0$. This assumption ensures that the expected costs of exaggerating by some amount are greater than the expected benefits of understating by the same amount. Intuitively, we are assuming that the audience’s response to exaggerating is greater than its response to understating.\(^{20}\)

Overall, this formulation captures the idea that the firm probabilistically bears a cost of claiming to have done more socially responsible activities that it actually does but receives a benefit if it does more socially responsible activities than claimed in its CSR report. Our model also accommodates a role for monitoring by social activists by assuming that $p(0) \geq 0$. $p(0)$ is strictly positive if monitoring by social activists creates a positive probability that differences between the firm’s claims in its CSR report differ and its actual level of socially responsible activity are uncovered.\(^{21}\)

---

\(^{18}\) For simplicity, we suppress discounting any delays associated with the expected costs of exaggerating (expected benefits of understating) the firm’s socially responsible activities.

\(^{19}\) An example may be the benefits that have accrued to Merck from its development of a drug and distribution system to combat river blindness without excessively publicizing the program. This effect may also be thought of as being related to the value of modestly describing accomplishments as documented by Ridge and Ingram [2014] and the references therein.

\(^{20}\) Our model accommodates the possibility that understating the firm’s socially responsible activities provides no benefits ($\delta_2 = 0$). The main effect of choosing $\delta_2 = 0$ in a separating equilibrium is to leave the $L$-type indifferent over a set of CSR reports, $r$, that result in understating the firm’s socially responsible activities.

\(^{21}\) This role for social activist monitoring was first developed by Lyon and Maxwell [2011].
4. Separating Equilibria.

Consider first the case without assurance (which can arise in equilibrium if $K$ is sufficiently large). Under these conditions, in any separating equilibrium, each firm type chooses a different CSR report (a different $r$) and the Bayesians in the audience correctly infer the firm’s type from its chosen CSR report. Thus, type $i$‘s payoff is obtained by substituting these facts into (1) yielding

$$\xi N(\alpha + \beta \rho_i) + (1 - \xi)N(\alpha + \beta r_i) - \frac{1}{2} \tau_i \rho_i^2 - p(0)\delta_k (r_i - \rho_i), \ i = L, H. \tag{2}$$

Given this, we can determine the payoff–maximizing level of socially responsible activity for each type.

**Lemma 1:** In any separating equilibrium, for each firm type $i = L, H$, the optimal level of socially responsible activity is

$$\rho^*_i = \frac{1}{\tau_i}(\xi \beta N + p(0)\delta_k).$$

Intuitively, each firm type anticipates that the Bayesian portion of the audience will correctly infer the level of socially responsible activities the firm chooses which, in turn, allows the firm to capture a portion of the benefits from increases in its socially responsible activities. As a result, each firm type balances the marginal benefits of increasing $\rho_i$, $\xi N \beta$, against the marginal costs, $\tau_i \rho_i + p(0)\delta_k$.

We will show below (Lemma 2) that in a separating equilibrium the $L$–type will not exaggerate its socially responsible activities.\textsuperscript{22} This combines with our assumption that $\tau_H < \tau_L$ to produce the result that $\rho^*_H > \rho^*_L$. In other words, the firm that faces lower costs of engaging in socially responsible activities does more even though its activities are unobservable.\textsuperscript{23} Further, both firm–types engage in more socially responsible activities if the benefits to doing so are greater ($\beta$ is larger), if the fraction of the audience that are Bayesians (and thus infer type correctly in a separating equilibrium) is greater or if the overall size of the audience is greater. Interestingly,\textsuperscript{22}

\textsuperscript{22} Interestingly, in a recent paper, Kim and Lyon [2015] offer evidence that some firms do understate their socially optimal activities and they coin the term “brownwashing” to describe this behavior. The focus of their paper is on identifying the characteristics of electric utilities that are associated with brownwashing. They find that firms with poor financial performance are those more likely to brownwash. If poor financial performance is associated with lower benefits or higher costs of socially responsible activities then these would be $L$–type firms in our model and our equilibrium predictions would be consistent with the results in Kim and Lyon.

\textsuperscript{23} Note that if we had allowed the benefits to engaging in socially responsible activities to differ, we would find that the firm that receives greater benefits does more.
if the probability that differences between claims in the firm’s CSR report and its actual level of socially responsible activity are uncovered is greater or if the expected costs of issuing a CSR report that mischaracterizes the firm’s socially responsible activities are greater, each firm type chooses to engage in more socially responsible activities. That is, the firm engages in more socially responsible activities if the audience responds positively to its activities or if it can lower the expected costs (raise the expected benefits) of mischaracterizing its activities.

Turning to the firm’s CSR report choice, (2) shows that the marginal benefits of increasing \( r_i \) are \((1 - \xi)N\beta\) and the marginal costs are \( p(0)\delta_k \). Thus, the payoff–maximizing \( r_i \) satisfies:

\[
r_i = \begin{cases} 
  0 & \text{if } (1 - \xi)N\beta < p(0)\delta_k \\
  \text{anything} & \text{if } (1 - \xi)N\beta = p(0)\delta_k \\
  \infty & \text{if } (1 - \xi)N\beta > p(0)\delta_k.
\end{cases}
\]

Obviously, we cannot support a separating equilibrium if each firm–type is indifferent to the choice of \( r_i \). Further, because payoffs are undefined if \( r_i = \infty \), we would be unable to support a separating equilibrium in that case either. Thus, we focus on the case when \((1 - \xi)N\beta < p(0)\delta_k\). Finally, note that in a separating equilibrium, there are no forces to keep the \( L \)-type from choosing \( r^*_L = 0 \) to maximize its payoff. And, that choice forces the \( H \)-type to choose a strictly positive \( r^*_H \) to support a separating equilibrium. As a result, we will focus on separating equilibria in which the \( L \)-type chooses \( r^*_L = 0 \).

Collecting, we have

\textbf{Lemma 2:} A necessary condition for a separating equilibrium is that the marginal benefits are smaller than the marginal costs of increasing \( r_i \), \((1 - \xi)N\beta < p(0)\delta_k \). In the separating equilibrium we focus on, \( r^*_L = 0 \) and \( r^*_H > 0 \) is chosen (if possible) to support a separating equilibrium.

The necessary condition for a separating equilibrium highlights both the impact of non–Bayesians in the audience and, absent assurance, the impact of monitoring by social activists. The condition requires that the fraction of non–Bayesians be small. Intuitively, if there are too many non–Bayesians in the audience, then their “naive” reliance on the firm’s CSR report produces sufficient benefits that every firm–type seeks to exaggerate its claims of socially responsible

\textsuperscript{24} This result follows from our assumption that the “penalty function,” \( p(0)\delta_k (r_i - \rho) \), is linear in \( r \). Had we assumed a convex “penalty function,” there would be an interior, profit–maximizing choice.

\textsuperscript{25} Our results are only modestly changed if we assume a convex “penalty” function instead. In that case, the \( L \)-type would choose the profit–maximizing value of \( r \) and the \( H \)-type would choose either the profit–maximizing value or the value described in Theorem 1, whichever is greater.

\textsuperscript{26} The latter inequality follows from our assumption that \( \delta_1 > \delta_2 \) and \( p(0) \geq 0 \).
activities in its CSR report. The condition also requires that \( p(0) \) not be too small because, otherwise, every firm–type again exaggerates its claims of socially responsible activities. Interestingly, if there are non–Bayesians in the audience, then monitoring by social activists must create a sufficiently high probability of detecting mischaracterizations in a firm’s CSR report if there is to be a separating equilibrium.

We focus on the separating equilibrium in which the \( L \)-type chooses \( r^*_L = 0 \) because that is the most profitable choice of \( r \) for the \( L \)-type. The reason is that the necessary condition for a separating equilibrium ensures that all types prefer smaller values of \( r \). For the \( L \)-type, there are no forces keeping it from choosing the smallest value possible and so its profits are maximized by choosing \( r^*_L = 0 \).

If separation is to be a feature of a signaling equilibrium, then neither firm–type can find a deviation (alternative choice of \( r_i \)) that yields a greater payoff. In what follows, we will make the simplest choice for off–the–equilibrium path beliefs and assume that if the audience observes any \( r \neq r^*_H \), they assume that the CSR report was issued by the \( L \)-type choosing \( \rho^*_L \) as its level of socially responsible activities.

Focusing first on the \( L \)-type, if it chooses to deviate, the only potentially profitable deviation is to mimic the CSR reporting choice of the \( H \)-type.\(^{27}\) If the \( L \)-type does so, its payoff would be

\[
\xi N(\alpha + \beta \rho^*_H) + (1 - \xi) N(\alpha + \beta r^*_H) - \frac{1}{2} \tau_L \hat{\rho}_L^2 - p(0) \delta_k (r^*_H - \hat{\rho}_L),
\]

where the Bayesian portion of the audience uses the fact that the \( L \)-type is mimicking the \( H \)-type’s CSR report to infer that the firm is providing the level of socially responsible activities that the \( H \)-type is expected to provide in equilibrium. Also, since the actual level of socially responsible activity is unobservable, the \( L \)-type will optimally adjust its level of activity to maximize (3),

\[
\hat{\rho}_L = \frac{1}{\tau_L} p(0) \delta_1.
\]

Given this, one of the conditions for a separating equilibrium is that there is an \( r^*_H \) such that the payoff represented by (3) is not larger than the payoff represented by (2) when \( i = L \).

Interestingly, even though mimicking means that the \( L \)-type is now exaggerating its level of socially responsible activities, it adjusts the level in a seemingly counterintuitive direction. Rather

\(^{27}\) Given the market’s beliefs, the choice of \( r \neq r^*_H \) produces marginal benefits of \( (1 - \xi) \beta \) and marginal costs of \( p(0) \delta_k \). The payoff–maximal choice of \( r \) is \( r^*_L \) because the necessary condition for a separating equilibrium is \( (1 - \xi) \beta \leq p(0) \delta_k \). Thus, the only possible profitable deviation is for the \( L \)-type to mimic the \( H \)-type.
than adjust its actual level of activity upward to reduce the expected cost of exaggerating (arising because $r^*_H > r^*_L$), the $L$–type maximizes its payoff from mimicking by reducing its chosen level of socially responsible activities. Essentially, the reason is that because it is mimicking the $H$–type, its choice of $\rho_L$ no longer produces benefits from the Bayesian portion of its audience: they infer that it is choosing to provide the level of socially responsible activity that the $H$–type is expected to choose and are thus unaffected by the mimicking firm’s actual choice of socially responsible activities. Saving on the cost of socially responsible activities dominates the expected cost of exaggeration.

Turning to the $H$–type, if it chooses to deviate, the Bayesian part of the audience infers that it is providing the level of socially responsible activity that an $L$–type provides, $\rho^*_L$, and so its payoff for any $r \neq r^*_H$ would be

$$
(4) \quad \xi N(\alpha + \beta \rho^*_L) + (1 - \xi)N(\alpha + \beta r) - \frac{1}{2} r_H \hat{\rho}_H^2 - p(0)\delta_k(r - \hat{\rho}_H).
$$

Since the first–order condition for maximizing (4) when choosing $r$ is the same when maximizing (2), the $H$–type choosing to deviate from the CSR report $r^*_H$ chooses to deviate to $r = r^*_L = 0$. And, analogous to our analysis of the maximizing level of socially responsible activities when the $L$–type deviated, we find that maximizing (4) when choosing $\rho_H$ yields

$$
\hat{\rho}_H = \frac{1}{\tau_H} p(0) \delta_2.
$$

Given this, the second condition for a separating equilibrium is that there is an $r^*_H$ such that the payoff represented by (4) is not larger than the payoff represented by (2) when $i = H$.

Having determined the payoffs in the conjectured separating equilibrium for both types and their payoffs from optimally deviating from their conjectured equilibrium strategies, we can collect our results in the following Theorem.

**Theorem 1:** When $(1 - \xi)N\beta < p(0)\delta_2 \leq p(0)\delta_1$, there is a separating equilibrium $(r^*_L, r^*_H)$ and the associated choices $(\rho^*_L, \rho^*_H)$ in which managers with lower costs of engaging in socially responsible activities choose to both to do more and report more than managers with higher costs when the following conditions hold:

$$(C1) \quad r^*_H \geq \frac{(\delta_1^2 - \delta_2^2)p(0)^2(\tau_H - 2\xi \beta N p(0)(\delta_2 \tau_H - \delta_1 \tau_L) - (\xi \beta N)^2(\tau_H - 2\tau_L))}{2\tau_L \tau_H \delta_1 p(0) - (1 - \xi) \beta N}$$

$$(C2) \quad r^*_H \leq \frac{(\delta_1^2 - \delta_2^2)p(0)^2(\tau_L - 2\xi \beta N p(0)(\delta_2 \tau_H - \delta_1 \tau_L) + (\xi \beta N)^2(\tau_L - 2\tau_H))}{2\tau_L \tau_H \delta_1 p(0) - (1 - \xi) \beta N}$$
The first condition, (C1), describes the values of $r^*_H$ that ensure that the $L$–type does not find it profitable to deviate from the separating equilibrium (choose $r \neq r^*_L$). The second condition, (C2), describes the values of $r^*_H$ that ensure that the $H$–type does not find it profitable to deviate from the separating equilibrium (choose $r \neq r^*_H$). We should also note that $(1 - \xi)N\beta < p(0)\delta_2 \leq p(0)\delta_1$ implies that the $H$–type’s payoff is maximized by choosing the smallest $r^*_H$ that satisfies (C1).

An interesting feature of this equilibrium is that the CSR report chosen by the $H$–type can be neither too large or too small. If it is too large, then the $H$–type benefits from deviating, mimicking the $L$–type’s CSR report and obtaining the expected benefits from understating its socially responsible activities in its CSR report. If it is too small, then the $L$–type benefits from deviating, mimicking the $H$–type’s CSR report and paying the expected cost of exaggerating its activities in its CSR report.

To show existence, we must show that there exists a value of $r^*_H$ that satisfies both conditions (C1) and (C2). A necessary and sufficient condition for this is that the right–hand side of (C2) exceed the right–hand side of (C1). Otherwise, there can be no value of $r^*_H$ that satisfies both (C1) and (C2). Simple arithmetic transforms the condition

$$
\frac{(\delta_1^2 - \delta_2^2)p(0)\tau_H - 2\xi\beta N\tau_H - \delta_1\tau_L - (\xi\beta N)^2(\tau_H - 2\tau_L)}{2\tau_L\tau_H(\delta_1p(0) - (1 - \xi)\beta N)} \leq \frac{(\delta_1^2 - \delta_2^2)p(0)\tau_L - 2\xi\beta Np(0)(\delta_2\tau_H - \delta_1\tau_L) + (\xi\beta N)^2(\tau_L - 2\tau_H)}{2\tau_L\tau_H(\delta_1p(0) - (1 - \xi)\beta N)},
$$

into

$$
p(0) \geq \frac{\tau_H + \tau_L}{(\delta_1^2 - \delta_2^2)(\tau_L - \tau_H)} \equiv \mathcal{P}(0).
$$

Since $\delta_1 > \delta_2$, this condition requires that $p(0)$ be sufficiently large. In other words, absent assurance, the probability of identifying differences between the firm’s actual socially responsible activities and its claims in its CSR reports must be sufficiently high for a separating equilibrium to exist. In fact, for reasonable parameterizations, there is no $p(0) \in [0, 1]$ that satisfies (5). Equation (5) also shows why $\delta_1 > \delta_2$ is required for a separating equilibrium. Intuitively, if they are equal, then one of the types always benefits from mimicking the other in any conjectured separating equilibrium.

---

28 All of the other equilibrium values, $r^*_L, \rho^*_L$ and $\rho^*_H$ are described in the lead–up to Theorem 1.
There are two important implications of Theorem 1 and equation (5) in the absence of voluntary assurance. First, if there is no monitoring by social activists of the firm’s socially responsible activities and its CSR report (i.e., \( p(0) = 0 \)), then there are no separating equilibria. And, as a result, no one can use the firm’s CSR report to draw inferences about its actual (and unobservable) socially responsible activities. Second, even if there is monitoring by social activists, there may not be a separating equilibrium. Not only must the activists monitor but the costs (benefits) of mischaracterizing the level of the firm’s socially responsible activities must not be zero and the size of the non–Bayesian portion of the audience cannot be too large. Without voluntary assurance, if (5) is not satisfied, no one will rely on the firm’s voluntary CSR reports. Below, we will show that this creates an endogenous motive for firms to voluntarily purchase assurance of their voluntary reports.

Additional implications can be obtained by examining how the right–hand side of (5) varies with key exogenous parameters in our model. In particular, in (5), we defined the minimum level of monitoring by social activists to support a separating equilibrium as \( P(0) \) and collect important comparative static results in the following Corollary.

**Corollary 1:** The minimum level of monitoring by social activists that will support a separating equilibrium is:

(i) increasing in the number of interested observers, \( N \),
(ii) increasing in the proportion of Bayesian observers, \( \xi \),
(iii) increasing in the benefits the firm obtains from its socially responsible activities, \( \beta \),
(iv) increasing when the marginal cost of exaggerating is closer to the marginal benefits of understating the firm’s actual socially responsible activities.

Intuitively, the minimum level of monitoring by social activists needs to be large enough to dissuade each type from mimicking the other. For example, increases in the number of Bayesians in the audience (either because \( \xi \) increases and/or because \( N \) increases) increases the benefits to the \( L \)–type from mimicking the \( H \)–type’s CSR report and thus earning the inference from the Bayesian part of the audience that its actual level of socially responsible activities is the same as the \( H \)–type’s. Similarly, an increase in the marginal benefits from socially responsible activities, \( \beta \), increases the benefits to the \( L \)–type from mimicking the \( H \)–type’s CSR report. In both cases, to offset the incentive to mimic, the expected costs of exaggerating its actual socially responsible activities must increase and that requires an increase in the probability that the firm is found to have mischaracterized its activities. It is also interesting to note that, in a separating equilibrium,
the “amount” of exaggeration in a firm’s CSR report is monotonically increasing in the sense that firms that incur smaller costs (receive greater benefits) from socially responsible activities engage in more exaggeration than those with higher costs (smaller benefits) because it is too costly for the latter types to mimic the former types. This result contrasts with the non-monotonic relation developed in Lyon and Maxwell [2011] that relies on increased activism to both alter the degree of exaggeration but also the firm’s willingness to disclose its socially responsible activities.

Our comparative static results can also offer insight on the impact of competition among firms providing socially responsible activities and CSR reports. Recall that we employed a reduced form for the benefits the firm receives from engaging in socially responsible activities in order to focus on the firm’s decisions to voluntarily disclose their socially responsible activities and to voluntarily assure the disclosures. That is, we assumed a reduced form description of strategic CSR. As a result, the impact of competition may be inferred from our comparative static results for parameters of that reduced form benefit function. Specifically, competition should reduce the number of observers, \( N \), reduce the fraction of Bayesian observers, \( \xi \) and reduce the benefits the firm obtains from its socially responsible activities, \( \beta \). As a result, our model suggests that competition will reduce the minimum level of monitoring by socially responsible activists required to support a separating equilibrium and thus reduce the need for voluntary assurance.

We cannot yet use the results in Theorem 1 and Corollary 1 to address the firm’s desire (in particular the \( H \)-type’s desire) to voluntarily pay professionals to verify the contents of its CSR report because we have yet to show that the \( H \)-type’s payoff is greater in a separating equilibrium than in a pooling equilibrium. To do so, we must first characterize the pooling equilibria.

5. Pooling Equilibria.

In a pooling equilibrium, both firm types choose to provide the same CSR report making it impossible for the audience to infer from the report the actual level of socially responsible activities the firm undertakes. As a result, the Bayesian portion of the audience is unable to update their priors over firm types. Thus, if the audience’s priors are that \( f \) is the probability that the firm’s marginal costs of socially responsible activities is \( \tau_H \) and \((1 - f) \) is the probability that those marginal costs are \( \tau_L \), then \( \mathbb{E}[\rho_i | \Phi] = f\tilde{\rho}_H + (1 - f)\tilde{\rho}_L \equiv \bar{\rho} \) where \( \tilde{\rho}_i \) is type \( i \)’s payoff maximizing level of socially responsible activity in a pooling equilibrium. If we let the common level of CSR reporting in a pooling equilibrium be \( r \), then type \( i \)’s payoff in a pooling equilibrium is obtained
by substituting these facts into (1) yielding

\[
(6) \quad \xi N(\alpha + \beta \bar{\rho}) + (1 - \xi) N(\alpha + \beta r) - \frac{1}{2} \tau_i \tilde{\rho}_i^2 - p(0)\delta_k(r - \tilde{\rho}_i), \quad i = L, H.
\]

Given this, we can determine the payoff-maximizing level of socially responsible activity for each type.

**Lemma 3:** In any pooling equilibrium, for each firm type \( i = L, H \), the optimal level of socially responsible activity is

\[
\tilde{\rho}_i^* = \frac{1}{\tau_i} p(0)\delta_k.
\]

It is interesting to contrast the results in Lemmas 1 and 3 because they show that in a separating equilibrium, both firm types choose higher levels of actual socially responsible activity. Intuitively, in a separating equilibrium, the Bayesian portion of the audience correctly infers the firm’s actual costs of such activities and responds to the level of socially responsible activity chosen by each firm-type. In a pooling equilibrium, no one in the audience can infer the firm’s actual costs of socially responsible activities and thus no one responds to the level of activity actually chosen. As a result, the level of socially responsible activities chosen by each firm type in equilibrium is not responsive to the proportion of the audience that is Bayesian. Said differently, the Bayesian portion of the audience provides extra incentives to engage in socially responsible activities in a separating equilibrium because they correctly infer the firm-type’s actual level of activity.\(^{29}\)

We can also use Lemma 3 and the audience’s priors over the firm types to compute the equilibrium level of \( \bar{\rho} \) in (6). In particular, recall that the audience’s prior probability that the firm has low costs of providing socially responsible activities is \( f \equiv \text{Prob}\{\tau = \tau_H\} \). Given this, \( \bar{\rho}^* = f \tilde{\rho}_H^* + (1 - f) \tilde{\rho}_L^* \).

For there to be a pooling equilibrium, neither firm-type can find a deviation (alternative choice of \( r_i \) which differs from \( r \)) that yields greater payoff. In what follows, we will make the simplest choice for off-the-equilibrium path beliefs and assume that if the audience observes any \( \tilde{r} \neq r \), they assume that the CSR report was issued by a firm type that chooses \( \rho \) as its level of socially responsible activities.

\(^{29}\) Note that this also implies that if there are only non-Bayesians in the audience, then there is no difference in the levels of socially responsible by each firm-type in separating and pooling equilibria.
Given these beliefs, if the $i$–type deviates, the most profitable deviation is to $\hat{r} = 0$. As a result, the firm’s payoff from deviating becomes

$$\xi N(\alpha + \beta \rho) + (1 - \xi)N(\alpha + \beta \hat{r}) - \frac{1}{2} \tau_i \hat{\rho}_i^2 - p(0)\delta_k(\hat{r} - \hat{\rho}_i).$$

The payoff maximizing level of socially responsible activity for the deviating $i$–type satisfies

$$\hat{\rho}_i = \frac{1}{\tau_i}p(0)\delta_k.$$

This is interesting because the payoff maximizing level of socially responsible activities is the same for the $L$–type in both the pooling equilibrium and the deviation payoffs. Intuitively, in both cases, the audience’s inferred level of socially responsible activity is independent of the firm’s actual choice. This means that the only payoff consequence of the choice of socially responsible activities is on whether the firm exaggerates or understates its level of socially responsible activities in its CSR report as reflected in the equation above. The $L$–type understates its activities in both cases and so its choice of socially responsible activities is exactly the same.

Having determined the payoffs in the conjectured pooling equilibrium for both types and their payoffs from optimally deviating from their conjectured equilibrium strategies, we can collect our results in the following Theorem.

**Theorem 2**: A pooling equilibrium $(r^*)$, with the associated choices $(\tilde{\rho}_L^*, \tilde{\rho}_H^*)$, exists if:

(C3) \[ 0 \leq r^* < \frac{\beta_i^2(0)(\delta_1^2 - \delta_2^2)}{2\tau_L [p(0)\delta_1 - (1 - \xi)\beta N]} + \frac{\xi \beta N(\hat{\rho} - \hat{\rho})}{[p(0)\delta_1 - (1 - \xi)\beta N]} \]

(C4) \[ 0 \leq r^* < \frac{\xi \beta N(\hat{\rho} - \hat{\rho})}{[p(0)\delta_2 - (1 - \xi)\beta N]} \]

In most circumstances, if (C4) is satisfied, then so is (C3). Regardless, since (6) is largest when $r^* = 0$, the Pareto dominating pooling equilibrium has neither firm offering a CSR report in equilibrium. Since both types do provide some level of socially responsible activity, their decision to not offer a CSR report (or offer a minimal report) means that they are understating their socially responsible activities.

---

30 The reason is the same as the reason the $L$–type’s payoff in a separating equilibrium was largest when it chose $r = 0$. That is, because $(1 - \xi)N\beta < p(0)\delta_k$. 

20

In this section, we examine the firm’s willingness to pay a professional third party to assure the contents of the firm’s CSR report. The role of assurance in our model is to increase the probability that any mischaracterizations in the firm’s CSR report are uncovered. Thus, for the $H$–type, assurance is a cost whose role is to allow for an equilibrium in which the Bayesian portion of the audience can use the firm’s CSR report to infer the firm’s actual level of socially responsible activities.

In our model, the firm has the opportunity to choose to purchase professional assurance of its CSR report and so has the ability to influence whether or not there is a separating equilibrium. More specifically, if the firm opts to pay $K$ to obtain a level of assurance $a$, and the associated probability $p(a)$, and if the increase to $p(a)$ is sufficient to meet the conditions for a separating equilibrium, it is possible for the firm to “select” the separating equilibrium. The underlying reason for this is similar to that in the “money–burning” game.\(^{31}\) The $H$–type would not pay $K$ for assurance in a pooling equilibrium because it offers no benefit and lowers its payoff. But, if the $H$–type purchases assurance thereby creating the conditions for the existence of a separating equilibrium, it can benefit. The $H$–type benefits if its payoff in the associated separating equilibrium exceeds its payoff in a pooling equilibrium. Thus, assurance must increase $p$ enough to satisfy the conditions for a separating equilibrium but cannot be too expensive. Given this, it is immediate that if (5) is satisfied and supports a separating equilibrium, then the firm does not find value in seeking professional assurance of its CSR report. It is possible that even if (5) is satisfied, the $H$–type might still be induced to voluntarily purchase third party assurance to “select” the separating equilibrium when, otherwise, the pooling equilibrium would obtain. The analysis of this case is essentially the same as when (5) is not satisfied and so we focus on the case when (5) is not satisfied. Thus, in what follows, we will assume that $p(0)$ does not satisfy (5): monitoring by social activists is not sufficient to support a separating equilibrium.

When $p(0) < P(0)$, the key comparison will be between the $H$–type’s payoff in a separating equilibrium with assurance (so that $p(a) \geq P(0)$) and in a pooling equilibrium. Collecting our results from Theorems 1 and 2, the difference in the $H$–type’s payoff in a separating equilibrium

---

\(^{31}\) See Ben–Porath and Dekel [1992] or van Damme [1989] for details. See also the textbook treatment in Fudenberg and Tirole [1993].
when it purchases professional assurance and a pooling equilibrium when it does not is

\[ \Delta = \frac{(\delta_1 p(a))^2 - (\delta_2 p(0))^2}{2\tau_H} + \frac{p(a)^2(\delta_2^2 - \delta_1^2)}{2\tau_L} + 2p(a)\xi N\delta_2 \]

\[ \frac{\xi N^2(\tau_L - \tau_H)}{2\tau_H\tau_L} - \frac{p(0)\xi N(\theta\tau_L\delta_2 + (1 - \theta)\tau_H\delta_1)}{\tau_H\tau_L} - K. \]

**Theorem 3:** If \( p(0) \) is small, \((1 - \xi)N\beta < p(0)\delta_k \) and \( 2\tau_H > \tau_L \), then the manager with lower costs of socially responsible activities will voluntarily purchase professional assurance if it is not too expensive. If so, then there is a separating equilibrium in which the manager with the lower costs of engaging in socially responsible activities chooses to both do more and report more than managers with higher costs.

Intuitively, if it is sufficiently likely that mischaracterizations of the firm’s socially responsible activities are uncovered, the \( L \)-type finds it more costly, in expectation, to mimic the \( H \)-type’s CSR reporting choice. In addition, to mimic, the \( L \)-type would need to purchase professional assurance. The result is that the cost of mimicking rises and if the \( H \)-type chooses a sufficiently high-quality assurance (a level of assurance, \( a \), that makes \( p(a) \) large enough), there will be a separating equilibrium in which the \( H \)-type offers an aggressive CSR report that exaggerates while the \( L \)-type offers a minimal CSR report that understates its socially responsible activities.

Further, the \( H \)-type engages in more socially responsible activities than the \( L \)-type. This follows because \( p(a) > p(0) \) and because \( \delta_1 > \delta_2 \). Interestingly, relative to a pooling equilibrium, both engage in more actual socially responsible activities. Again, the reason is that in a separating equilibrium, the Bayesians in the firm’s audience correctly infer the firm’s actual socially responsible activities and the benefits the firm obtains from their responses motivates the firm to do more than it would in a pooling equilibrium where there is no inference and thus no response. This result has an immediate social welfare implication. In our model, neither firm type captures all of the marginal benefits of additional socially responsible activities because they cannot capture the benefits that accrue to the non-Bayesian portion of the audience and because neither type can, in general, capture the full marginal benefits that accrue to the Bayesian portion of the audience. As a result, neither type provides the socially optimal level of socially responsible activity: both types under-provide the public good. Thus our result that both types engage in more actual socially responsible activities implies that the firm’s ability to voluntarily assure its voluntary disclosure leads to a socially beneficial improvement in the private provision of those activities. Interestingly, our analysis also shows that, even though the \( H \)-type engages in more socially responsible activity
than in a pooling equilibrium (and more than the \textit{L}-type), it exaggerates in its CSR report in order to make it too costly for the \textit{L}-type to mimic its CSR report.

The proof of Theorem 3 shows that the \textit{H}-type will voluntarily choose the level of assurance quality that is just sufficient to support a separating equilibrium.\textsuperscript{32} Intuitively, once the \textit{H}-type’s goal of supporting a separating equilibrium is achieved, any subsequent increases in \( p \) increase the \textit{H}-type’s expected costs without increasing any benefits because \((1 - \xi)N\beta < p(0)\delta_1\). Thus the \textit{H}-type chooses the minimally required quality of assurance needed to support a separating equilibrium. This observation allows us to develop an understanding of what drives the chosen level of assurance quality which we summarize in Corollary 2.

The proof of Theorem 3 also allows us to explain why the decision to make the cost of assurance a constant \( K \) rather than an increasing function of the chosen level of assurance quality has very little effect on our analysis. Had we assumed that the cost was a function of quality (say \( K(a) \)), it would still be the case that the \textit{H}-type would choose the minimally required quality of assurance needed to support a separating equilibrium which would, in general, result in a lower quality assurance choice. Beyond this, making the cost of assurance depend on the quality of assurance chosen has no additional effects on our analysis.

**Corollary 2**: In a separating equilibrium, the chosen assurance quality is:

(i) increasing in the level of activist monitoring, \( p(0) \),

(ii) increasing in the number of interested observers, \( N \),

(iii) increasing in the proportion of Bayesian observers, \( \xi \),

(iv) increasing in the benefits the firm obtains from its socially responsible activities, \( \beta \),

(v) decreasing in the cost differential, \((\text{when } \tau_L - \tau_H \text{ increases holding } \tau_L + \tau_H \text{ constant})\).

Theorem 3 and Corollary 2 provide the basis for a number of empirical implications associated with voluntary assurance of voluntary disclosures. First, Theorem 3 indicates that firms that engage in large amounts of socially responsible activity will be more likely to use voluntary CSR reports to disclose their activities and that they are more likely to exaggerate their performance. Further, these are exactly the firms that are more likely to voluntarily seek professional assurance of their CSR reports and are potentially more risky clients for firms that offer assurance services.

\textsuperscript{32} As mentioned above, the quality of assurance of CSR assurance varies in practice. We previously noted the UPS example in which UPS engages Deloitte to review the full CSR report and examine its greenhouse gas emission claims, and engages Societe Generale de Surveillance (SGS) to verify its statement of greenhouse gas emissions.
Second, and perhaps most interesting, the chosen level of assurance is increasing in \( p(0) \), the monitoring activity of social activists. Recall that we are examining the situation in which the outside monitoring by activists is insufficient to support a separating equilibrium. Fundamentally, \( p(0) \) is too small to discourage the \( L \)-type from mimicking the CSR reporting of the \( H \)-type. In fact, this is exactly what motivates the \( H \)-type to seek a level of assurance that increases the probability of identifying miscalculations in the firm’s CSR report to \( p(a) \), a level sufficient to discourage the \( L \)-type from mimicking its CSR report. Thus, increases in \( p(0) \), while leaving it too small to support a separating equilibrium, do not alter the \( L \)-type’s incentives to deviate from a separating equilibrium. It is discouraged from doing so by the \( H \)-type’s choice of \( a \) and the associated magnitude of \( p(a) \). Instead, increases in \( p(0) \) increase the benefits to the \( H \)-type from mimicking the \( L \)-type’s CSR reporting and capturing the expected benefits from understating its socially responsible activities. But, because the \( H \)-type’s payoff in the separating equilibrium is larger, it voluntarily chooses to have its CSR report assured (increase \( a \)), thereby motivating the \( H \)-type to increase both its actual level of socially responsible activity and its reported level. Thus, when the firm voluntarily assures its voluntary disclosures in its CSR report, greater scrutiny by social activists in the form of additional monitoring of the firm’s CSR report is associated with the firm seeking higher quality voluntary assurance from professionals.

Third, our model suggests that firms whose costs of providing socially responsible activities are smaller (\( \tau \) is smaller) or whose benefits are larger (\( \beta \) is larger) are more likely to voluntarily purchase assurance of their CSR report and are more likely to purchase higher quality assurance. These effects are enhanced if the firm’s audience is larger (\( N \) is larger) or more attentive (\( \xi \) is larger). We interpret these results as suggesting that firms that are under greater public scrutiny for their socially responsible (or irresponsible) activities and which offer CSR reports would be more likely to purchase professional assurance and more likely to purchase higher quality assurance. Examples of such firms might be found in the extraction industries, among firms whose production facilities are located in developing countries suspected of offering lower quality working conditions or among companies that have become targets of activists or companies that seek a competitive advantage in hiring by promoting their socially responsible activities.

The just mentioned cross-sectional implications do not, in general, imply that there will be observable industry effects in voluntary assurance.\(^{33}\) There are two reasons for this. First, it may

\(^{33}\) This is in line with the inconsistent industry effects reported in Casey and Grenier [2015], Kolk and Perego.
be the case that the cost of assurance varies among firms within and across industries. Second, in separating equilibria, there are firms of different “types” that choose different strategies. Whether there are more $H$–type firms or $L$–type firms is exogenously given in our model (the value of $f$ is exogenous). As a result, there is no reason to expect $f$ to vary systematically with industry.

Our results also indicate that the magnitude of the difference in the costs of socially responsible activities for the different types affects the quality of voluntary assurance sought by the $H$–type. Specifically, as the magnitude of the difference declines, the chosen quality of assurance increases. Intuitively, when the cost difference increases, the cost to the $L$–type of mimicking the $H$–type rises which allows the $H$–type to purchase lower quality assurance and still support a separating equilibrium. The increase in the cost differential substitutes for increasing the cost of mimicry through the voluntary purchase of higher quality assurance. Thus, our analysis implies cross-sectional differences in the quality of voluntary assurance among the firms that choose to have their CSR reports assured. That is, comparing firms that voluntarily assure their reports, those in industries whose firms have more similar costs of providing socially responsible activities are likely to choose higher quality assurance than those in industries whose firms’ costs are more different. This suggests that industries that focus on charitable giving (e.g., banks, other financial institutions and service industries) will contain firms that, when they choose to have their CSR reports assured, will choose higher quality assurance. Similarly, in industries where the costs of socially responsible activities differ substantially, possibly because of the use of different production technologies or different ages of the production facilities (e.g., extraction industries, technology industries and utilities) firms that choose to have their CSR reports assured will choose lower quality assurance.

Finally, firms whose customer, employee or investor bases contain higher proportions of sophisticated (Bayesian) consumers, employees or investors are more likely to offer CSR reports and more likely to purchase professional assurance of higher quality. Conversely, those whose customers, employees or investors exhibit more limited attention (are non–Bayesians) are less likely to offer CSR reports and less likely to purchase professional assurance. It may also be the case that firms selling intermediate goods, but not in extraction industries, find that their customers

[2010] and Simnett, Vanstraelen and Chua [2009]. It is also consistent with a 2010 EY report that notes that while sustainability reporting was originally done by consumer–based industries and resource–intensive industries, it has expanded to include most firms in many other industries (EY 2010, p. 3).

For example, in the case of investors, it is relatively common to use the fraction of retail investors as a proxy for the fraction of investors with limited attention (e.g., Barber and Odean 2008 or the survey by Barber and Odean 2011).
pay less attention to their CSR disclosures. If so, then such firms would be less likely to offer CSR
reports and less likely to purchase professional assurance of their reports.

7. Conclusions.

Many firms engage in socially responsible activities (e.g., reducing environmental damage,
charitable giving, community involvement and improving working conditions), and most provide
a description of these activities. These disclosures are not, in general, mandatory in the United
States, and survey results indicate that a relatively small fraction of firms offering these types of
voluntarily disclosures choose to voluntarily pay professionals to assure some or all of the contents
(KPMG 2013).

In this paper, we analyze a model that includes all three of these decisions. In our model,
the firm’s decisions to voluntary disclose its socially responsible activities and voluntarily assure
those disclosures arise endogenously as a result of a natural asymmetry: the firm knows its chosen
level of socially responsible activities but the relevant audience (investors, creditors, consumers,
employees and/or supply chain partners) is unable to directly observe these activities.35 We show
that this asymmetry provides the firm with incentives to voluntarily disclose its socially responsible
activities but does not create sufficient incentives to report truthfully. Even so, the firm’s CSR
report will have value if (at least) some of the audience can use the report to infer the firm’s actual
socially responsible activities.

We show that such a separating equilibrium is possible only if the probability of identifying
any mischaracterizations in the firm’s CSR report is sufficiently high. This probability can be high
enough if there is sufficient monitoring by social activists but, if there is not, we show that the firm
itself has an incentive to increase the probability by purchasing assurance of sufficient quality to
support a separating equilibrium. That is, there is an endogenous demand for voluntary assurance
of voluntary disclosure.

In the separating equilibrium, the firm type that has greater incentives to engage in socially
responsible activities also has incentives to voluntarily disclose these activities and to purchase
professional assurance of the associated report when social activist monitoring is insufficient. In
essence, this firm type “selects” the separating equilibrium by choosing the quality of assurance

35 Note that assurance in our model refers to the firm expending resources to hire a third-party to attest to its
CSR report and the relevant audience infers the firm’s actual socially responsible activities.
that just ensures that the audience can use the CSR report to infer the firm's actual level of socially responsible activity.

We show that the firm that engages in more socially responsible activities reports that it does more. Interestingly, to support the separating equilibrium, its report exaggerates its actual activities. We also show that both types actually engage in more socially responsible activity than they would in a pooling equilibrium. Thus, the decision to voluntarily seek sufficiently high-quality assurance of the firm's CSR report by one type of firm motivates all firms to engage in more actual socially responsible activities. Thus, not only does voluntary assurance of the firm's voluntary disclosure increase social welfare by resulting in both types engaging in more socially responsible activity but our analysis also shows that there is a social benefit to voluntary assurance. As a result, our analysis suggests that care needs to be taken when considering whether such assurance should be mandated. Mandatory assurance should improve the quality of the voluntary disclosure but destroys the benefits to voluntary assurance identified in this paper.

We also show that the firm that purchases voluntary assurance of its CSR report is motivated to choose a higher quality of assurance when its CSR report and activities are subject to more monitoring by social activists. In other words, monitoring by social activists complements, rather than substitutes for, the firm's voluntary assurance choice. When combined with the results described above, this result indicates that increased monitoring by social activists increases the likelihood of assurance as well as the quality of assurance and the actual level of socially responsible activities the firm engages in.

Our results also suggest that firms with audiences that are more sensitive to the firm's level of socially responsible activity, either because more care or those who care are more attentive to the firm's socially responsible activities, are more likely to purchase voluntary assurance and are more likely to purchase higher quality assurance. Finally, if assurance providers vary in their abilities to assure CSR reports, our results on the firm's choice of quality of its voluntary assurance may offer insight into the selection of which third parties are chosen to provide assurance.
8. Appendix.

Proof of Lemma 1: In a separating equilibrium, the payoff to type $i$, ($i = L, H$) is

$$\xi N(\alpha + \beta r_i) + (1 - \xi) N(\alpha + \beta r_i) - \frac{1}{2} \tau_i \rho_i^2 - p(0) \delta_i (r_i - \rho_i).$$

Each firm type chooses its level of socially responsible activity to maximize this expression and the first order condition is $0 = \xi \beta N - \frac{1}{\tau_i} p(0) \delta_i$. Rearranging produces the expression in Lemma 1,

$$\rho_i^* = \frac{1}{\tau_i}(\xi \beta N + p(0) \delta_i).$$

Finally, note that the second order condition for a maximum is satisfied.

Proof of Theorem 1: For there to be a separating equilibrium, each type’s payoff on the equilibrium path must be at least as large as its payoff from any deviation (issuing a different CSR report). Since our off–the–equilibrium path beliefs are that for any $r \neq r^*_L, r^*_H$, the audience believes that the report is made by the $L$–type with the associated level of socially responsible activities $\rho^*_L$, the only potentially profitable deviation for the $L$–type is to mimic the $H$–type and choose $r^*_H$ as its CSR report. If it does so, its payoff is

$$\xi N(\alpha + \beta \rho^*_H) + (1 - \xi) N(\alpha + \beta r^*_H) - \frac{1}{2} \tau_L \rho^*_L^2 - p(0) \delta_1 (r^*_H - \rho^*_L),$$

where $\hat{\rho}_L = \frac{1}{\tau_L} p(0) \delta_k$. The $L$–type’s payoff from choosing $r^*_L$ is

$$\xi N(\alpha + \beta \rho^*_L) + (1 - \xi) N(\alpha + \beta r^*_L) - \frac{1}{2} \tau_L (\rho^*_L)^2 - p(0) \delta_2 (r^*_L - \rho^*_L),$$

and the difference in these payoffs must be non–positive. Substituting for $\hat{\rho}_L$, subtracting and rearranging yields condition (C1).

Similarly, the most profitable deviation for the $H$–type is to mimic the $L$–type and choose $r^*_L$ as its CSR report. Doing so earns the $H$–type

$$\xi N(\alpha + \beta \rho^*_H) + (1 - \xi) N(\alpha + \beta r^*_H) - \frac{1}{2} \tau_H (\rho^*_H)^2 - p(0) \delta_1 (r^*_L - \rho^*_H),$$

where $\hat{\rho}_H = \frac{1}{\tau_H} p(0) \delta_k$. The $H$–type’s payoff from choosing $r^*_H$ is

$$\xi N(\alpha + \beta \rho^*_H) + (1 - \xi) N(\alpha + \beta r^*_H) - \frac{1}{2} \tau_H (\rho^*_H)^2 - p(0) \delta_1 (r^*_H - \rho^*_H).$$

Again, for a separating equilibrium, the difference between these payoffs must be non–positive. Substituting for $\hat{\rho}_H$, subtracting and rearranging yields condition (C2).
Proof of Theorem 2: For there to be a pooling equilibrium, each type’s payoff on the equilibrium path must be at least as large as its payoff from any deviation (issuing a different CSR report). As noted in the text, each type’s payoff in a conjectured pooling equilibrium is

\[ \xi_N (\alpha + \beta \rho) + (1 - \xi) N(\alpha + \beta r) - \frac{1}{2} \tau_r \hat{\rho}_r^2 - p(0) \delta_k(r - \hat{\rho}_i) \]

where \( \hat{\rho}_i \) is described in Lemma 3. Since our off–the–equilibrium path beliefs are that for any \( r \neq r^* \), the audience believes that the report is made by the \( L \)-type, a deviation by either type results in the following payoff:

\[ \xi_N (\alpha + \beta \rho) + (1 - \xi) N(\alpha + \beta r^*_H) - \frac{1}{2} \tau_r \hat{\rho}_r^2 - p(0) \delta_k(r - \hat{\rho}_i) \]

For each type, the difference between the payoffs must be non–negative for a pooling equilibrium. Subtracting the deviation payoff from the equilibrium payoff for the \( L \)-type produces condition (C3) and for the \( H \)-type produces condition (C4).

Proof of Theorem 3: Again, for there to be a separating equilibrium, each type’s payoff on the equilibrium path must be at least as large as its payoff from an off–the–equilibrium path action (issuing a different CSR report). Since our off–the–equilibrium path beliefs are that for any \( r \neq r^*_L, r^*_H \), the audience believes that the report is made by the \( L \)-type with the associated level of socially responsible activities \( \rho^*_L \), the only potentially profitable deviation for the \( L \)-type is to mimic the \( H \)-type and choose \( r^*_H \) as its CSR report. If it does so, its payoff is

\[ \xi_N (\alpha + \beta \rho^*_H) + (1 - \xi) N(\alpha + \beta r^*_H) - \frac{1}{2} \tau_L \hat{\rho}_L^2 - p(a) \delta_k(r^*_H - \hat{\rho}_L) - K \]

where \( \hat{\rho}_L = \frac{1}{\tau_L} p(a) \delta_k \). The \( L \)-type’s payoff from choosing \( r^*_L \) is

\[ \xi_N (\alpha + \beta \rho^*_L) + (1 - \xi) N(\alpha + \beta r^*_L) - \frac{1}{2} \tau_L \hat{\rho}_L^2 - p(a) \delta_k(r^*_H - \hat{\rho}_L) \]

and the difference in these payoffs must be non–positive. Substituting for \( \hat{\rho}_L \), subtracting and rearranging yields condition:

\[ (\delta_r p(0))^2 - (\delta_2 p(0))^2) \tau_H - 2K \tau_H \tau_L - 2\xi \beta N(\delta_2 \tau Hp(0) - \delta_1 \tau_L p(a)) - (\xi \beta N)^2 (\tau_H - 2\tau_L) \]  
(A1)

Similarly, the most profitable deviation for the \( H \)-type is to mimic the \( L \)-type and choose \( r^*_L \) as its CSR report. Doing so earns the \( H \)-type

\[ \xi_N (\alpha + \beta \rho^*_H) + (1 - \xi) N(\alpha + \beta r^*_H) - \frac{1}{2} \tau_r \hat{\rho}_r^2 - p(0) \delta_k(r - \hat{\rho}_H) \]

where \( \hat{\rho}_H = \frac{1}{\tau_H} p(0) \delta_k \). The \( H \)-type’s payoff from choosing \( r^*_H \) is

\[ \xi_N (\alpha + \beta \rho^*_H) + (1 - \xi) N(\alpha + \beta r^*_H) - \frac{1}{2} \tau_H (\hat{\rho}_H)^2 - p(a) \delta_k(r^*_H - \hat{\rho}_H) - K \]

Again, for a separating equilibrium, the difference between these payoffs must be non–positive. Substituting for \( \hat{\rho}_H \), subtracting and rearranging yields

\[ (\delta_r p(0))^2 - (\delta_2 p(0))^2) \tau_L - 2K \tau_H \tau_L - 2\xi \beta N(\delta_2 \tau Hp(0) - \delta_1 \tau_L p(a)) - (\xi \beta N)^2 (\tau_H - 2\tau_L) \]  
(A2)

Comparing the right–hand sides of (A2) and (A1), a necessary condition for the existence of a separating equilibrium is

\[ p(a) \geq \sqrt{\frac{p(0)^2 \delta_2^2 (\tau_L - \tau_H) + (\xi \beta N)^2 (\tau_H + \tau_L)}{\delta_1^2 (\tau_L - \tau_H)}} \]

\[ \blacksquare \]

29
9. References.


GRI, 2013. Trends in External Assurance of Sustainability Reports: Spotlight on the USA.


