VOLUNTARY ASSURANCE OF VOLUNTARY DISCLOSURE*

by

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1. Introduction.

Many corporations engage in socially responsible activities, and of those that do, some choose to disclose these activities. Disclosure of a firm’s socially responsible activities is not (generally) mandatory in the United States but, interestingly, some firms not only offer these disclosures voluntarily, they also voluntarily pay professionals to assure the content of the disclosures.¹ The results of the KPMG [2013] bi–annual survey show that over 80% of their sample of U.S. firms report on their corporate responsibility activities but only 23% provided some type of independent assurance.²

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 those activities (a Corporate Social Responsibility or CSR report) and whether to voluntarily seek professional assurance of the contents of the report.³ We develop a role for voluntary CSR reports and voluntary assurance of the content of the report by relying on a natural information asymmetry: the firm knows its chosen level of socially responsible activities but the audience (investors, creditors, consumers and supply chain partners) does not observe this choice.

In our model, because the firm’s actual level of socially responsible activities is not observed, firms have an incentive to provide a CSR report describing their activities. However, the firm does not have sufficient incentives to report truthfully. In spite of this, the CSR report may still have value if (at least) a portion of the audience can use it to infer the firm’s actual level of socially responsible activities. We show that it is possible to have such a separating equilibrium only if the firm faces a sufficiently high probability of having the audience learn that the CSR report it voluntarily provides mischaracterizes its actual activities. This probability can be large enough if outside parties (social activists) engage in sufficient monitoring of the firm’s activities but when it is not, we show that there is an endogenous demand for voluntary third–party assurance.

In particular, firm types with greater incentives to engage in socially responsible activities have incentives to purchase professional assurance. Doing so raises the probability that the audience

¹ Professionals often refer to these activities as a review rather than assurance.
² Similar proportions of assured CSR reports are observed by Casey and Grenier [2014] who analyze 2,649 CSR reports published between 1993–and 2010. They find that less than 10% are independently assured.
³ In this paper we refer to these disclosures as the firm’s CSR report even though firms, in practice, use a variety of names for these reports (social responsibility reports, sustainability reports, ESG reports, citizenship reports, etc.)
learns of any mischaracterizations of its activities. Since assurance is costly, this type only benefits 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. We also show that the firm chooses the quality of assurance just sufficient to support a separating equilibrium. In other words, the demand for voluntarily obtained professional assurance of voluntary disclosure arises because it allows the purchasing firm the ability to use its CSR report to distinguish its greater level of socially responsible activities from the activities of firms that do less. In addition, these same incentives motivate the firm to choose the quality of the assurance to support its efforts to distinguish its level of socially responsible activities.

We also develop a number of testable implications based on our analysis. First, firms that engage in greater amounts of socially responsible activities distinguish themselves using their CSR reports, and interestingly, to develop the conditions that allow the report’s audience to infer the firm’s activities, the firm must exaggerate its actual level of activity. That is, the firm that engages in greater amounts of socially responsible activities also exaggerates its report: it over-promises and under-delivers.

Second, when the content of the firms’ CSR reports are sufficiently different to support a separating equilibrium, all firms engage in more socially responsible activity than they would in a pooling equilibrium. Further, we show that the quality of assurance chosen by a firm that seeks professional assurance for its CSR report is increasing in the amount of monitoring of that firm by social activists. Combining these results, increased monitoring by social activists increases the likelihood and quality of voluntary assurance and increases the actual level of socially responsible activity the firm engages in.

Third, firms with audiences who are more inclined to respond to the firm’s socially responsible activities, rather than simply the claims contained in its CSR report, are more likely to purchase professional assurance and are more likely to purchase higher quality assurance. Such firms may be more likely to be found in the extraction industries, among firms whose water usage is under scrutiny, whose production facilities are suspected of offering poor working conditions or who have become targets of social activists for other reasons.\footnote{Note that these results do not imply that differences in CSR activity, reporting or third-party assurance will empirically exhibit industry effects (Casey and Grenier 2014, Kolk and Perego 2010 and Simnett, Vanstraelen 2016).}
Finally, our results may help to explain not only the choice to have third-party assurance of the firm’s CSR report but also the selection of which firm(s) are chosen to provide assurance whenever the assurer’s identity 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 avoiding production processes that damage the environment, selling or using conflict diamonds/minerals, using child labor or supporting harsh working conditions. Other examples include disclosures that firms expend resources to improve the environment including reducing their carbon footprint, reducing water usage, using environmentally friendly packaging or supporting a wide variety of charitable and 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 bi-annual 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 [2014] who analyze 2,649 corporate social responsibility (CSR) reports published between 1993 and 2010.

\[\text{and Chua 2009)}\]. 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, reporting and assurance depends on the distribution of firm-types.

5 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/PressRelease/Detail/PressRelease/1365171484002#.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) but the vast majority of the information in a CSR report is not required to be disclosed in the United States.

6 Firms that provide such assurance services include large accounting firms, engineering firms and other professional services firms.

7 The Global Reporting Initiative which focuses on GRI–based sustainability reports finds that only 10% of GRI–based sustainability reports received independent assurance in 2011 (GRI 2013).
They find that only 230 are independently assured.

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 (Lyons and Maxwell 2011, Kotowski, Weisbach and Zechhauser 2014). In these models, monitoring by an outsider disciplines the disclosure decisions by the firms. In Lyons and Maxwell [2011], this outside monitoring causes the firm to provide more honest disclosure. 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. Our paper contributes to this literature by focusing on the *discloser’s* incentives to purchase third–party assurance itself and how this affects both the firm’s chosen level of socially responsible activities and the firm’s voluntary disclosure of those activities.

In contrast to the theoretical literature, there is a growing literature that empirically examines assurance of a firm’s CSR report (Casey and Grenier 2014, Peters and Romi 2013, 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 both U.S. and non–U.S. firms and either study differences in market responses to the decision to issue a CSR report with and without assurance, or identify firm characteristics that are 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. The papers that focus on the factors associated with CSR report assurance find that firms that purchase assurance are generally those that engage in more socially responsible activity, have stronger corporate governance and are located in countries with greater focus on stakeholder–oriented and countries with weaker governance enforcement. To the surprise of the authors, this work finds no relation between CSR reporting, assurance and industry membership. Our work complements this literature by focusing on the fact that 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

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8 Recent empirical work (Mahoney, Thorne, Cecil and LaGore 2013 and Marquis and Toffel 2012) attempts 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.

9 See also the interview evidence reported in Jones and Solomon [2010].
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 on the impact of CSR reporting on market responses, the newer work suggests that the market response to CSR disclosures is generally positive but depends on the type of disclosures and on the firm’s information environment. Interestingly, Lys, Naughton and Wang [2012] offer evidence that current socially responsible activity 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 socially responsible activities may “signal” better future firm performance. Our paper complements this literature by highlighting the interactions of the firm’s choices to engage in socially responsible activities, voluntary 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, especially those certified by “higher quality” certifiers. Kauser, Shroff and White [2014] study the impact of a firm’s decision to seek a voluntary audit of its financial statements once British regulations drop the requirement of an audit. They interpret their results as suggesting that the choice to obtain a voluntary audit conveys information to capital providers. Our paper differs from these in that we study a theoretical model focused on voluntary assurance of voluntary disclosures and thus complements this work.

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, consumer and supply chain partners) does not observe this.
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.11 Because our main focus is on the firm’s decisions to voluntarily offer a CSR report and whether to pay for professional verification to 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

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

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.

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). 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

11 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 Lyons 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. For an interesting new perspective, strategic CSR benefits the company by influencing its supply chain, see Arya and Mittendorf [2014].
differ only in terms of how expensive they find socially responsible activities to be (the magnitude of \( \tau_i \)) and not in terms of the magnitude of the benefits they receive from those activities. 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 differed only in terms of the benefits they receive from engaging in socially responsible activities (allow the magnitude of \( \beta \) to vary between firms).\(^{12}\) 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 was made 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 did not provide a report. 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).\(^{13}\) Specifically, we assume that \( \mathbb{E}[\rho_i | \Phi] = \mathbb{E}[\rho_i | r_i, a_i] \) for the members of the audience who are Bayesian and that \( \mathbb{E}[\rho_i | \Phi] = r_i \) 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. Collecting, the firm’s net

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\(^{12}\) If firms differed 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.

\(^{13}\) 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 Hirshleifer and Teoh [2003]. See also the surveys in the fields of accounting, economics and finance by Birnberg [2011], Camerer, Loewenstein and Rabin [2003], Thaler [2003], Barberis and Thaler [2003] and Baker and Wurgler [2013].
benefits to its choice of socially responsible activities becomes
\[ \xi N(\alpha + \beta \mathbb{E}[\rho_i \mid r_i, a_i]) + (1 - \xi)N(\alpha + \beta r_i) - \frac{1}{2} \tau_i \rho_i^2, \]
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.

To complete the description of the model, we assume that the hiring of professionals to verify to the contents of a firm’s CSR report (assurance), increases the probability that the audience learns of any differences between the actual level of socially responsible activities the firm engages in and the amount reported in the firm’s CSR report. Specifically, we assume that the cost of assurance is \(K\) and that the firm incurs a cost of over-promising and under-delivering on its socially responsible activities. Conversely, the firm benefits from under-promising and over-delivering on those activities. Including these effects yields the following payoff for the firm:

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

where \(p(a_i)\) is the probability that the audience learns whether the firm’s CSR report was accurate, \(p'(a_i) > 0\). The cost of over-promising and under-delivering is represented by \(\delta_2\) and the benefit to under-promising and over-delivering is represented by \(\delta_1\). 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 \(\delta_1 > \delta_2\). This assumption ensures that the costs of over-promising and under-delivering by some amount are greater than the benefits of under-promising and over-delivering by the same amount. Intuitively, we are assuming that the audience’s response to over-promising is greater than its response to under-promising.

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. We also allow for a role for monitoring by social activists by assuming that \( p(0) \geq 0 \) where \( p(0) \) is strictly positive if this monitoring activity creates a positive probability that the audience learns if the firm’s claims in its CSR report differ from its actual level of socially responsible activity.\(^{14}\)

4. Separating Equilibria.

Consider first the case without assurance which can arise 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

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

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

\[
\rho_i^* = \frac{1}{\tau_i}(\xi \beta N + p(0)\delta_k).
\]

We will show below (Lemma 2) that in a separating equilibrium the \( L \)-type will not over–promise. 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.\(^{15}\) 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, if the probability the audience learns if the claims in the CSR report differ from the actual level of socially responsible activity is greater or if the cost of over–promising and under–delivering are greater, each firm type chooses to engage in more socially responsible activities.

\(^{14}\) This role for social activist monitoring was first developed by Lyons and Maxwell [2011].

\(^{15}\) 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.
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 \(p(0)\delta\). 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 support a separating equilibrium in that case either. 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. Collecting, we have

**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 any separating equilibrium, \( r_L^* = 0 \) and \( r_H^* > 0 \) is chosen (if possible) to support a separating equilibrium.

For there to be a separating equilibrium, 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.

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. If the \( L \)–type does so, its payoff would be

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

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),

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

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 over–promising and under–delivering, it adjusts its level of socially responsible activities in a seemingly counterintuitive direction. Rather than adjust its actual level of activity upward to reduce the expected cost of
over-promising (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.

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

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

(4)

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

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

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 $(1 - \xi)N\beta < p(0)\delta$, 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) $r_H^* > \left(\frac{\delta_1^2 - \delta_2^2}{2\tau_L}p(0)^2(\delta_1 \tau_H - \delta_2 \tau_L) - (\xi \beta N)^2(\tau_H - 2\tau_L)}{2\tau_L \tau_H (\delta_1 p(0) - (1 - \xi)\beta N)}\right)$

(C2) $r_H^* < \left(\frac{\delta_1^2 - \delta_2^2}{2\tau_L}p(0)^2(\delta_1 \tau_H - \delta_2 \tau_L) - (\xi \beta N)^2(\tau_L - 2\tau_H)}{2\tau_L \tau_H (\delta_1 p(0) - (1 - \xi)\beta N)}\right)$

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 \( r \neq r^*_{H} \)).

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 under–promising. 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 over–promising.

To show existence, we must show that there exists a value of \( r^*_{H} \) that satisfies both conditions (C1) and (C2). A necessary 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

\[
\frac{(\delta^2_1 - \delta^2_2)p(0)^2(\tau_H - 2\xi\beta N p(0))(\delta_2\tau_H - \delta_1\tau_L) - (\xi\beta N)^2(\tau_H - 2\tau_L)}{2\tau_L\tau_H(p_1(0) - (1 - \xi)\beta N)} < \frac{(\delta^2_1 - \delta^2_2)p(0)^2(\tau_L - 2\xi\beta N p(0))(\delta_2\tau_H - \delta_1\tau_L) - (\xi\beta N)^2(\tau_L - 2\tau_H)}{2\tau_L\tau_H(p_1(0) - (1 - \xi)\beta N)},
\]

into

\[
p(0) > \frac{\xi N \beta}{\sqrt{\delta^2_1 - \delta^2_2}} \equiv P(0).
\]

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.

An immediate implication of Theorem 1 and equation (5) is that if outside forces are unable to provide sufficient monitoring of a firm’s CSR activities and reports \( (p(0) \) is small), no one will be able to use the firm’s voluntary disclosures to infer whether or not it is providing high or low levels of socially responsible activities. Thus, if there is no monitoring by social activists, there will not be a separating equilibrium and 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.

\[16\] All of the other equilibrium values, \( r^*_{L}, \rho^*_{L}, \rho^*_{H} \) are described in the lead–up to Theorem 1.
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 over-promising is closer to the marginal benefits of under-promising.

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 engages. 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 $E[\rho_i | \Phi] = f\tilde{\rho}_H + (1-f)\tilde{\rho}_L \equiv \tilde{\rho}$ 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

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

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

$$\tilde{\rho}_i = \frac{\xi N(\alpha + \beta \tilde{\rho}) + (1 - \xi) N(\alpha + \beta r) - \frac{1}{2} \tau_i \tilde{\rho}_i^2 - p(0)\delta_k(r - \tilde{\rho}_i)}{\frac{\xi}{\tau_i} N'(\alpha + \beta \tilde{\rho}) + \frac{1 - \xi}{\tau_i} N'(\alpha + \beta r)}.$$
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 in a separating equilibrium. 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 do not respond to the level of activity actually chosen. This also explains why the levels of socially responsible activities chosen in equilibrium are not responsive to the proportion of the audience that is Bayesian.

We can also use Lemma 3 and the audience’s priors over the firm types to compute the equilibrium level of \( \tilde{\rho} \) 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, \( \tilde{\rho}_i^* = f \tilde{\rho}_H^* + (1 - f) \tilde{\rho}_L^* \).

For there to be a pooling equilibrium, neither firm-type can find a deviation (alternative choice of \( r_i \) which differs from \( r \) and the associated inference about the actual level of socially responsible activity, \( \tilde{\rho} \)) 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 \( \hat{r} \neq r \), they assume that the CSR report was issued by the \( L \)-type.

Given these beliefs, if the \( i \)-type deviates, the most profitable deviation is to \( \hat{r} = 0 \) because the audience interprets any \( \hat{r} \neq r \) to have been chosen by the \( L \)-type. As a result, the firm’s payoff from deviating becomes

\[ (7) \quad \xi N(\alpha + \beta \rho) + (1 - \xi) N(\alpha + \beta \hat{r}) - \frac{1}{2} \tau_i \hat{\rho}_i^2 - p(0)\delta_k(\hat{r} - \hat{\rho}_i). \]

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 the 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 the degree of over– or –under–promising it is engaging in and this is reflected in the equation above. For the $H$–type, in both cases it is under–promising 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:

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

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

In most circumstances, if (C4) is satisfied, then so is (C3). Further, 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 means that they are under–promising and over–delivering.


In this section, we examine the firm’s willingness to pay a professional to assure the contents of the firm’s CSR report. The role of assurance in our model is to increase the probability that the audience learns that the firm’s CSR report mischaracterizes its actual socially responsible activities. Thus, for the $H$–type, assurance is a cost—its 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 increase $p(0)$ to $p(a)$ and if the increase 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”
Neither firm type would pay $K$ for assurance in a pooling equilibrium because it offers no benefits to either type and lowers each type’s 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 a separating equilibrium exceeds its payoff in a pooling equilibrium. Thus, assurance must increase $p(a)$ enough to satisfy the conditions for a separating equilibrium but cannot be too expensive. Given this, it is immediate that if (5) is satisfied, then the firm does not find value in seeking professional assurance of its CSR report. 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 $p(0) < \mathcal{P}(0)$, the key comparison will be between the $H$–type’s payoff in a separating 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 when it purchased professional assurance and a pooling equilibrium when it does not is

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

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

**Theorem 3:** If $p(0)$ is small 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 it does 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 the audience can learn that the firm is over–promising and under–delivering on its socially responsible activities, 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 attestation (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 over–promises and under–delivers while the $L$–type offers a minimal CSR report that under–promises and over–delivers. Further, the $H$–type engages in more socially

---

17 See Ben–Porath and Dekel [1988] or van Damme [1989] for details. See also the textbook treatment in Fudenberg and Tirole [1993].
responsible activities that the $L$–type. Interestingly, relative to a pooling equilibrium, both engage in more actual socially responsible activities. But, even though the $H$–type engages in more socially responsible activity, it over–promises in order to make it too costly for the $L$–type to mimic its CSR report.

The proof of Theorem 3 shows that the $H$–type will voluntarily choose the level of assurance quality (level) of assurance that is just sufficient to support a separating equilibrium. Intuitively, once the $H$–type’s goal of supporting a separating equilibrium is achieved, any subsequent increases in $p$ increase the $H$-type’s expected costs without increasing any benefits. Thus the $H$–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.

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

1. increasing in the number of interested observers, $N$,
2. increasing in the proportion of Bayesian observers, $\xi$,
3. increasing in the benefits the firm obtains from its socially responsible activities, $\beta$
4. increasing in the level of activist monitoring, $p(0)$.

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.

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 $p(0)$ 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) have no effect on 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 under–promising and over–delivering. But, because the $H$–type’s payoff in the separating equilibrium is larger, it chooses to increase $a$ thereby motivating itself to increase both its actual level of socially responsible activity and its reported level.

Third, for firms that engage in larger amounts of socially responsible activities, if those 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. For such firms, either the benefits from socially responsible activities or the size of the audience interested in their decisions is greater. In either case, the firm would be more highly motivated to purchase assurance and more highly motivated 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. We should caution the reader that these results to not imply that there will be observable industry effects in either CSR reporting or assurance.\footnote{This is consistent with the results reported in Casey and Grenier [2014], Kolk and Perego [2010] and Simnett, Vanstraelen and Chua [2009] who find no industry effect for CSR reporting or assurance.} There are two reasons. First, it may 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).

Finally, firms whose customer or investor bases contain higher proportions of sophisticated consumers or investors are more likely to offer CSR reports and more likely to purchase professional assurance of higher quality. Conversely, those whose customers or investors exhibit more limited attention are less likely to offer CSR reports and less likely to purchase professional assurance.\footnote{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).} It may also be the case that firms selling intermediate goods (but not in extraction industries) find that their customers 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 and most provide descriptions 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 voluntary 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 of these decisions. Specifically, the firm’s decisions to voluntarily disclose its socially responsible activities and voluntarily assure those disclosures arise endogenously as a result of a natural asymmetry: the firm knows how much socially responsible activity it engages in but the relevant audience (investors, creditors, consumers and supply chain partners) is unable to directly observe these activities. This asymmetry provides the firm with incentives to voluntarily disclose 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 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 exaggerations in the firm’s CSR report is sufficiently high. This probability can be the result of social activist monitoring but, if they are unable to provide sufficient levels of monitoring, we show that the firm itself has an incentive to increase the probability by purchasing assurance. 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 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 but, interestingly, to support the separating equilibrium, its report exaggerates its activities. We also show that both types actually engage in more socially responsible activity than they would in a pooling equilibrium. Further, the firm that purchases voluntary assurance of its CSR report is motivated to choose a higher quality of assurance when its CSR report is subject to more monitoring by social activists. In other words, the monitoring by social activists complements rather than substitutes for the firm’s voluntary assurance choice. Taken together, these results
indicate that increased monitoring by social activists is expected to increase the likelihood of assurance, increase the quality of assurance and increase 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 more are 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

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

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

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

Finally, note that the second order condition for a maximum in satisfied. \[\square\]

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 an off–the–equilibrium path action (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, 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

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

The \( L \)–type’s payoff from choosing \( r^*_L \) is

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

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

\[
\xi N(\alpha + \beta \hat{r}_i) + (1 - \xi)N(\alpha + \beta \tilde{r}_i) - \frac{1}{2}\tau_H \hat{\rho}_H^2 - p(0)\delta_k(r - \hat{\rho}_H).
\]

The \( H \)–type’s payoff from choosing \( r^*_H \) is

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

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). \[\square\]

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 an off–the–equilibrium path action (a different CSR report). As noted in the text, each type’s payoff in a conjectured pooling equilibrium is

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

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:

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

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). \[\square\]
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 (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, 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

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

The \( L \)–type’s payoff from choosing \( r^*_L \) is

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

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

\[
(A1) \quad r^*_H > \frac{((\delta_1 p(a))^2 - (\delta_2 p(0))^2) \tau_H - 2K \tau_H \tau_L - 2\xi \beta N(\delta_2 \tau_H p(0) - \delta_1 \tau_L p(a)) - (\xi \beta N)^2 (\tau_H - 2\tau_L)}{2\tau_L \tau_H (\delta_1 p(a) - (1 - \xi) \beta N)}.
\]

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

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

The \( H \)–type’s payoff from choosing \( r^*_H \) is

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

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

\[
(A2) \quad r^*_H < \frac{((\delta_1 p(a))^2 - (\delta_2 p(0))^2) \tau_L - 2K \tau_H \tau_L - 2\xi \beta N(\delta_2 \tau_H p(0) - \delta_1 \tau_L p(a)) - (\xi \beta N)^2 (\tau_H - 2\tau_L)}{2\tau_L \tau_H (\delta_1 p(a) - (1 - \xi) \beta N)}.
\]

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

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


