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« The GreenWashing Machine : Is CSR more than Communication ? »

**Rémi BAZILLIER
Julien VAUDAY**

Laboratoire d'Economie d'Orléans – UMR CNRS 6221 Faculté de Droit, d'Economie et de Gestion,
Rue de Blois, B.P. 6739 – 45067 Orléans Cedex 2 - France

Tél : 33 (0)2 38 41 70 37 – 33 (0)2 38 49 48 19 – Fax : 33 (0)2 38 41 73 80

E-mail : leo@univ-orleans.fr - <http://www.univ-orleans.fr/DEG/LEO>

The GreenWashing Machine: Is CSR more than communication? *

Rémi BAZILLIER[†] and Julien VAUDAY[‡]

July 3, 2009

Abstract

Corporate Social Responsibility (CSR) and advertising are strategic complements. Short of assuming firms are pure benevolent, firms will consider CSR as beneficial if it contributes to their sales and/or profits. However, it could be that communicating on CSR represents by itself a good strategy. If the claim about the environmental or social benefits of the product is unsubstantiated or misleading, this practice is known under the name of GreenWashing (GW). If consumers do not discover there is no CSR, they may be attracted by a so-called CSR product because of the advertising. This paper provides both a theoretical and an empirical frameworks to explore this question. The model clearly identifies some “usual suspects” that will prefer GW over CSR. We then conduct an empirical analysis using data on CSR, economic data of the 500 largest European firms to test the predictions. Several instruments are used in order to estimate the propensity to prefer GW, such as the number of pages of sustainable development reports. The results confirm that there exist some “usual suspects”.

J.E.L.: M14, M37, D2

Key-words: Corporate Social Responsibility, Greenwashing, Communication

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[†]LEO - CNRS (UMR 6221) - Université d'Orléans. remi.bazillier@univ-orleans.fr

[‡]Ecole Polytechnique - GIS X-HEC Decision Theory. julien.vauday@polytechnique.edu

Abstract

Corporate Social Responsibility (CSR) and advertising are strategic complements. Short of assuming firms are pure benevolent, firms will consider CSR as beneficial if it contributes to their sales and/or profits. However, it could be that communicating on CSR represents by itself a good strategy. If the claim about the environmental or social benefits of the product is unsubstantiated or misleading, this practice is known under the name of GreenWashing (GW). If consumers do not discover there is no CSR, they may be attracted by a so-called CSR product because of the advertising. This paper provides both a theoretical and an empirical frameworks to explore this question. The model clearly identifies some “usual suspects” that will prefer GW over CSR. We then conduct an empirical analysis using data on CSR, economic data of the 500 largest European firms to test the predictions. Several instruments are used in order to estimate the propensity to prefer GW, such as the number of pages of sustainable development reports. The results confirm that there exist some “usual suspects”.

Résumé

La Responsabilité Sociale des entreprises (RSE) et la publicité sont des compléments stratégiques. A moins de considérer que les firmes sont purement altruistes, elles considéreront la RSE bénéfique si elle contribue à leurs ventes et/ou au profit. Néanmoins, il se peut que la communication autour de la RSE peut représenter en soit une bonne stratégie. Si la revendication des bénéfices environnementaux ou sociaux des produits n'est pas vérifiée ou exagérée, on considère qu'il s'agit de Greenwashinh (GW). Si les consommateurs ne découvrent pas l'absence de RSE, ils peuvent être attirés par des produits prétendument RSE, du fait de la publicité. Ce papier propose un cadre théorique et empirique permettant d'analyser cette question. Le modèle définit clairement des “coupables idéaux” qui préféreront le GW par rapport à la RSE. Nous conduisons ensuite une analyse empirique à partir de données sur la RSE portant sur les 500 plus grosses firmes européennes. Plusieurs instruments sont utilisés pour estimer la propension à préférer le GW, comme par exemple le nombre de pages des rapports développement durable. Les résultats confirment l'existence de ces “coupables idéaux”.

J.E.L: M14, M37, D2

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1 Introduction

More and more firms launched some initiatives related to their social and environmental responsibilities. If the debate over the responsibility of the firm within society is far to be new, the fears created by the globalization and the huge challenge raised by climate change may explain a rising concern by the consumers and thus a new interest from the firms themselves. The Corporate Social Responsibility (CSR) is a notion that is not well defined and therefore the verifiability of the real commitment of firms in CSR is weak. The picture is therefore quite clear. The consumers want more CSR and may be willing to pay for that. Firms are aware of that demand for CSR and may find it profitable to invest in CSR if the demand is high enough. However, CSR is costly, so firms may be tempted to communicate over a non-existent or overestimated effort in CSR.

Of course, the development of CSR raises different issues or problems. The first one is the famous critics raised by Friedman (1971) who considers that the only social responsibility of the firm is to make profits. This can be linked to the *instrumental* view of CSR: firms will engage in CSR only if the firm has an economic interest to do so Mitchell, Agle, and Wood (1997); Odgen and Watson (1999). In other words, firms will be “responsible” if and only if it is a way to maximize their profits or their market share. Maybe because of this argument, another group criticizes CSR for the opposite reasons. CSR is seen as a way to substitute “hard law” by “soft law” determined by the firms themselves. For this group of people, CSR is a way to weaken the welfare state and to put the maximization of the profit at the top of the collective priorities. One of the key aspect of these critics is the scepticism towards the social and environmental commitments of the firms: “*The image of multinational companies working hard to make the world a better place is often just that - an image*”, said a report of the British NGO ChristianAid (2004) who called for “*new laws to make businesses responsible for protecting human rights and the environment wherever they work*”. This scepticism may be reinforced by the “GreenWashing” attitude. This notion of Greenwashing has been used in the eighties and is defined by Greenpeace as “the act of misleading consumers regarding the environmental¹ practices of a company or the environmental benefits of a product or service”. The sceptical will consider that CSR is nothing more than Greenwashing in most of the cases. TerraChoice Environmental Marketing Inc. conducted a survey of six category-leading big box stores. Through these surveys, they identified 1,018 consumer products bearing 1,753 environmental claims. Of the 1,018 products examined, all but one made “*claims that are demonstrably false or that risk misleading intended audiences.*” For the “sceptical”, CSR cannot be seen as a new model of development or regulation because of the large scale of GreenWashing.

The denunciation of Greenwashing does not mean that the firms do not have to communicate around social or environmental considerations. In most of the cases, CSR and communication will be seen as strategic complements if we retain the instrumental view of CSR. However, if we consider that both CSR and communication have a significant cost, the firm may decide to choose the relative proportion of CSR and communication according to a trade-off between the reality of the social and environmental commitments but also the need for the firm to use these commitments in her broader communication strategy.

¹In this paper, we will enlarge the definition of GreenWashing with the inclusion of social practices.

This paper investigates the extent to which firms use “green” communication and advertising as a substitute or complement with CSR. We model the communication between consumers and the firms and determine under which conditions it is profitable for the firm to invest more in communication or in CSR. The core structure of the framework relies on Dewatripont and Tirole (2005). We identify some “usual suspects” that will have a higher probability to prefer the communication strategy. We will test empirically some implications of the model, using an original database on CSR level for the biggest 595 European firms and on the level of *reporting* that will be used as a proxy of “Green” communication.

The literature largely studied the determinants of CSR. Garriga and Melé (2004) distinguish four families of theories explaining the development of CSR: the instrumental theories, the political theories, the integrative theories and the ethic theories. But this framework does not allow a distinction between an effective level of CSR and a possible strategy of greenwashing. Nelson (1974) showed that advertising strategy will depend on the nature of the good itself. From this idea, McWilliams and Siegel (2001) suggest that the goods can be divided into the “search goods” and the “experience goods”. The search goods is a category of products where the quality of the products can be revealed before the buy. The experience goods are goods for which the only way to have an estimate of the quality is to taste it. CSR would be more developed for this last category of goods. McWilliams and Siegel (2001) showed a positive correlation between experience goods and advertising. Siegel and Vitalino (2007) investigates empirically the determinants of CSR and confirm that CSR tends to be more important for experience goods.

Our analysis makes a number of contributions to the literature. First, we propose a theoretical framework explaining when communication and CSR are strategic complements and when they are substitutes. The theoretical implications are tested empirically. Second, we propose an original estimation of the level of CSR *reporting* for the 595 biggest European firms and a new index of their effective level of CSR built from VIGEO data. We define different level of commitments, from the simple communication in CSR reports (the “cues” communication in Dewatripont and Tirole (2005)) to the external certification (the “issue-relevant” communication in Dewatripont and Tirole (2005)).

The paper is organized as follow. In section 2, we present the basic framework, based on Dewatripont and Tirole (2005). In section 3, we will study when it is “strategic” for the firm to use GreenWashing, using the framework presented in section 2. We will see how cues and hard information may influence these strategies. From these two sections, we will propose some empirical specifications that we will test in the following sections. In section 4, we will present the three sets of data we use in the paper: (1) the effective level of CSR, approximated by an original index built from VIGEO data, (2) the level of CSR communication, approximated by the general level of *reporting*, (3) the external certification asked by the firms in the frame of the *Global Reporting Initiative*. In section 5, we will show empirically when CSR and communication are substitutes or complements. In section 6, we make the same analysis for each subcomponents of CSR. In section 7, we will discuss the implications of the results and directions for future researches. Finally, we will conclude in section 8.

2 Basic framework

The core structure of the framework relies on Dewatripont and Tirole (2005). This paper provides a simple framework for the study of modes of communication. As this paper refers to advertising as a strategic tool available to firms, it seems to apply quite well.

Dewatripont and Tirole (2005) (D & T 05 hereafter) introduce two types of relations between a sender, S, and a receiver, R. Either their relation is governed by a Supervisory Decision Making (SDM) or by an Executive Decision Making (EDM). Under the former, the information the communication may convey helps the receiver to decide whether she chooses action A or the status quo. Under the latter, without any communication, the receiver would never choose to take action A. The action A we consider in this paper is to buy a more expansive product or not. We assume the payoff of R under the status quo is 0. The consumer (receiver) would then choose action A if the product contains CSR. Therefore, there is an implicit utility function such that the consumer derives a higher indirect utility for consuming a good that contains CSR, despite the price is higher². We shall consider in another section the case of a continuous content of CSR. In such case, there is a tradeoff between the price charged and the expected level of CSR in the product.

Two types of consumer may exist. First, the suspicious one that considers that without any information, there is no CSR in a product. Consequently, her decision is similar to the EDM. Second, the risk neutral one that assumes there is a probability the product contains CSR. Hence, her action corresponds to SDM. This distinction is close to the one of Gabaix and Laibson (2006) that also introduces two types of consumers, the sophisticated and the unsophisticated ones. The first of them being aware of the existence of high add-ons price, contrary to the second, that are myopic with respect to that aspect.

Therefore, the suspicious consumer attributes a nil ex-ante probability that taking action A will generate a positive revenue (or indirect utility increase). As for her, the risk neutral consumer establishes an ex-ante probability that is non nil. Similarly to D & T 05, this ex-ante probability is such that the lowest probability from which the consumer expects a positive revenue from taking action A is

$$\alpha^* = \frac{-r_L}{r_H - r_L} \quad (1)$$

where r_L (r_H) is the low (high) revenue. The revenue here is to be considered as the difference between the relative prices of both products and the indirect utility the consumer obtains to the extent of CSR contained in the product. We consider that firms know how consumers value the CSR content. Therefore, buying a product that contains no CSR at all yields an unambiguously negative revenue as the product that may contain CSR is more expansive than the standard product.

²This hypothesis is common in the analysis of CSR. It is confirmed by surveys conducted by the Marymount University: consumers claimed to be willing to pay as much as one dollar or 5 percent more for apparel not manufactured in sweatshops (Dickson, 2001). Pelsmacker, Driesen, and Rayp (2001) showed that the average price premium that the Belgian consumers were willing to pay for a fair-trade label was 10%. Another study revealed that, on average, 46% of European consumers also claimed to be willing to pay substantially more for ethical products (MORI, 2000).

With p_H (p_L) the price charged for a (non) CSR product, $r_L = E[U(CSR = 0)] - p_H < 0$, $r_H = E[U(CSR > 0)] - p_H > 0$. If the consumer does not choose A, it gets $E[U(CSR = 0)] - p_L = 0$. $E[U(\cdot)]$ means that the consumer is not able to verify if the product indeed contains CSR. He however knows that if it does, this would yield him a higher utility.

Another concern is about the property a product has of giving some information about its CSR content. A product can fully or partly reveal its real CSR content to the consumer. However, if a product has not this property, a *blinding product*, it is similar to assume the case of the suspicious consumer: since it is impossible to verify its content, a consumer will never choose to buy it. Similarly, a product that reveals a part of its CSR content amounts to the risk neutral consumer. It would influence, possibly, the ex-ante probability α^* . This reminds the distinction between *search goods* and *experience goods* proposed by McWilliams and Siegel (2001).

We focus on a particular case developed in D & T 05 that involves cue communication. These “cues” convey no hard information on the CSR content but may convey information on the type of the sender, the firms. A “good news” is expected to raise the *congruence* between the consumer and the firm. This congruence has to be understood here as an *a priori* convergence of interest. The “*a priori*” is important as this allows us to make the parallel between cues and advertising. Of course, suspicious consumers that need some hard information on the CSR content would not be influenced by this ads.³ This corresponds then to the EDM case, for which only hard information communication may trigger the action A. Otherwise, a consumer that is more or less gullible refers to various SDM situations.

In order to modify the ex-ante decision that depends on the ex-ante probability, both actors, the sender and the receiver, may also make an effort in order to communicate and assimilate hard information. These efforts, labeled x and y for the sender and the receiver, respectively, are costly. Their costs $S(x)$ and $R(y)$ are increasing and differentiable. As in D & T 05, we assume the communication efforts are strategic complements.

As a consequence, also note that CSR and communication/advertising are also strategic complement in many cases. In particular, when this is a blinding product and/or the consumer is a suspicious one, practicing CSR without communicating on the content of the product incurs losses, by definition, as developing CSR practices is costly for the firm. The effort to communicate hard information is therefore comparable to a verifiable certification of the CSR content of the firm, by an independent agency for instance⁴. It may also be the case if the consumer has joined a consumer lobby and spend some time helping it in order to verify products CSR content.

In particular, we focus on a case that is not developed in D & T 05, when cues coexist with the fact that the sender knows the receiver payoffs. We first present the two basic cases, which either involves only cues or only hard information communication. Next, we turn to the model that involves both.

³Because of that parallel, the words cues and ads will be used interchangeably.

⁴See section 4 for discussion.

3 Cues and hard information: when is it strategic to practice greenwashing?

3.1 Firms know the consumer payoff: hard information communication

This set-up is developed in D & T 05 so we just recall the main results of that situation. It is obvious that the firm has no incentive to send any information if she knows $r = r_L$. So in that case, a firm that has not invest in CSR will not communicate. The equilibrium with no communication is not of interest in this paper. The ex-ante probability of the consumer determines whether he buys or not the product. An optimistic one will buy it for instance. As one will see, it may be the case that no communication occurs when $r = r_H$, precisely when the congruence (α) is high. So this is not an absurd decision of the consumer.

Consider now that $r = r_H$. For a low congruence, $\alpha < \alpha^*$, the consumer does not choose A without any communication. Hence, the equilibrium values of communication effort are given by:

$$R'(y^*) = x^* \alpha r_H \quad (2)$$

$$S'(x^*) = y^* s \quad (3)$$

In the case of high congruence, $\alpha > \alpha^*$, (2) holds under EDM. Under SDM, an equilibrium exists where no information is conveyed. However, another equilibrium does exist. The consumer may be worried because of the absence of information. As already mentioned, since there is no communication when the congruence is low, the absence of communication may then correspond either to a CSR product or not. In such case, the sender is obliged to make an effort. If we denote x^* and y^* the equilibrium communication effort, the two following conditions have to hold:

$$\frac{\alpha(1 - x^* y^*)}{1 - \alpha x^* y^*} r_H + \frac{1 - \alpha}{1 - \alpha x^* y^*} r_L < 0 \quad (4)$$

$$\alpha x^* y^* r_H - R(y^*) \geq r_H \alpha + (1 - \alpha) r_L \quad (5)$$

In D & T 05, they explain that since $R(y^*) > 0$, then the second inequality implies the first one. This second inequality yields a threshold α^{***} under which the sender needs to convey some hard information in order to induce the consumer to choose action A.⁵

The most important implication of that model is that two situations involving no communication are diametrically opposed as r could either be equal to r_H or to r_L . Now let introduce that a firm that has invested in CSR would only obtain a payoff of s_H , strictly lower than s_L , the payoff of a firm that has not invested in CSR. Is it interesting for a firm to invest in CSR? The answer is yes, under some conditions. If α is higher than the threshold defined by the equations above, then there is “real authority”. Hence, no hard information is sent. Everything depends on the ex-ante probability. Investing in CSR is therefore not optimal. However, if α is lower, then when choosing r_L , the firm has no chance to sell its product. Investing CSR is therefore optimal if $s_H > S(x^*)$,

⁵If, of course, $\alpha^{***} > \alpha^*$.

where x^* is defined according to (2).

When only hard information can be sent. It is optimal to practice CSR iff

$$\alpha < \alpha^{***}$$

$$s_H > S(x^*)$$

3.2 Firms know the payoffs: cues

To begin with cues, we again take the D & T 05's framework. We assume that communicating cues is not costly (or negligible compared to the communication of hard information). We will of course relax this assumption. The effort the firm makes in communicating cue allows to signal an *a priori* congruence that is either low, $\underline{\alpha}$, or high, $\bar{\alpha}$.

As the cue conveys no information on the CSR content of the product. The fact the firm knows that r is low or high does not affect the incentive of signaling a high α . Again, let us introduce the fact that the payoff of the firm is s_H or s_L whether she has invested in CSR or not, respectively, with $s_H < s_L$. Hence, a firm has never the incentive to invest in CSR in that case since she will bear the same cost of signaling for an absolutely identical outcome, A is chosen, but that would only yield a payoff of s_H if she had invested in CSR. When only cues can be sent, it is never optimal to invest in CSR. So either it is optimal to choose to invest in CSR, but with hard information communication under some conditions. Or the communication is a cue, hence not investing in CSR strictly dominates investing in CSR.

3.3 Hard information and cues

We now combine both types of communication in order to allow the following possible equilibria altogether:

- (i) Investing in CSR is optimal
- (ii) Not investing in CSR is optimal, with no communication
- (iii) Not investing in CSR is optimal, with communication
- (iv) It is never optimal to invest in CSR without communication.

The third item corresponds to a corner solution of greenwashing. With a continuum of possible level of investment in cues and/or in CSR, one will have to compare with a situation without cues in order to determine whether there is greenwashing or not.

The most important aspect when both communication types are mixed is that if equation (4) is not verified⁶, the optimal solution is to choose $r = r_L$ and to send a cue such that $\alpha > \alpha^{***}$, if and only if the cost of communicating a cue is not too high. We will refine this below. For now, we focus on the most simple case. As in D & T 05, the firm can either signal $\underline{\alpha}$, or $\bar{\alpha}$, with $\alpha = \gamma\bar{\alpha} + (1-\gamma)\underline{\alpha}$, where γ is the associated probability of $\bar{\alpha}$. Hence, this means consumers form expectation over the probability the firm will be good or not.

Under EDM, there is no equilibrium *No-CSR/Cue* since cues convey no hard information on the CSR content of the product. As a consequence, greenwashing is impossible when consumers are suspicious. So we will mainly focus on the SDM case. It is worth to note that EDM corresponds to an *a priori* congruence equal to zero.

Several different possibilities need to be addressed. Suppose first that firms are not able to signal more than $\underline{\alpha} < \alpha^*$. This could be interpreted by a world of rather suspicious consumers or a cost of advertising that is almost prohibitive.⁷

If the firm knows that $r = r_L$, she has no incentive to communicate hard information, so she does not send a cue. If she knows $r = r_H$, therefore she sends a cue and the equilibrium communication efforts $(\underline{x}^c, \underline{y}^c)$ are given by

$$R'(\underline{y}^c) = \underline{x}^c \alpha r_H \quad (6)$$

$$S'(\underline{x}^c) = \underline{y}^c s \quad (7)$$

Here, the optimal communication efforts are both lower for the consumer and the firm, compared to a situation without cue, for $\underline{\alpha} < \alpha^*$ which is assumed here.⁸

Now, firms can send $\bar{\alpha} > \underline{\alpha}$. First, assume firms can signal $\bar{\alpha} > \alpha^{***}$. In that case, whether firms know $r = r_L$ or $r = r_H$, they send the cue and the consumer rubber-stamps the action without any additional communication of hard information. So if the consumers are very gullible, the optimal action for the firm is to send cue without investing in CSR. This is a “real authority” situation.

If $\bar{\alpha} \in [\alpha^*, \alpha^{***}]$ and the firm knows $r = r_L$, she knows she will not send any hard information, but she is obliged to, since the consumer doubts about the CSR content of the product if no cue is sent such that the firm should send some hard information. So the firm will not either send a cue nor any hard information.

Obviously, if $r = r_H$, then both are send. The hard information communication efforts are given by (2) and (3), where $\bar{\alpha}$ replaces α , under EDM and SDM, under the condition, for SDM, that equation (5) holds.⁹

Finally, if $\bar{\alpha} < \alpha^*$, there are no reasons to send the cue if there is an ex ante probability α , independently of the value of r . If without cue, $\alpha = 0$ is assumed, then sending a cue is always optimal for “good firms”.

If $r = r_H$, then hard information is communicated according to the efforts (2) and (3) yield. To the contrary, when $r = r_L$, no communication takes place.

⁶If the inequalities are reversed then, as before (5) implied (4), now (4) implies (5).

⁷We introduce a way to separate these two aspects later in the paper.

⁸Both types of communication are therefore substitutes.

⁹Both types of communication are then complements.

All in all, when $r = r_L$, the consumer would consider buying the product if and only if the congruence that can be revealed is high enough. When $r = r_H$, the consumer will always consider buying the product.

Proposition 1 (Hard Greenwashing) *When cues and hard information communication coexist, if $\bar{\alpha} > \alpha^{***}$, then the optimal solution is No-CSR/Cue, that is hard (or full) green washing.*

*If $\bar{\alpha} < \alpha^{***}$, practicing CSR is the only way to sell the product. The optimal choice depends on the gains the firm obtains relatively to the cost of communicating hard information.*

A cue is always sent by a CSR firm if the ex ante probability, with no communication at all, is nil.

3.4 Costly cues

Now, we need to turn to the utilities the consumer and the firm derive in each situation in order to check whether all situations are equilibria. If $\bar{\alpha} > \alpha^{***}$, a situation that is an equilibrium is *No-CSR/Cue* since it strictly dominates *CSR/Cue* from the point of view of the firm and that the consumer hardly believes the product contains CSR.

Several additional hypotheses have to be added in order to represent more correctly the situation of the tradeoff between practicing CSR or not and (not) to diffuse soft or hard information about its content. In particular, we assume from now on that the payoff of the firm is s_H if she has practiced CSR, s_L otherwise, with $s_H < s_L$. We also assume that the firm's cost of the cue communication is a function of α , and we further assume that this function has the same property than the cost functions of hard communication efforts, except for convexity, as we shall discuss that point, as the question of the consumer's cue cost, later on. To sum up, the utility functions are as follows. For the consumer, if there is cue communication, the utility function is

$$U_C = xy\alpha r_H - R(y) - R_c \quad (8)$$

and for the firm

$$U_F = xy\alpha s_H - S(x) - S_c(\alpha) \text{ if CSR is practiced} \quad (9)$$

$$U_F = xy\alpha s_L - S(x) - S_c(\alpha) \text{ otherwise} \quad (10)$$

Whereas, if no cue is sent, the terms indexed with c have to be removed.

The cost of the cue is equal to $S_c(\alpha)$ for firms and is constant and negligible for the consumer. Since we interpret cue communication as ads, it seems rather intuitive to set the cost of assimilating the cue at a very low level for consumers. Consumers are not tracking for advertising, the probability they see one depends on the effort of firms.

3.4.1 Consumers

The consumer chooses action A under the following conditions. First, if $\alpha > \alpha^{***}$, the consumer chooses A if and only if $r_H - r_L > R_c$ since there is no hard information communication. If $\alpha < \alpha^{***}$,

then she chooses A if and only if $r_H - r_L > R_c + R(y)$.

Recall that action A corresponds to paying the price p_H in order to obtain a product that may contain some CSR. If action A is not taken, then the price is p_L and we have that $E[U(CSR = 0)] - p_L = 0$. Otherwise, we have that $E[U(CSR = 0)] - p_H < 0$ if the product does not contain any CSR and $E[U(CSR)] - p_H > 0$ if it does. It is then possible to write that $r_H - r_L = E[U(CSR > 0)] - E[U(CSR = 0)]$. Moreover, if the hard information is assimilated, the consumer then chooses A (otherwise, neither the consumer nor the firm would have the incentive to make a communication effort). We assume that the consumer builds an anticipation such that the probability the product contains some CSR is α . This represents the ex-ante expectation corresponding to the sector. pour future work, cc le tout :)

3.4.2 Firm

The firm is facing a tradeoff. Either she has invested in CSR or she has not and the lowest cue level she would send is α^{***} . Under CSR, the lowest level is lower and then the cue is cheaper, but the firm only earns s_H . Conversely, under No-CSR, the lowest level is higher so sending a cue is more expensive but the reward is higher. As a consequence, the level of α is very important.

As for the notation, $\bar{\alpha}$ (and all the upper bar α) indicates the value the firm has set, α indicates the ex-ante value. Of course, the firm will have an incentive to send the cue if and only if the cue signals a probability higher than α .

If $r = r_L$, then $\bar{\alpha} = \alpha^{***}$, if feasible.

Otherwise, no cue is sent.

This result is trivial as once the level α^{***} is reached, the consumer rubber-stamps action A. Setting a higher $\bar{\alpha}$ would then be a pure waste of resources. From a more pragmatcal point of view, this would mean that a very good communication plan should be enough to convinced a consumer that a firm is practicing CSR.

Consider now that $r = r_H$. In a cost analysis, the firm will prefer $\bar{\alpha} = \alpha^{***}$ to $\bar{\alpha} = \alpha^*$ if and only if $S[x(\alpha^*)] > S_c(\alpha^{***}) - S_c(\alpha^*)$, that is if the cost of sending a better cue is lower than the cost of sending hard information as a complement of the cue. This is true if $\alpha^{***} > \alpha^*$. Similarly, the firm will prefer an intermediate level $\alpha^{**} \in [\alpha^*, \alpha^{***}]$ if and only if $S[x(\alpha^{**})] - S[x(\alpha^*)] > S_c(\alpha^*) - S_c(\alpha^{**})$.

Lemma 1 *If $r = r_H$, then $\bar{\alpha} = \alpha^{***}$ iff*

$$S[x(\alpha^*)] > S_c(\alpha^{***}) - S_c(\alpha^*) \quad (11)$$

*and $\bar{\alpha} = \alpha^{**} > \alpha^*$ iff*

$$S[x(\alpha^{**})] - S[x(\alpha^*)] > S_c(\alpha^*) - S_c(\alpha^{**}) \quad (12)$$

and $\bar{\alpha} = \alpha^$ otherwise.*

The most important effect in this cost analysis comes from the elasticities of $S(\cdot)$ and $S_c(\cdot)$ with respect to α . Importantly, from the effort functions, we know that x depends on α in the following

ways. The higher r_H and s_H , the higher the effect of α on x^* . Moreover, a weak $R'(y^*)$ and a high y^* have the same effect. This corresponds therefore to power functions. That is, if the rewards are both large and if the consumer can set a high effort for a quite low cost, then the higher α , the higher x^* .

Hence, if cues are cheap, both types of communication are substitutes. Otherwise, there is a complementarity as both types of information are sent. Two effects are at work. As one or both rewards increase, this tends to increase the positive effect of α over x^* , so the complementarity is higher. But increasing the spending on α increases x^* and the corresponding spending. Consequently, the complementarity is higher when both cost functions have the same proprieties, such that α^{**} would be preferred to α^* . Under these conditions, α^{**} is preferred under the cost analysis, and then this situation dominates as it corresponds to a higher α and a higher x^* so the probability is increased as well as the utility. When x and α are rather substitutes, the situation is less clear and we need to compare utility levels.

If $\bar{\alpha} = \alpha^*$, for a given s , the utility is $U_F^* = x^*y^*\alpha^*s - S[x(\alpha^*)] - S_c(\alpha^*)$. The equation is similar for $\bar{\alpha} = \alpha^{**}$. When $\bar{\alpha} = \alpha^{***}$, then the utility is equal to $U_F^{***} = s - S_c(\alpha^{***})$.

We assume that the utility of a firm that has not practiced CSR is such that $U_{F,L}^{***} = s_L - S_c(\alpha^{***}) > 0$. Hence, the GW is profitable. Since $s_L > s_H$, *No-CSR/Cue* dominates *CSR/Cue* if $\alpha^{***} = \alpha$ is affordable.

3.4.3 What situation dominates?

The α^{**} -*CSR/Cue* dominates *No-CSR/Cue* if and only if

$$S_c(\alpha^{***}) - S_c(\alpha^{**}) > s_L - x^*y^*s_H + S[x(\alpha^{**})] \quad (13)$$

First, we can study the necessary condition (since $s_L > s_H$):

$$S_c(\alpha^{***}) - S_c(\alpha^{**}) > s_H - x^*y^*\alpha^{**}s_H + S[x(\alpha^{**})] \quad (14)$$

The necessary condition corresponds to the choice of a firm that has decided to practice CSR and that has to decide whether to set $\bar{\alpha}$ equal to α^{**} or α^{***} . It precisely means that the firm has to prefer α^{**} . If this is not the case, hence the unique equilibrium would be *No-CSR/Cue* since a firm that practices CSR prefers to set $\bar{\alpha}$ to α^{***} which is dominated by not practicing CSR and sending the same cue.

If

$$S_c(\alpha^{***}) - S_c(\alpha^{**}) < s_H(1 - x^*y^*\alpha^{**}) + S[x(\alpha^{**})] \quad (15)$$

the unique equilibrium is the GreenWashing. This means that if $S_c(\alpha^{***})$ is sufficiently low, such that a firm that has set $r_H^* > 0$ would choose to send a cue α^{***} , then the equilibrium situation is announcing a high r_H^* , sending a cue $\bar{\alpha} = \alpha^{***}$ and practicing no CSR. Therefore, we are interested in knowing when hard greenwashing dominates. It is indeed important to show that this is not the unique equilibrium.

Moreover, this holds if $\bar{\alpha} = \alpha^{**}$ dominates $\bar{\alpha} = \alpha^*$. We can show that, except the relative forms the cost functions take, s_H and the elasticity of y to α are very important. Given that an increase in α raises y^* , as s_H increases, this reinforces the interest of sending a cue. If $\bar{\alpha} = \alpha^*$ dominates, then the necessary condition has to be rewritten with α^* replacing α^{**} .

As it is clear, if hard information cost function is steeper, or if the cue cost function is almost flat, then this condition holds more easily. As for the effect of s_H , if it increases this raises x^* and y^* . So the probability the hard information is assimilated increases. If α and x are complements, the cost of sending the hard information increases too. The first term of the RHS decreases in s_H if the effect on $p^*\alpha^{**}$ is strong. This has to be compared to the increase in the cost of the hard information and the increase of the cue. This last effect reduces the opportunity cost of choosing to not send any hard information.

So if the incentives to make a large effort following an increase of the payoff are strong and if the corresponding cost increase are not too high, then the inequality is harder after an increase in s_H . If α and x are substitutes, then there is an ambiguous effect on $p^*\alpha^{**}$, but the increase in s_H would allow to decrease the more expansive communication.

So this result is important as it highlights that an increase in the reward of practicing CSR does not necessary coincide with a reduction of GW. The reason is that an increase of s_H simply raises the reward the firm is certain to obtain if no hard information is sent. Consequently, a firm that is more productive in CSR is not necessarily inclined in communicating hard information and hence in practicing CSR. Therefore, if one extrapolates, a firm that is used to invest in R & D in order to improve CSR may reach a level which for she will not practice CSR anymore. Moreover, the reputation she may enjoy because of her history as an investor in R & D should help her in this practice.

If the necessary condition (15) holds, then whether hard greenwashing dominates or not depends on the relative values of s_L and s_H , and on the same effects than highlighted in the case of the necessary condition. Now, however, s_H has not an effect on the likelihood to choose an equilibrium with no hard information. So a higher s_H should increase the incentive to choose α^{**} if the cost increases implied by a higher s_H are not too large in the case of complementarity between α and x . In the case of substitutability, if the cost of the cue is relatively higher than the cost of sending hard information, an increase in s_H that would yield an increase in α and therefore a decrease in x^* would simultaneously decrease the gap between $S_c(\alpha^{***})$ and $S_c(\alpha^{**})$, and decrease $S[x^*(\alpha^{**})]$. The shape of cost functions has a very important impact. If the cost function of cue is steeper than the one of the hard information, an increase in s_H could increase the incentive of practicing the greenwashing.

Proposition 2 *According to the relative elasticities of x , y with respect to s_H , of the elasticities of the cost functions to an increase of x and α , an increase of s_H may or may not increase the incentive to practice CSR.*

3.5 Continuous choice of the level of CSR

In order to have more practicable empirical predictions, we now need to extend the model to a continuous choice of CSR level. The timing of events is now as follows:

- i The firm chooses the CSR level
- ii The firm (S) decides the cue and the communication of hard information
- iii The consumer (R) decides the cue and the effort to assimilate the HI
- iv Consumer decides to take action A or not.

We assume the firm has a technology such that in order to produce a good that contains a level r_H of CSR, she spends $s(r_H)$. Therefore, we have that $s_H = s_L - s(r_H)$.

First, several remarks about this version of the model. One could think it is optimal to set a very low level of CSR in order to convince the consumer. This is of course not true. If firm communicates on a higher r_H , the level of $\bar{\alpha}$ that is needed to send in order to signal a high congruence is lower. Therefore, the firm has an interest in increasing r_H since the cue that corresponds to the r_H announced is lower. That is, a firm that announces a low cue (compared to what is expected by the consumer) signals a higher content of CSR. However, this could ease the greenwashing strategy. Indeed, α^{***} also decreases. As we have shown, the “bad” firm has no incentives to announce a cue other than $\bar{\alpha} = \alpha^{***}$. Hence, a firm that has a high content in CSR can send a lower cue without being assimilated to a “bad” firm. As a consequence, The higher the level of CSR the firm chooses, the lower the cue communication. With a higher r_H , it is possible to set a lower $\bar{\alpha}$ in order to enter a path with increasing communication efforts. The most important aspect is that the consumer that observes a lower $\bar{\alpha}$ will infer that there is a high CSR content. This result therefore underlines that improving CSR is not done only because of the consumer taste for CSR but to facilitate the communication strategy of the firm.

3.5.1 Continuous CSR without cue

As soon as $r_H > r_L$, the consumer is interested in buying the product. What makes then an incentive to increase CSR? We need to conserve the timing of the previous sections. Indeed, if the decision is simultaneous, this means that the consumer does not observe neither the r_H^* set by the firm, nor its communication effort. We need then to assume that either one, the other, or both are observable by the consumer.

(i) If the r_H^* is announced ex ante by the firm, it is trivial that an increase in r_H increases the ex ante probability, hence the communication efforts. Since the probability and the cost of the CSR are monotonic in the CSR content, there is a unique equilibrium level of CSR.

(ii) If x is observed ex ante, the firm is in a position of a Stackleberg leader. Referring to this possibility in the D & T (05) framework, the effort is indeed increased, but not because of r_H since it still no begin observed by the consumer. In that case, the firm has no incentive to set a high r_H^* since its gain decreases in s_H .

(iii) Obviously, if both are observable by the consumer, efforts are increased by uniquely because r_H has been observed ex ante. For that reason, we rule out the possibility evoked in D & T (05) where the effort of the sender is only partly observed since for the same reasons, the content in r_H is not the reason

Therefore, in order to compare both situations we focus on a slightly modified version of the first case: the firm can commit to invest the level announced. In other words, when announcing a level r_H^* , the product, if it contains some CSR, has to contain the level r_H . So we assume that the r_H that is announced is indeed the one the consumer gets, if firm has practiced CSR. However, in such a case, a firm has an incentive to announce a r_H^* such that the ex ante probability exceeds α^{***} . If so, then no firm would invest in CSR, except under EDM. Therefore, we introduce an important function such that we have a $\tilde{r}_H = \rho(r_H)r_H^*$, where $\rho(r_H)$ measures the degree of trust (or gullibility) of the consumer. It is decreasing and concave in r_H , $\rho(0) = 1$ and $\rho(\infty) = 0$. This assumption is made in order to avoid the possibility for firms to announce $r_H^* = \infty$. Firms know the existence of this parameter but do not know exactly the function. So now, α measures precisely the “quality” of the communication. The introduction of this parameter allows also to allow a SDM case to become an EDM or a “quasi-EDM”, that is when $\alpha \simeq 1$. Under reasonable assumptions, one could think that communication costs are such that it is prohibitive to communicate when α is close to one.

With this additional function, can a firm announce $r = r_H^*$ without practicing any CSR? If this is not the case, this means that the possibility of revealing $r = r_H$ rules out the hard greenwashing. We assume that $\rho(r_H)$ is such that announcing a r_H^* such that sending a cue $\bar{\alpha} = \alpha^{***}$ is affordable is not feasible.

Moreover, from the previous results, we know that a firm that has sent $\alpha^{***} = \bar{\alpha}$ is necessarily a firm that has not practiced CSR. The consumer would therefore never buy a product in such case.

If we assume that $\rho(r_H)$ is known by the consumer. The continuity of α and/or r_H rules out the possibility of hard greenwashing, except for a misperception of this function by the firm.¹⁰ So the level α^{***} is a limit. The lower it is, the harder communicating soft information it is. Recall that α^{***} is given by inequality (4)

$$\alpha^{***} = \frac{-r_L}{(1 - x^*y^*)\rho(r_H)r_H - r_L}$$

So the gullibility has two effects. It makes the consumers harder to convince but it increases the communication limit above which the consumer is certain that there is greenwashing.

3.5.2 Cues and CSR versus CSR alone

First, is there any incentive to send a cue when r_H has been announced? This depends on the relative cost of both the cue and the CSR. As it has been already shown, the incentive to send a cue implicitly depends on r_H . However, except through announcing $r_H = \infty$, $\alpha < 1$ and an incentive to

¹⁰The proof is straightforward.

send a cue remains, this is guaranteed by the function $\rho(r_H)$. However, if it is much more expensive to send a cue, it is preferable to invest in CSR and *vice versa*.¹¹

The very important question is to know whether the possibility to send a cue reduces the optimal level of CSR the firm chooses. Two very different stories are possible. First, we compare the situation in which the firm chooses the level of CSR and may send a cue but the consumer does not has any information on it to the situation with revelation of the promised level of CSR if the CSR is realized. In this case, the presence of cues and the endogenous continuous level of CSR allow to diminish the level from which both efforts in hard information communication increase. As a consequence, it is not obvious that the presence of cues reduce the investment in CSR. It rather seems that both strategies behave similarly. In one case, without cues, the increase in r_H increases the ex ante congruence. In the other case, with cues, the increase in r_H combined with the incentives to communicate a cue increase the level from which both efforts increase.

However, those two situations are not totally comparable. Now we compare models in which firms commit to r_H^* if CSR is practiced and we consider the relative incentives of firms willing to practice CSR. As argued, the possibility of revealing r_H does not suppress all incentives to send cues. Moreover, if cues are relatively cheap compared to the investment in CSR, the firm may prefer a quite low level of r_H^* and sending a strong cue. Hence, the possibility to send a cue, everything else equal, help to sell its product with a lower level of CSR. In equation (6), α and r_H increases the effort in issue-relevant communication. However, in that case, a larger cue may increase communication efforts as a larger r_H does it if cues are sendable.

Proposition 3 (Light greenwashing) *If r_H is continuous and endogenous, and if firms can ex ante commit to a level of r_H^* they pretend to have invested in, then the presence of cues reduces the optimal level of CSR.*

Proof. We start with the following lemma that states that under *No-Cue*, an increase of r_H has two opposed effects but that the overall effect is positive:

Lemma 2 *For $\rho(r_H) = \rho$, an increase of r_H decreases α and increases directly $R'(y)$, the overall effect is equal to*

$$\frac{\partial R'}{\partial r_H} = x^* \left(\frac{r_L}{\rho r_H - r_L} \right)^2 > 0 \quad (16)$$

and

$$\frac{\partial^2 R'}{\partial^2 r_H} = x^* \left(\frac{-2\rho r_L}{(r_H - r_L)^2} \right) \left(\frac{r_L}{r_H - r_L} \right) < 0 \quad (17)$$

so the positive effect is decreasing in r_H .

¹¹The cue and announcing r_H before are almost substitutes. Without the function $\rho(r_H)$, announcing a very large r_H would always be preferable to sending a cue since it is free. This however allows to introduce the distinction between the gullibility of the consumers and the reputation through communication of firms.

If $\rho(r_H)$ is not constant, then the first order derivative is equal to

$$\frac{\partial R'}{\partial r_H} = x^* \frac{r_L^2 + r_L r_H^2 \rho'(r_H)}{(\rho r_H - r_L)^2} > 0 \quad (18)$$

Then, consider first what happens if a firm announces \bar{r}_H when no cue can be sent. In that case, she spends a cost $s(\bar{r}_H)$. In parallel, from lemma 1, an increase in r_H increases the communication effort of the consumer; and an increase in $s(\bar{r}_H)$ reduces the communication effort of the firm.

Now consider a firm that announces $\bar{r}_H < \bar{r}_H$. From above, the cost in investing in CSR is lower, so the effort the firm will make will be higher for the hard information. She will however send a cue. A lower r_H means a higher α^* . The effect on the effort of the consumer when passing from \bar{r}_H to \bar{r}_H generates a positive but small effect from lemma 1.

As a consequence, the firm that can use a cue saves $s(\bar{r}_H) - s(\bar{r}_H)$. She spends $S_c(\bar{\alpha})$ more. The effect on both efforts are ambiguous. Passing from \bar{r}_H to \bar{r}_H implies that the firm effort is higher because of higher reward and that the effort of the consumer is lower because of the smaller reward. Then, the difference between the two probabilities ultimately depends on the elasticity of investing in CSR. The higher it is, the more probable the probability under \bar{r}_H is higher.

Therefore, if the cost of sending a cue is not too high, the firm choosing \bar{r}_H may achieve the same utility under cue than a firm choosing \bar{r}_H under *No-Cue*. ■

We call this light greenwashing because firms keep investing in CSR, yet less than without cues. Several effects are at work. The cost functions are very important. Another very important effect passes through $\rho(r_H)$. Indeed, the effect on α is not monotonic by assumption. As a consequence, sending a high r_H^* may actually induce an increase of α^* . We have assumed this not the case from now on. If it was the case, this would mean that firms face another problem that obliges them not to announce a too high level of CSR (and then not to invest for a high level of CSR).

This would switch the relationship presented above between the level of CSR and the cue communication. We have however seen that firms may want to send a larger cue than $\bar{\alpha}^*$, so this additional effect would not be of a great interest.

To conclude on the theoretical model, it has presented a very simple model that encompasses both equilibria with an investment in CSR and light greenwashing. The cost function are very important in this model, as well as the productivity in CSR. Finally, the gullibility of consumers is also very important. It is however important to note that the possibility of hard greenwashing is ruled out. The main predictions of the model is the dual effect of an increase in the level of CSR. It increases the reward for the consumer and the probability it will buy the product but it also raises incentives to practice light greenwashing.

4 Data

In order to test empirically some implications of the theoretical model presented in the last section, we will use different data approximating the level of CSR and the level of communication related to CSR. According to the model, we need three sets of information (i) the effective level of social

responsability for the firms, (ii) the “hard information” which is a reliable certification provided by the firm in order to give a clear assessment of the level of CSR to the consumers, (iii) the “cues” which is here the non-verifiable information or communication related to CSR provided by the firm.

4.1 CSR, cues and hard information

The level of CSR will be approximated by the extra-financial rating provided by VIGEO for European firms. The use of these data are in our view the most reliable estimation of the effective level of CSR¹². Igalens and Gond (2005) showed the relevancy of VIGEO-ARESE¹³ data: *“a proxy that is particularly suitable for Corporate Social Performance, at least from a theoretical point of view”*¹⁴.

The most difficult challenge is to find an acceptable proxy of greenwashing and communication related to CSR. According to the model, there are two main types of information: the “hard information” and the “cue”. The cues are information that do not convey direct information on the CSR content of the products. Here, sending a cue will rise the *congruence* between the consumers and the firm. We assume these cues can be assimilated as communication and/or advertising. The main methodological difficulty is that this level of advertising is unobservable¹⁵. The first possibility will be to use the total advertising budget as a proxy for CSR advertising. But this is not satisfying as it we cannot distinguish the firms that have a specific strategy linked to social or environmental considerations. We propose to consider the level of Sustainable Development reporting as a proxy of the general level of CSR communication. In parallel with the rise of social and environmental concerns within the society, the number of sustainable development reports has strongly increased in the last years. These extra-financial reports took various forms: environmental

¹²Cochran and Wood (1984) argued there are two generally accepted measures of CSR: the reputation index (Moskowitz, 1975) or content analysis (such as the data we will use here). They found benefits and drawbacks for both methods. Tsoutsoura (2004) criticized the reputation indexes stating that *“it is unclear exactly what these indicators measure”*. Igalens and Gond (2005) add three other measures: the measurements based on analysis of the content of annual report, the pollution indices, the perceptual measurements derived from questionnaire based survey. Waddock and Graves (1997) drew upon the Kinder Lydenberg Domini (KLD) rating system and used these data to measure CSR. Tsoutsoura (2004) or Siegel and Vitalino (2007) used these measurement. VIGEO can be considered as the European counterpart of KLD with comparable methods. Igalens and Gond (2005) compared KLD and VIGEO-ARESE data and noted some distinctions explained mainly by different cultural sensitivities. Methodologically, they found that the scoring-quality proxy is always more favorable to the VIGEO-ARESE data (see Mattingly and Greening (1999) for a detailed analysis of KLD data). More recently, authors proposed new tools for measuring corporate contribution to sustainability: the sustainable value-added (Figge and Hann, 2001) but there is no consensus on the relevance of such measurement (Korhonen, 2003)

¹³The analysis was done on the French extra-financial rating agency ARESE which merged with VIGEO in 2002. We assume former ARESE data and VIGEO data are similar as the same methodology applies.

¹⁴However, they insist on the nuances introduced by the observation of the different sub-components of the index. That’s why we will analyse these different sub-components in section 6.

¹⁵The firms do not split their marketing / communication strategy between CSR-related communication and non-CSR related ones. Most of the time and even more in the case of Greenwashing, the CSR is seen as such as a communication tool as such.

reports, health and security reports, social reports, integrated reports (combining financial and non-financial information)... Contrary to the financial reports which are compulsory for the firms in the stock-exchange, these extra-financial reports are not homogenized and are purely voluntary¹⁶.

We assume that the will of a firm to make extensive reports about their social and environmental strategies and actions are part of their overall communication related to CSR. Most of these reports are not certified and the firms are free to give the information they want. A firm may produce extensive reports but hide some crucial aspects which will be seen as negative by the consumers. These reports will, in most of the cases, be subjective and give a partial overview of the real CSR content for the products sold by the firms. Of course, the sustainable development reporting made some progress in the last years: different organizations provided clear and homogenized guidelines. The *Global Reporting Initiatives* (GRI) is probably the most famous one and is clearly supported by international organizations such as the United Nations. The GRI advises the firms to use external organization to certify their report and even propose to check the consistency of these reports. But still a minority of the firms decides to use this opportunity. Over the 593 firms of our sample, 406 have made at least one sustainable development report but only 187 (31%) used the GRI guidelines and 86 (14%) realized an external certification of their report.

Analyses of the content of annual report has been used as a general proxy of corporate social performance (Dejean and Oxibar, 2003). However, as noted by Ullman (1985) and Igalens and Gond (2005), the analysis of annual reports involves more a measurement of “*social discourse*” than of CSR per se. It is clearly our hypothesis here. The difference between the “social discourse” and the CSR measured by VIGEO data will be then considered as a possible greenwashing.

We then assume that the external certification of the sustainable development reports will be a proxy of the ‘hard information’ level sent by the firm. We suppose that the external certification gives a credibility to the report, and reveals a “real level” of CSR. This certification has a significant cost. We suppose that a firm with a deliberate strategy of greenwashing may realize a report in order to send a positive cue to the consumers but won’t realize a certification of the report due to the lack of consistency of their CSR commitments.

4.2 Data on Corporate Social Responsibility

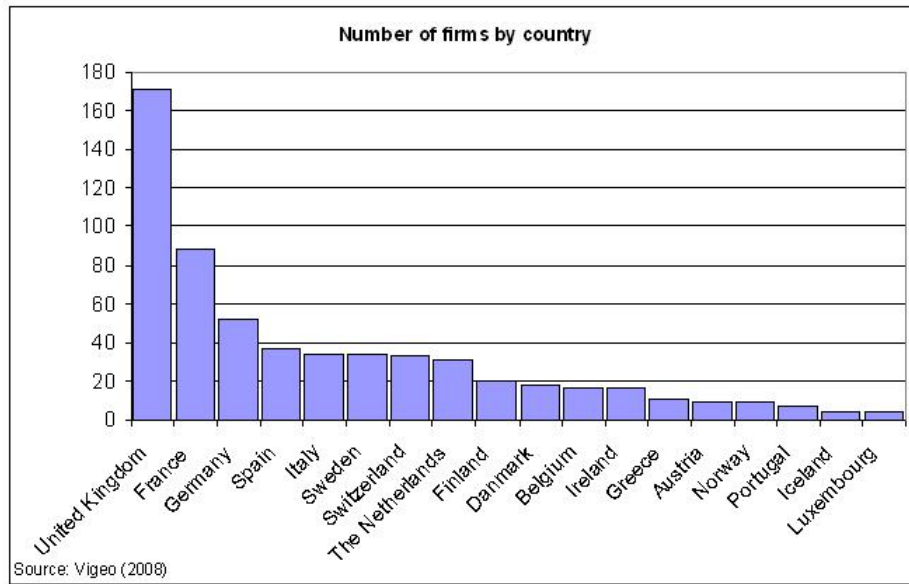
We propose to create an original index of the effective level of CSR based on the VIGEO data. Vigeo is a European extra-financial rating company. Their ratings are used by SRI funds in order to choose the firms which meet the ethical criteria required by the actors. Their CSR evaluation is based on internationally recognised standards such as the conventions, recommendations, statements or guidelines of UN, ILO, UNEP, Global Compact or OECD. From these standards, Vigeo proposes different CSR principles of universal application translated into action steps for management. They propose 6 evaluations fields and 37 criteria. These fields are: (1) Human Rights, (2)

¹⁶In France, however, since 2001, the reporting of social and environmental activities is compulsory for firms in the French stock exchange (*Loi NRE*). However, there is no sanctions if a firm do not respect this obligation and this law is not fully respected.

Human Resources, (3) Environment, (4) Business Behaviour, (5) Community Involvement, and (6) Corporate Governance. These objectives are evaluated on the basis of about 200 action steps.

VIGEO provided detailed data on 595 European firms¹⁷. These firms are included in the Dow Jones Stoxx 600 index, which includes the 600 biggest capitalization at the European level¹⁸. Out of these 595 firms, 171 are from the United Kingdom, 88 are French and 52 are German (see figure 1). The banking and insurance sectors are the most represented in the sample, with respectively 64 and 35 firms (see figure 2).

Figure 1: Number of firms in the VIGEO database by country



According to VIGEO, their methodology guarantees:

- A system of analysis and rating that is impartial and may be reproduced
- Traceability of the information collected

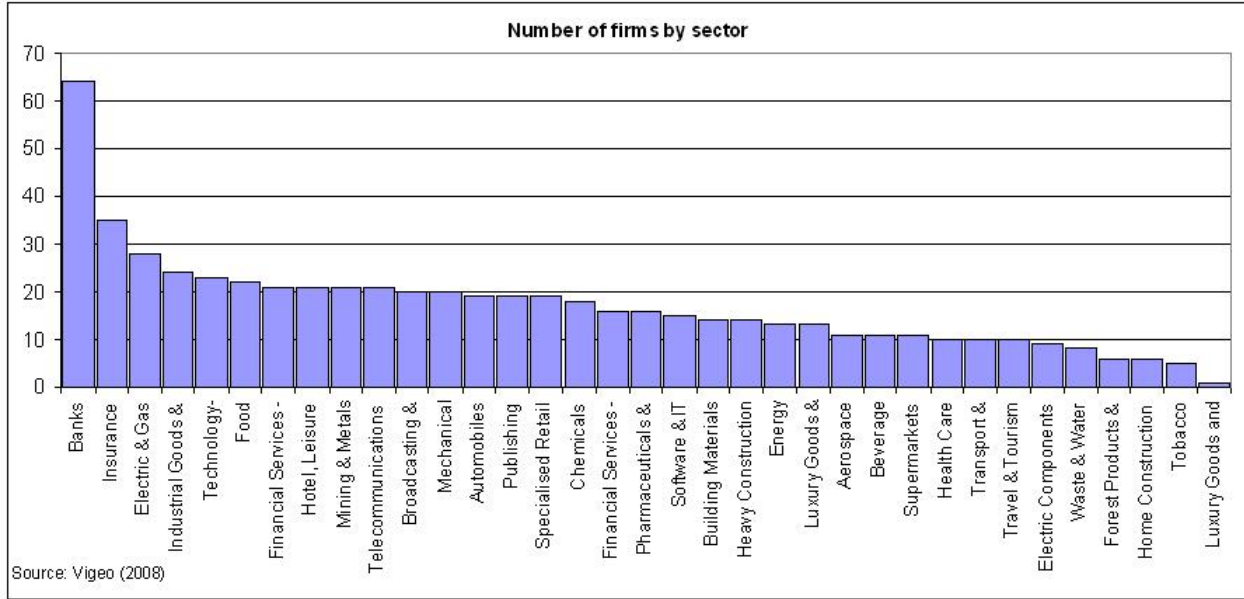
The evaluation is realized by Vigeo, and not by the firms themselves. They use a questionnaire which presents specific questions and points of observation from which the analysts and auditors of Vigeo collect, select and classify information before passing judgement. For each criteria, the questionnaire is based on 3 items and 9 approaches¹⁹. The weight between the individual score for

¹⁷Vigeo is extending the coverage of the database for American and Asiatic firms. However, the coverage is not yet significant. We then limit our analysis to European firms.

¹⁸We don't have exactly 600 firms in the database because of the exit or entry of some firms during the period.

¹⁹see <http://www.vigeo.com/csr-rating-agency/en/methodologie/methodologie-vigeo/un-referentiel-managerial-orientee-vers-lamelioration-continue.html> for details.

Figure 2: Number of firms in the VIGEO database by sector



each approaches and items depends on the sector and is defined by a preliminary sectorial analysis realized by Vigeo²⁰. The weight depends on three considerations: (1) This is based on CSR criteria of a sensitive nature for the company, (2) This is based on CSR criteria of a fundamental nature for the company, (3) This is based on CSR criteria of a vital nature for the company.

Annex A gives the details of each criteria (Human Rights, Human Ressources, Environment, Business Behaviour, Community Involvement, and Corporate Governance) and the distribution of each indicator among the firms.

4.2.1 Principal Component analysis

The main goal of the analysis is to see if we can observe global patterns of behaviour regarding different CSR aspects and to give an assessment of the global level of CSR according to the different items. Data analysis is a very useful methodology to reach these two main objectives. Igalens and Gond (2005) propose to use data analysis to evaluate the quality of the scoring. We will then use the same methodology to get global estimates of the general level of CSR.

Component factor analysis is one of the several factor models. Like the other model of factor analysis, its aim is to pattern the variation in a set of variables common or unique. One of the use

²⁰The explanation given by Vigeo is the following: “*The score for each criterion is established by consolidating the individual scores assigned to the relevance of policies, coherence of implementation and results. The scores assigned to each angle of analysis are, by means of consolidation, linked to their associated segment, “the item”. The scores of “items” are then consolidated at criterion level to produce “criteria scores”, which are in turn consolidated at field level. Taking into account the heterogeneous nature of their subjects, scores by field are not consolidated.*”

of PCA is to reduce a mass of information to an economical description.

We can represent the data in a matrix X with n rows (the n countries) and p columns (the p different initial conditions variables). Graphically, we can represent the n countries in a p dimensional space. The distances²¹ between the n row points in the p dimensional space is a perfect representation of the similarities between the row in the matrix X . The art of principal component analysis is to find a lower dimensional space (the factorial space) in which we project the row points and which retains almost all of the distances between the rows.

Therefore, the best space is the space which maximizes the dispersion of the row points projected:

$$Max_H \sum_i \sum_{i'} d_H^2(i, i')$$

And we can demonstrate that it is the same as maximizing $\sum_i d_H^2(i, G)$ with H the space of projection and G the centroid. In the general case, we have to consider that the row points are weighted because of their importance. The mass is p_i (with $\sum p_i = 1$) and we maximize $\sum_i p_i d_H^2(i, G)$ which is the projected inertia (variance). Therefore, we found the space which maximizes projected inertia.

The lower dimensional space which exists is a one dimension graph. Let's imagine this defined by a vector u . The projection of a row point on the direction defined by u is:

$$\psi_i = \sum_{j=1}^p x_{ij} u_j$$

So, the inertia of all the points projected on u is:

$$\sum_{i=1}^n p_i \left(\sum_{j=1}^p x_{ij} u_j \right)^2 = \lambda$$

If we have to found the space which maximizes the inertia, the objective is to found the vector u which maximizes λ . u is the eigenvector and λ the eigenvalue. u is the line on which the variance is maximal. It remains variability which is not captured by the first factor. Therefore we continue and define another vector that maximizes the remaining variability. We can proceed a third time and more if its is necessary. First, note that the variability remaining is less and less important because all the time we find a vector which maximizes the inertia. Second, because each consecutive factor, i.e. line, is defined to maximize variability which is not explained, consecutive factors are orthogonal (because they are uncorrelated). The fundamental idea is that if variables are correlated with each other, there is redundancy and the number of axes can be reduced.

Remembering that one of the aims of principal component analysis is to reduce the number of variables, a first question is: until when we have to extract consecutive factors? The choice is not clear-cut. To select the number of factors to extract, two commonly used criteria are the

²¹The Euclidean distance between countries i and i' is used: $d^2(i, i') = \sum_{j=1}^p (x_{i,j} - x_{i',j})^2$

Table 1: Eigenvalues PCA

Factor	Eigenvalue	Proportion	Cumulative
1	13.39	27.91	27.91
2	3.30	6.88	34.78
3	2.43	5.06	39.85
4	2.11	4.39	44.24
5	1.80	3.75	47.99
6	1.69	3.51	51.50
7	1.53	3.19	54.70
8	1.51	3.14	57.83
9	1.21	2.52	60.36
10	1.14	2.38	62.74
11	1.11	2.31	65.05
12	1.08	2.25	67.30
13	1.01	2.10	69.40
14	0.98	2.03	71.44

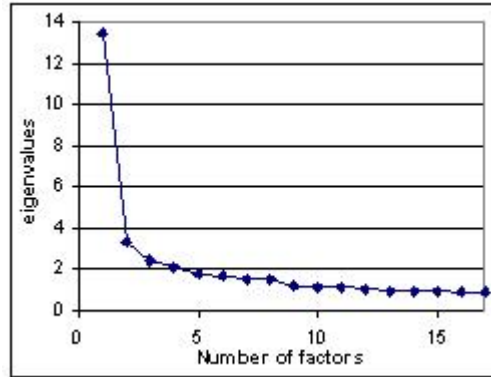
Kaiser criterion and the scree (or Cattell) test. The Kaiser criterion expresses the idea that if a factor explains more than the original variable, we extract it. As the sum of the eigenvalues of the p variables are equal to p , we consider factors with eigenvalues greater than one. The other method, the scree test, is a graphical one. In x-coordinate we put the number of eigenvalues, in y-coordinate, the value. We obtain a decreasing function (the factors explain less and less variability so the eigenvalue are decreasing). The point where the break is the most important is the number give the number of eigenvalues to extract.

Here, the optimal number of consecutive factors to extract depends on the criteria chosen. Indeed, if we choose the Kaiser criterion and retain all the factors which have an eigenvalue greater than one, we will retain 13 factors. But if we choose the Cattell test, we will choose to retain only one or two factors (see figure 3). In fact, we will see that this will depends on the goal of the analysis. The use of a large number of factors will allow us to build a typology taking into account the maximum level of information. But using an interpretation of the first factors, we can describe some specific “CSR behaviours” and analyse the determinants of these behaviours. Here, we will be more interested by this last possibility.

4.2.2 The first axis: a quantitative assessment of the global corporate social performance

The first axis can be interpreted as a proxy of the general level of CSR. We make this hypothesis considering the correlation between each of the VIGEO items, except the community involvement,

Figure 3: Eigenvalues of the different factors



and the coordinates on the first axis. If we keep the definition retained by the European Commission, Corporate Social Responsibility is “*a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis.*” (European Commission, 2006). The corollary of this definition is the fact that all the social actions which are not directly linked to the core business of the company won’t be assimilated as CSR. All the actions related to the community involvements are not included in this definition. The correlation between the coordinates on the first axis and the performance in terms of Human Resources, Human Rights, Business Behaviour, and Environment is very high (around 0,80). This correlation is lower with corporate governance (which is a concept broader than the only CSR) and nil with the community involvement. The more negative is the coordinate on the first axis, the better is the CSR performance for the firm. According to this interpretation of the first axis, the best performances in terms of CSR are observed in France (-3,4), in the UK (-2,6) and in the Netherlands (-1,9). The worst performances are observed in Ireland (4,1), Iceland (2,6) and Austria (2,1). In terms of sectors, the best performances are observed in the chemical sectors (-3,1), in the automobile sector (-2,6) and in the energetic sector (-2,1). On the other site, the food sector (3,5), and the mechanical component sector (3,2) have the worst marks in terms of CSR performance. Few observations can be made at this point:

- The level of CSR performance does not depend on the legal system on the country. France and UK with very different legal system have the best performances. On the contrary, Nordic countries for example have heterogeneous performances (between 3,3 for Danmark against -1,5 for Norway) despite they have very similar legal system.
- The sectors who have the best performances in terms of CSR are also sectors which have to face a negative image in the public opinion regarding the environmental or social responsibility (automobiles, energy, chemical products).
- Generally, the corporate social performance is higher for the companies which are quoted on stock exchange.

The first axis do not give any information on the *kind* of CSR performed by the companies (except the fact we do not take into account actions related to the community involvement). We will see that the second axis (and the following) give a sharper description of the phenomena. However in our analysis, we will only use the score of the first axis. Annex B gives the description of the second axis and the followings.

In order to facilitate the interpretation of the index, we will transform the coordinates on the first axis into an index included between 0 (the worst performance in terms of CSR) and 1 (the best performance in terms of CSR). We call RSENORM this variable.

Table 2: Statistics of RSENORM

Mean	0.46
St. Dev.	0.21
Skewness	0.07
Kurtosis	2.31
	Percentiles
10 %	0.16
25 %	0.29
50 %	0.46
75 %	0.62
90 %	0.74

4.3 An estimation of the CSR-related communication: the level of CSR-reporting

We collected for each firm of our sample different information on their CSR reports. For this, we use Corporateregister.com which is a global directory of CSR resources, including a CSR report directory. Thanks to this directory, it is possible to determine whether or not the firms have already produced a report, how many reports were produced, how many pages each reports contain, the type of report and if the firm was member of Global Compact, GRI or AA1100. Of course, The fact to have numerous, extensive reports does not mean as such that the company has a global strategy of greenwashing. However, thanks to the comparision with our first index of CSR, we are able to detect some “usual suspect” that have the specificity to have a huge reporting / communicating activity but a very low level of CSR.

From these data, we will build two measures of CSR-communication: **communication experience** (measured by the total number of reports, see table 4) and the **communication effort** which is a combination of (1) number of reports per year and (2) the number of pages for the last report (see table 5).

Table 3: Description of the factorial axes (coordinates of the different variables)

Variables	Factor 1	Factor 2	factor 3	Factor 4
HR	-0,82	0,27	0,15	-0,10
HRts	-0,79	0,03	0,21	-0,03
ENV	-0,88	0,06	-0,31	-0,08
CS	-0,82	-0,04	0,35	0,17
CG	-0,41	-0,87	-0,02	0,10
CIN	0,04	0,21	-0,20	0,89
Austria	2,1	1,3	-0,2	-0,6
Belgium	0,3	3,3	1,2	-0,4
Danmark	3,3	3,9	-1,2	0,0
Finland	-0,3	0,4	-1,1	-0,2
France	-3,4	7,4	1,1	-1,7
Germany	-0,6	5,0	0,9	1,1
Greece	2,1	2,9	-2,1	1,0
Iceland	2,6	0,0	-0,7	2,1
Ireland	4,1	-1,6	-0,2	1,5
Italy	0,7	3,9	3,3	-0,7
Luxembourg	0,6	0,0	1,4	0,2
Norway	-1,5	-0,3	0,8	-0,6
Portugal	0,4	2,4	-0,4	1,6
Spain	1,4	4,4	-0,5	-1,8
Sweden	1,1	2,4	0,2	-0,2
Switzerland	1,0	0,5	0,0	-0,5
The Netherlands	-1,9	-2,2	1,9	0,1
United Kingdom	-2,6	-17,7	-3,0	1,1
DJStoxx 600 (497 firms)	-4,3	-1,4	-0,5	0,3
Eurostoxx (264 firms)	-2,2	-1,4	-0,5	0,3
SBF250 (90 firms)	-3,6	7,6	1,0	-1,3
SBF120 (85 firms)	-3,9	7,1	0,7	-1,0
CAC40 (40 firms)	-6,6	5,4	-0,1	-0,1
DJStoxx 200 (200 firms)	-10,7	-0,2	-2,1	0,8

Source: VIGEO data, PCA realized by the authors.

Table 4: Description by sector of the factorial axes (coordinates of the different variables)

Variables	Factor 1	Factor 2	factor 3	Factor 4
Aerospace	-0,7	-0,5	-0,2	-1,0
Automobiles	-2,6	2,6	-1,6	-3,0
Banks	-2,0	3,1	6,5	1,3
Beverage	-0,2	0,6	-1,4	1,1
Broacasting and advertising	2,4	0,5	0,3	1,3
Building materials	0,0	2,0	-1,1	-0,7
Chemicals	-3,1	0,8	-0,6	2,3
Electric and gas utilities	-1,9	2,2	-3,1	-2,3
Electric components	1,1	-1,2	1,1	-0,5
Energy	-2,1	-0,3	-2,4	-3,2
Financial services	1,4	-2,9	2,7	-1,4
Food	3,5	-2,9	-1,6	-1,2
Forest products	-1,4	2,6	-2,5	-0,3
Health care equipments	2,4	-0,1	2,1	1,2
Heavy construction	0,7	2,2	0,3	-2,4
Home construction	-0,5	-2,6	-4,0	-0,8
Hotel, leisure goods	1,8	-2,1	3,2	-0,1
Industrial goods and services	2,4	-3,1	1,7	-2,7
Insurance	-1,9	-1,5	4,3	-1,2
Luxury goods and cosmetics	0,2	2,1	0,4	0,5
Mechanical components	3,2	1,1	1,7	1,0
Mining and metals	-0,3	-1,5	-0,6	0,8
Pharmaceutical and biotechnologies	1,0	1,2	-1,5	1,3
Publishing	-0,2	-2,3	0,2	1,9
Software and IT services	1,4	-0,4	-0,7	0,5
Specialised retail	0,1	-1,7	-1,4	3,2
Supermarkets	-0,2	0,8	-2,7	1,0
Technology - Hardware	-1,2	1,6	-2,0	-0,2
Telecommunications	-0,8	0,4	-4,1	1,0
Tobacco	-0,5	-1,6	-1,6	0,1
Transports and logistic	0,3	2,0	-1,5	0,1
Travel and tourism	-1,0	-1,3	-0,3	2,2
Waste and water utilities	-1,7	-1,0	-1,6	1,4

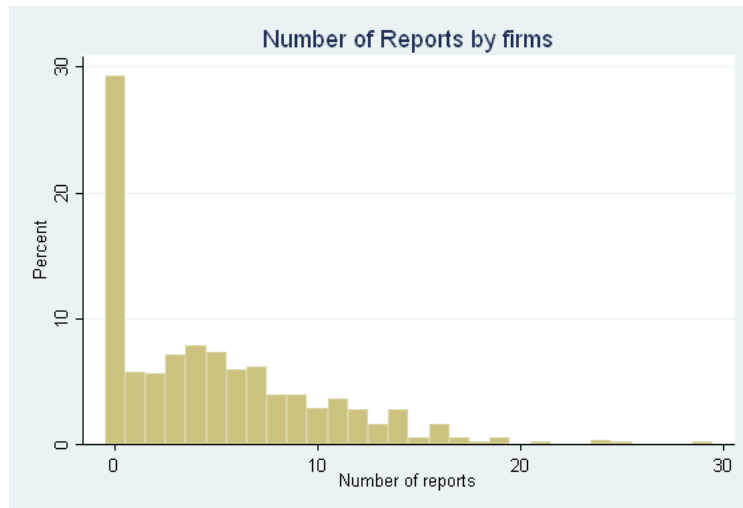
Source: VIGEO data, PCA realized by the authors.

Table 5: Descriptive statistics: CSR reports

Variables	Mean	Std. Dev.	Min	Max
Number of Reports	4.82	4.95	0	29
Year of the first report	2001	4.03	1975	2008
Number of Pages (last report)	47.81	60.71	0	436
Number of Reports (per year)	0.58	0.62	0	2.4
Variable	Yes (%)	No (%)		
Report	70.66%	29.34%		
GRI	31.42%	68.58%		
Global compact	12.94%	87.06%		
AA1000	3.53%	96.47%		

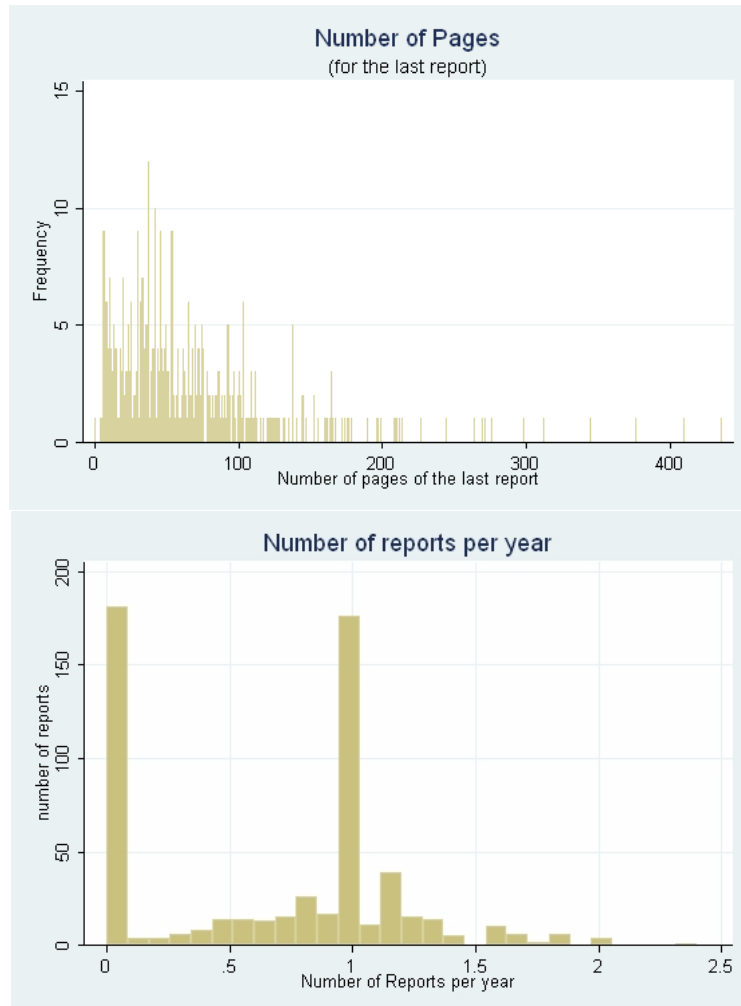
Source: Corporateregister.com, data collected by the authors

Figure 4: Communication experience



Source: Corporateregister.com, data collected by the authors

Figure 5: Communication effort



Source: Corporateregister.com, data collected by the authors

5 Empirical specification and results: who are the usual suspects?

In this section, we will test empirically some of the implications of the model presented in section 2 and 3. First, we will propose an estimate of the level of CSR measured by our index RSENORM in order to see if the communication behaviour has an influence on the level of CSR. In a second time, we will estimate empirically the probability to follow the GRI guidelines and to ask for an external certification. In our model, these two variables are assimilated as the sending of the “hard information”. Finally, we will study the relation between communication (the “cues” in our model) and CSR.

5.1 Determinants of the level of CSR and influence of communication

According to the theoretical model, communication and CSR are strategic complements. However, if the maximum CSR level the firm can provide is too low, the firm will choose between investing a lot in communication (a very high level of reporting); or do not invest neither in CSR and in communication. The choice will then depend on the communication costs. According to these predictions, we should observe a non-linear relation between the effort of communication (measured by the number of reports per year and the number of pages of the last report) and CSR: if the communication effort is very high, it may be explained by a too low level of CSR and a substitutability between CSR and communication.

On the other side, hard information can be sent only if the level of CSR is sufficient (as the hard information reveals the real level of CSR). We then expect a positive relation between the proxy of hard information and CSR.

We propose the following estimable equation:

$$RSENORM = \alpha X + \beta X^2 + \gamma Y + \chi Z + \epsilon \quad (19)$$

RSENORM is the level of CSR measured by our index. X is a matrix of variables related to CSR communication: the number of reports per year and the number of pages measuring the effort of communication; and the total number of reports measuring the experience of communication. α is the column vector of coefficients to be estimated associated to matrix X and β is the column vector of coefficients to be estimated associated to matrix X^2 . Y is the matrix of variables measuring the “hard information” in our model (here GRI, the fact to follow the GRI guidelines, and GRI+ if an external certification is asked by the firm). Z is the matrix of control variables including the sector and the country of the firm²². The error term ϵ is assumed to be i.i.d. According to the model, α and γ should be positive and β should be negative (see table 6).

The results (table 7) are consistent with the theoretical framework. We observe a non-linear

²²The analysis will be further developed by adding other control variables taking into consideration the size of the firms and other firm-specific characteristics (see section 7).

Table 6: Prediction of the model: signs of the estimated coefficients

Variables	Estimated coefficient	Sign
X (cues)	α	+
X^2	β	-
Y (hard information)	γ	+

relation between the effort of communication and the level of CSR. GRI is positively correlated with the level of CSR. the estimated coefficient of GRI+ is not significant but this result can easily be explained by the strong correlation with GRI and by the weak number of observations for GRI+. An interesting results is all our three measures of CSR take the expected sign. Concerning the proxy of CSR efforts (number of reports per year and number of pages), it can be explained by the fact that firms with very low level of CSR will have an incentive either to not invest in communication or to invest a lot in communication (greenwashing). This latter case is represented in our results by the decreasing relation between CSR level and CSR communication beyond a certain turning point of communication. After this threshold, the lowest is the CSR, the highest will be the investment in communication.

Concerning the proxy of communication experience, this can be linked to one intuition of the model related to the respective level of CSR productivity and CSR. Our model suggests that a firm will have an incentive to decrease her level of CSR if her level of credibility is high enough. This increased credibility is explained by two aspects. The first one is an effect of “CSR efficiency”. The past investments in CSR will increase the efficiency of the current investment. The second one, not directly suggested by the model but relatively obvious here, is an effect of reputation.

5.2 The probability to send a “hard information”: interactions between the level of CSR and communication

“Hard information” in our model is approximated by GRI and GRI+. We propose to test the probability to follow the GRI guidelines (GRI) or to ask for an external certification (realized by GRI or by a third-party: GRI+). Before estimating this probability, we propose to split our sample in two sub-samples: the firms that “realize” CSR and the ones that do not perform CSR. Of course, the delimitation between the two samples has to be fixed arbitrarily. Here, we propose to group the firms “without CSR” if their level of RSENORM is inferior to the mean of RSENORM minus the standard deviation of this variable. We then have a group of firms (denoted as CSR=0) for which RSENORM is inferior to 0,2430819. This group includes 79 firms. On the other side, the firms with RSENORM>0,6716 (the mean + a standard deviation) have a value of CSR=1. It is then interesting to see if these two groups of firms have different behaviours according to their effort of communication and the fact to send a “hard information”.

The intuition is confirmed by the data. Out of the 19 firms in our sample that have asked for an

Table 7: OLS estimates of CSR

Dep. Var.	(1) RSENORM	(2) RSENORM
Number of Pages (last report)	0.000575*** (3.566)	0.00116*** (3.587)
[Number of Pages (last report)] ²		-2.28e-06** (-2.513)
Number of Reports (Total)	0.0143*** (5.465)	0.0204*** (3.939)
[Number of Reports (Total)] ²		-0.000669** (-2.571)
Number of Reports (per year)	0.0162 (1.045)	0.0573*** (2.698)
[Number of Reports (per year)] ²		-0.00322** (-2.587)
GRI	0.0933*** (4.096)	0.0661*** (2.850)
GRI +	0.00236 (0.0950)	0.0242 (1.017)
Constant	0.526*** (4.122)	0.506*** (3.938)
Observations	437	437
R-squared	0.583	0.615
Country-specific fixed effects	Yes	Yes
Sector fixed effects	Yes	Yes

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Distribution of GRI+ and CSR

	CSR		
	0	1	Total
GRI+			
0	77 (97,4%)	57 (77%)	134
1	2 (2,5%)	17 (23%)	19
Total	79 (100%)	74 (100%)	153

Table 9: Distribution of GRI and CSR

	CSR		
	0	1	Total
GRI			
0	75 (95%)	34 (45,95%)	134
1	4 (5%)	40 (54,05%)	19
Total	79 (100%)	74 (100%)	153

external certification, only two are in the group CSR=0 (see table 8). We obtain the same result if we take into consideration all the firms that follow the GRI guidelines. Out of the 44 firms in the sample that follow the GRI guidelines, only 4 are member of the group CSR=0 (table 9).

We continue the analysis by exploring the probability of sending a hard information. We propose the following specification:

$$GRI = \phi RSENORM + \varphi X + \gamma Z + \epsilon \quad (20)$$

Two values of GRI will be tested: GRI takes the value of 1 if the firm follows the GRI guidelines. GRI+ takes the value of 1 only if the firm realizes an external certification of her report. RSENORM is our index of CSR and ϕ the estimated coefficient associated to RSENORM. X is the matrix of variables related to CSR communication and φ the column vector associated to the matrix X . Z is a set of control variables (including the sector and the country of the firm). ϵ is the error term and is assumed to be i.i.d. Estimation are performed using a robust probit estimator.

Columns (1) and (3) of table 10 give the results of this estimation. Both communication and CSR are positively correlated with the probability to send a hard information. For GRI+, the number of pages (communication effort) and the total number of reports (communication experience) have a positive and significant impact on the probability to send a hard information. The fact that RSENORM is positively correlated with GRI and GRI+ can be explained, theoretically by the growing relation between r_H and the optimal effort of hard information communication (see equation 6).

The positive coefficient of the communication variables cannot be explained by the model: it is theoretically impossible to send a hard information if the level of CSR is nil. In our view, this result

can be explained by the nature of the proxy we use here. The GRI variables are a proxy for hard information. However, they also bring information on the level of reporting. If the firm follows the GRI guidelines, the sustainable development report will take a specific form with a certain number of pages and a certain regularity. It is clearly a limitation of our data, as the hard information is, by definition, included in the cues. However, it is very difficult to find a hard information that will be uncorrelated with the cues.

To come back to the model, there is another effect that we did not take into consideration in this first set of estimation. If we look to equations (16) and (17), we can see that r_H affects negatively the effect of α on the optimal effort of hard information. This can be observed empirically by the inclusion of a term of interaction between communication variables and RSENORM. We then control for the direct effect of r_H on the optimal effort of hard information communication. And we want to measure a possible crossed effect of CSR and communication on the probability to send a hard information.

We thus estimate the following equation:

$$GRI = \phi RSENORM + \varphi X + \eta X.RSENORM + \gamma Z + \epsilon \quad (21)$$

Results are given in column (2) and (4) of table 10. As suggested by the model, the coefficient of the interaction variable is significantly negative both for GRI+ (with the variable number of pages) and for GRI (with the variable number of report per year). If a firm makes CSR *and* communicates, the fact to increase her level of CSR will decrease the cost of sending the optimal cue. In the model, this reduces the effort of communication from the consumers. At the equilibrium, this will also reduce the effort of communication (hard information) from the firm. The probability to send the hard information will thus be reduced.

In both cases, the variable “total number of reports” measuring the communication experience is not significant when we add the interaction variables.

5.3 Estimates of the CSR communication (cues)

Lastly, we want to observe the relation between the communication variables and the other variables. Table 11 gives the results of this estimation. For the three variables of communication, coefficient of RSENORM is always strongly positive and significant. This is coherent with the theoretical assumptions and the hypothesis that CSR and communication are strategic complements.

GRI coefficient is also positive and significant. This confirms the intuition we mention in the last subsection: as our proxy for “hard information” is included in the proxy for “cues”, the fact to follow the GRI guidelines will have an impact on the type, size and regularity of the reports made by the firm.

Efforts of communication (measured by the number of pages and by the number of report per year) and experience of communication (measured by the total number of reports) seems to be interlinked. As the variable of experience reflects a past behaviour, we deduce that the experience

Table 10: Probit estimates of hard information (GRI)

height Dependant Variable	(1) GRI (checked)	(2) GRI (checked)	(3) GRI	(4) GRI
CSR	3.094*** (3.174)	4.213* (1.899)	3.206*** (4.324)	4.379*** (3.879)
Number of Pages (last report)	0.00479* (1.710)	0.0259*** (2.686)	0.0160*** (5.405)	0.00931 (1.061)
Number of Reports (per year)	0.127 (0.699)	0.760 (0.826)	0.264 (1.015)	2.119*** (2.732)
Total number of Reports	0.196*** (4.684)	0.0770 (0.558)	0.107*** (3.000)	-0.0145 (-0.148)
CSR x Number of Pages		-0.0333** (-2.194)		0.0110 (0.758)
CSR x Number of Reports per year		-1.006 (-0.782)		-3.076*** (-2.816)
CSR x Number of Reports		0.231 (0.927)		0.205 (1.245)
Constant	-3.981*** (-4.048)	-5.006*** (-3.548)	-1.519** (-2.194)	-1.324 (-1.636)
Country-specific fixed effects	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes
Observations	297	297	404	404
Robust z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1				

of communication influences positively the effort of communication (learning effect).

Table 11: OLS estimates of the CSR communication (cues)

Dep. Var.	(1) Number of Pages (Last report)	(2) Number of Reports (per year)	(3) Number of Reports (total)
RSENORM	50.84*** (3.982)	0.476** (2.336)	5.796*** (5.208)
Number of Pages (last report)		0.00213 (1.260)	0.00618* (1.656)
Number of Reports (per year)	6.401** (2.489)		1.361** (2.148)
Number of Reports (Total)	1.350* (1.836)	0.0988*** (4.638)	
GRI +	11.91 (0.998)	-0.0788 (-0.625)	1.938*** (3.203)
GRI	38.61*** (4.954)	-0.100 (-0.638)	1.596*** (3.065)
Constant	-20.07 (-1.407)	-0.213 (-1.471)	-2.134 (-1.105)
Country Fixed Effects	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes
Observations	437	437	437
R-squared	0.548	0.387	0.651

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6 Which aspects of CSR matter?

As mentionned by Igalens and Gond (2005), if a global index of CSR built from VIGEO data through data analysis gives a good description of the overall corporate social performance, some nuances exist. In this section, we see if certain subcomponents of CSR has a stronger or lower explicative power. We will just take the raw score of VIGEO for each subcomponent: HRts (Human Rights), HR (Human Ressources), ENV (environment), CS (Business Behavior), CG (Corporate Governance), CIN (Community Involvements).

6.1 Estimates of the different CSR subcomponents level

Here, we reproduce estimations of equation 19 for each subcomponents of CSR. The inverted U-shape for the total number of reports still appears in our results whatever is the measure of CSR. However, for Environment score, both other variables (number of pages and number of reports per year) do not have a significant impact on the scoring. For Human ressources, we obtain the same results for all the variables (with a significant inverted U-shape). For Business behaviour and Human rights, the decreasing part of the relation between the number of pages and the scoring is not anymore significant. For Corporate Governance, Human Rights, and Community involvements, the variable “number of reports per year” is not anymore significant. Corporate Governance determinants seems to be different than for other CSR variables: the coefficient for the number of pages takes the opposite sign and the significance for all other variables is lower. Finally, GRI and CSR are globally positively correlated, whatever is the subcomponent of CSR chosen (except for Human ressources).

Table 12: Determinants of CSR subcomponents

Dep.var.	(1) HRTS	(2) HR	(3) ENV	(4) CS	(5) CG	(6) CIN
Number of Pages (last report)	0.0671*** (2.759)	0.117*** (4.699)	0.0384 (1.464)	0.0530** (2.393)	-0.0330 (-1.566)	0.116*** (3.423)
[Number of Pages (last report)] ²	-0.000126 (-1.549)	-0.000251*** (-3.600)	-4.26e-05 (-0.600)	-9.82e-05 (-1.519)	0.000128** (2.262)	-0.000290*** (-3.191)
Number of Reports (Total)	1.084*** (3.553)	1.135*** (2.953)	2.892*** (7.126)	1.197*** (3.447)	0.728*** (2.680)	2.432*** (5.554)
[Number of Reports (Total)] ²	-0.0345*** (-2.818)	-0.0364** (-2.128)	-0.0918*** (-4.298)	-0.0446** (-2.496)	-0.0180* (-1.737)	-0.0817*** (-4.502)
Number of Reports (per year)	1.561 (1.047)	3.598* (1.802)	1.480 (0.858)	3.257** (2.388)	1.804 (1.249)	-0.0211 (-0.00961)
[Number of Reports (per year)] ²	-0.0728 (-0.838)	-0.208* (-1.813)	-0.0337 (-0.335)	-0.193** (-2.399)	-0.121 (-1.466)	-0.0261 (-0.210)
GRI	4.514*** (2.647)	1.473 (0.928)	3.478** (2.150)	3.721** (2.492)	2.776* (1.904)	3.623* (1.760)
GRI+	1.146 (0.610)	3.184* (1.798)	3.263* (1.898)	2.71 (1.345)	-0.926 (-0.548)	4.230* (1.773)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	
Sector Fixed Effects	Yes	Yes	Yes	Yes	Yes	
Observations	584	584	584	584	584	584
R-squared	0.430	0.565	0.606	0.489	0.637	0.501

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6.2 GRI and GRI+ estimates with CSR subcomponents

Globally, Human Rights scoring has a positive impact on the probability to follow the GRI guidelines and community involvement and business behaviour a positive impact on the probability to ask for an external certification. At the contrary, Corporate Governance has a negative impact on both probabilities. Concerning the interaction variables, we found the expected negative sign for human resources and community involvement (GRI) and for Business behaviour and Human Rights (GRI+).

Table 13: Probit estimates with CSR subcomponents

Dep. Var.	(1) GRI (checked)	(2) GRI (checked)	(3) GRI	(4) GRI
HRscore	0.00351 (0.330)	0.0102 (0.399)	-0.00919 (-1.037)	-0.000661 (-0.0340)
ENVscore	0.0145 (1.518)	0.00718 (0.353)	0.0151* (1.753)	-0.00493 (-0.339)
CSscore	0.0204* (1.670)	0.0419* (1.722)	0.0143 (1.428)	0.0502** (2.490)
CGscore	-0.0170* (-1.739)	-0.0667*** (-3.172)	0.00204 (0.216)	-0.0365** (-2.220)
CINscore	0.0167** (2.262)	0.0688*** (4.334)	0.00869 (1.400)	0.00791 (0.657)
HRTScore	0.00400 (0.346)	-0.0179 (-0.653)	0.0199** (2.296)	0.0442** (2.169)
Number of Pages (last report)	0.00424** (2.533)	0.0116 (1.224)	0.0137*** (5.819)	0.00706 (0.715)
Number of Reports (per year)	0.0491 (0.290)	0.0116 (1.481)	0.556** (2.241)	3.073*** (2.876)
Total number of Reports	0.141*** (4.869)	-0.115 (-1.039)	0.0446 (1.496)	-0.209* (-1.668)
Page x HR		8.21e-05 (0.688)		-0.000126 (-0.773)
Report per year x HR		-0.0432* (-1.715)		0.000246 (0.0116)
Report x HR		0.00372* (1.691)		-0.000971 (-0.504)
Page x ENV		8.72e-06 (0.0528)		1.85e-05 (0.110)
Report per year x ENV		-0.00505 (-0.255)		-0.0124 (-0.814)
Report x ENV		0.000650 (0.258)		0.00493** (2.305)
Page x CS		-0.000240 (-1.639)		-0.000331* (-1.869)
Report per year x CS		-0.00360 (-0.180)		-0.0168 (-0.931)
Report x CS		0.000881 (0.279)		0.00155 (0.564)
Page x CG		7.72e-05		-7.65e-05

		(0.648)		(-0.473)
Report per year x CG		0.0206		0.0321
		(1.101)		(1.613)
Report x CG		0.00273		0.00149
		(1.557)		(0.845)
PAGE x CIN		-0.000181		0.000232*
		(-1.508)		(1.814)
Report per year x CIN		-0.0281**		0.00296
		(-2.005)		(0.218)
Report x CIN		-0.00177		-0.00160
		(-1.270)		(-1.050)
Page x HRTS		8.54e-05		0.000490**
		(0.434)		(2.078)
Report per year x HRTS		0.0274		-0.0589*
		(0.872)		(-1.948)
Report x HRTS		3.07e-05		0.000471
		(0.0117)		(0.177)
Constant	-4.103***	-3.103***	-1.779*	-3.361***
	(-4.404)	(-2.599)	(-1.956)	(-2.788)
Observations	452	452	543	543
Country-specific fixed effects	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes
Robust z-statistics in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

6.3 Determinants of communication and CSR subcomponents

We reproduce the estimation of the determinants of communication (cues), but we substitute the general level of CSR (RSENORM) by the six subcomponents of the index. For variables of communication and GRI, the results are consistent with the previous estimation (positive correlation between communication effort and communication experience and positive influence of GRI). However, for the CSR variables, the results are less convincing than before. In the last section, the variable RSENORM was in all the cases strongly positive and significant. Here, only environment and community involvements are significant, and only for the estimation of the total number of reports. The *experience* of communication is positively correlated with the performance in terms of environment and community involvement. Otherwise, all “social variables” are not significant. And the *effort* of communication does not seem to be influenced by the CSR performance. However, we should be very careful in the interpretation of such results²³. As we can see in table 15 (Annex A), the correlation between CSR subcomponents is very high. The variance inflation factor is, in average, included between 5.51 and 5.54 for each estimation. If we retain a threshold value of 5, we face a problem of colinearity. This is also another argument in favor of building an aggregated index of CSR performance as the coordinates on the first factor are good proxies for the general level of CSR. In these conditions, it is very difficult to identify the individual impact of each CSR

²³The same remark applies also for the other estimations presented in this section.

subcomponents.

To conclude with the relative impact of CSR subcomponents:

- There is a high correlation between the performances related to different CSR subcomponents (see table 15). The correlation is lower with corporate governance which seems to have its own determinants and specific effects.
- Globally, the performance in environment and community involvements seems to have the highest explicative power for the determinants of communication
- For all CSR subcomponents, we observe a non-linear relation between *communication experience* and CSR performance.
- For Human resources, community involvement and business behaviour, we still observe a non-linear relation of *communication effort* with CSR performance.
- For the determinants of GRI and GRI+, Human Rights, Community involvement and Business Behaviour performances have a positive impact on the probability to follow the GRI guidelines or to ask for an external certification. Corporate governance has the opposite effect.

7 Directions for future research

7.1 Extensions of the theoretical model

Three aspects have not been studied in the present model that could be of interest. First, one could assume that the cost function of the cue is $S_c(\bar{\alpha} - \alpha)$ instead of $S_c(\bar{\alpha})$. This would allow to introduce the role of the ex ante probability that would depend on expectations on r_H , r_L and the gullibility of consumers. This however would have as a consequence to introduce an additional interest in announcing a large r_H^* as this would reduce the future cost of sending a cue.

The second aspect that has been totally occulted in this paper is the competition issue. It would be very interested to study what happens when two firms (or more) are in competition. The incentive of one of the firm to invest in CSR and hence to behave accordingly could allow the other firm to practice greenwashing. This would be the case if for instance α , r_H^* or both are common to all firms in a sector.

The last interesting aspect is the function $\rho(r_H)$. For simplicity in this model, we have assumed this function is common knowledge. However, this assumption is the reason why hard greenwashing is ruled out. If firms do not know this function, then they could send a too hard cue and be therefore perceived as greenwashers. If consumers do not know the function (or if there are a large number of consumers with different functions ρ), hard greenwashing could be a strategic choice for firms if they believe that consumers would overestimate the real value of α^{***} . In such case, these would reintroduce multiple equilibria.

Table 14: Determinants of communication (with CSR subcomponents)

Dep. Var.	(1) Number of Pages <i>Last report</i>	(2) Number of Reports <i>per year</i>	(2) Number of Reports <i>Total</i>
GRI	37.77*** (5.426)	0.0400 (0.403)	0.976** (1.977)
GRI +	8.607 (0.923)	-0.106 (-1.076)	1.935*** (3.545)
Number of Reports (per year)	8.294*** (3.027)		1.437* (1.931)
Number of Reports (Total)	1.535** (2.417)	0.0740*** (6.585)	
Number of Pages (last report)		0.00217* (1.680)	0.00780** (2.026)
HRscore	0.375 (1.348)	0.00141 (0.486)	-0.00355 (-0.257)
ENVscore	0.104 (0.532)	0.00459 (1.203)	0.0773*** (5.721)
CSscore	0.143 (0.575)	0.00274 (0.912)	-0.00597 (-0.368)
CGscore	-0.127 (-0.711)	-0.00112 (-0.569)	0.0154 (1.207)
CINscore	0.0737 (0.598)	-0.00174 (-0.735)	0.0214** (2.254)
HRTScore	0.136 (0.519)	0.000785 (0.299)	0.00606 (0.399)
Constant	-43.21* (-1.942)	-0.0183 (-0.0620)	-3.856** (-2.477)
Observations	584	584	584
R-squared	0.517	0.389	0.633
Country-specific fixed effects	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes
Yes			

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

7.2 Empirical analysis

In this paper, we focused on the interactions between relative level of CSR, communication and certification. A lot of other aspects may influence the social or environmental behaviours of the firm.

The first goal will be to determine empirically the determinants of CSR, taking into consideration firm-specific characteristics and behaviour on different markets. Here, due to data limitations, we only control in our analysis of CSR determinants for the sector and for the country. With more data on firms, we will be able to see the influence, for example, of selling *experience goods* or *search goods*²⁴. Siegel and Vitalino (2007) proposed an empirical analysis of CSR using KLD data and American firms. It could be thus interesting to see whether the “European CSR” has the same determinants than the American one. This analysis can be extended to specific sector analysis.

The second goal will be to study the determinants of CSR communication measured with our variables of communication experience and communication effort, adding the same control variables than for the analysis of CSR determinants. This will allow us to determine if the determinants of CSR and CSR *communication* are statistically different. If it is the case, it will confirm our result that greenwashing is a reality and may be a dominant strategy under specific characteristics.

The last goal will be to see whether the international strategy of the firms has an impact on the respective level of CSR and communication. We want to test the idea that the firms’ choice of location may be a “negative cue” in certain case that will have an impact on the consumers’ perception.

8 Conclusions

The goal of this paper is to determine theoretically and empirically the conditions where greenwashing may be strategic for firms. The model, derived from Dewatripont and Tirole (2005), underlines a situation of “hard greenwashing” where No CSR / communication is strictly dominant. It depends on the congruence between the firms and the consumers. If the level of congruence, which can be interpreted here as an estimation of the credibility of the firm and of the level of consumers’ confidence, is too low; then the firm may have an interest to practice CSR. The optimal choice depends on the gains the firms obtain relatively to the cost of communicating hard information.

When we allow the possibility to have a continuous level of CSR, the model predicts a possible situation of “light greenwashing” where the communication reduces the optimal level of CSR needed to satisfy the consumers. From this situation, CSR and communication may coexist but the optimal level of CSR will be lower than what it will be without communication.

The theoretical model then encompasses both equilibria with an investment in CSR and light greenwashing. The cost functions are very important in this model, as well as the productivity in

²⁴In the current analysis, this distinction can be done with the analysis of sector dummies variables.

CSR. Finally, the gullibility of consumers is also very important. It is however important to note that the possibility of hard greenwashing is ruled out. The main predictions of the model is the dual effect of an increase in the level of CSR. It increases the reward for the consumer and the probability it will buy the product but it also raises incentives to practice light greenwashing.

We test empirically this last idea, suggesting a non-linear relation between the communication and CSR. Communication and CSR will be strategic complements until a threshold of communication. Then, the situation of “light greenwashing” may reduce the optimal level of CSR. Empirically, we observe an inverted U-shape between our three measures of communication: communication experience (measured by the total number of CSR reports) and communication efforts (measured by the last report’s number of pages and by the number of reports per year).

In a second time, we measure the probability to send a “hard information”, which is a verifiable information sent by the firm in order to convince the sceptical consumers. This hard information is opposed in the theoretical model to the “cues” which are non-verifiable information. Here, the cues are our different variables of CSR communication. The hard information is measured by the fact to follow the *Global reporting initiative* guidelines for the sustainable development reporting, and by the fact to ask for an external certification of such reports.

Concerning the probability to send a hard information, the CSR level will affect positively this probability. However, the interaction variable between CSR and communication is negative. Theoretically, we show that if a firm makes both CSR and communication and this firm decides to increase her level of CSR, it will reduce the cost of sending the optimal cue and then reduce the effort of communication. At the equilibrium, it will also reduce the incentive for the firm to send a hard information.

Lastly, we show that the communication effort is positively influenced by the level of CSR, and by the communication experience. This last effect may be explained by a learning effect which reinforce the efficiency of CSR strategies.

Another contribution of this paper is to propose an original database measuring CSR communication from a detailed analysis of the reporting behaviour for the firms. From a comparison between this index and our index of CSR performance (built through data analysis from VIGEO data), we show that differences between “social discourse” and CSR per se is another evidence of the reality of the greenwashing phenomena.

All in all, we show that CSR communication and social responsibility may coexist in a lot of cases. Under certain conditions however, we show that the communication effort is much higher than the effective responsibility of the firms. If CSR becomes substitutable with communication, it is very easy to determine the “usual suspects” for which it will be strategic to practice greenwashing.

Annexes

A Sub-components of VIGEO criterion and distribution of score among firms

A.1 Human Rights (HRts)

This field is divided into four main criteria:

1. Respect for Human Rights Standards and prevention of violations (HRts 1.1): *“the extent to which the company is complying with obligation to respect human rights in the community (community taken as a whole, i.e. within and without the workplace). This obligation includes: respect of effective exercise of fundamental human rights and personal rights ; prevention of human rights violations or complicity of violations ; promoting or contributing to promote rights are part of the obligation and should be emphasized by analyst”*²⁵
2. Respect for freedom of association and the right to collective bargaining (HRts 2.1): *“the extent to which the company respects trade union freedom, collective bargaining right and promotes collective bargaining right”*
3. Non-Discrimination (HRts 2.4): *“Assesses the way in which the company prevents gender discrimination on workplace and other discrimination regarding work conditions, vocational training, promotion, fees, and other benefits. Positive measures and specific measures intended to protect and support women (pregnancy, maternity) or vulnerable people, constitute measures to promote equal opportunity and treatment.”*
4. Elimination of Child Labour and Forced Labour (HRts 2.5): *“the extent to which the enterprise contributes in its activity area to elimination of child labour and / or forced labour”.*

The graph A.1 gives the distribution of the HRts score.

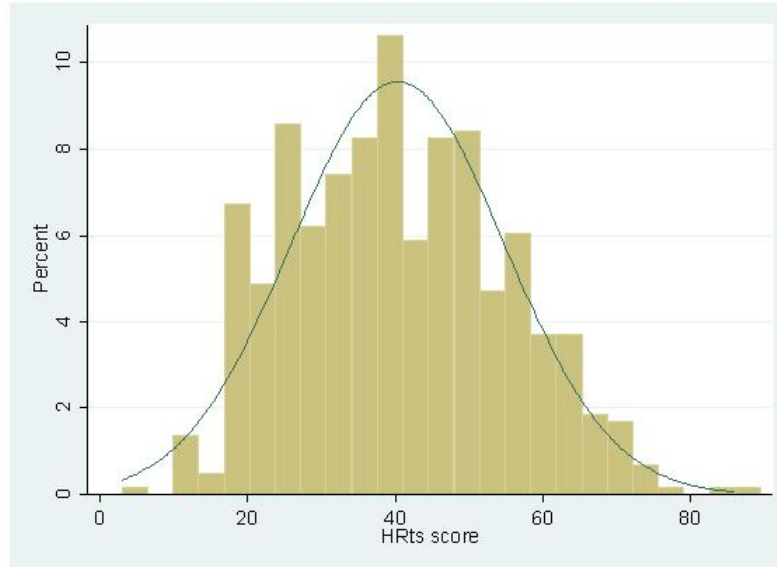
A.2 Human Ressources (HR)

This field is divided into 7 main criteria:

1. Promotion of labor relations (HR 1.1): *“the company’s commitment to ensure the respect of independent worker’s representatives through information, consultation, and notably collective bargaining, at the workplace”*

²⁵Source: VIGEO detailed rating framework

Figure 6: Distribution of HRts score (Human Rights)

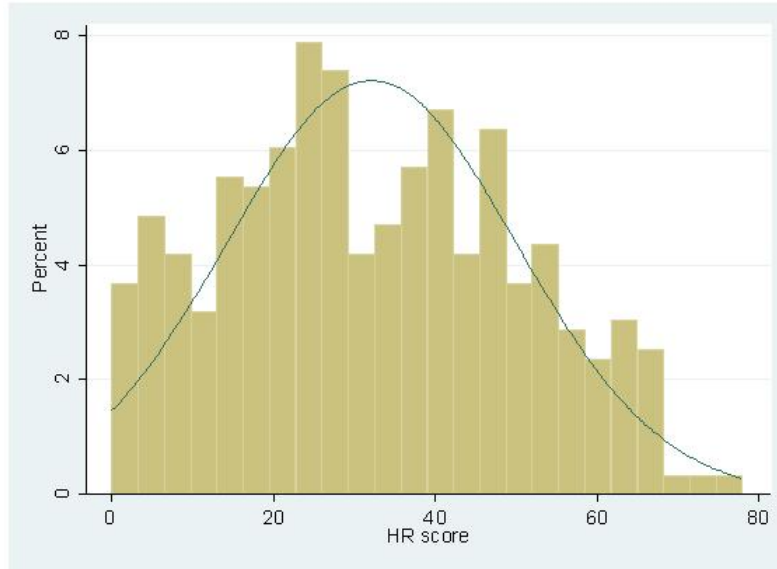


Source: Vigeo (2008), calculation of the authors.

2. Encouraging employee participation (HR 1.2): *“Assesses the company’s commitment to defend and promote employees’ individual information and expression, and employees’ participation in decision making on matters not related to collective bargaining.”*
3. Responsible management and restructurings (HR 2.3): *“Assesses the company’s commitment to ensure tangible consultation of employee representatives, to prevent lay offs, and propose appropriate collective and individual solutions in a context of restructurings.”*
4. Career management and promotion of employability (HR 2.4): *“Assesses the company’s commitment to foster its employees’ professional evolution, to ensure their future employability, to develop their skills, to allow professional mobility, and to anticipate its employment needs.”*
5. Quality of remuneration systems (HR 3.1): *“Assesses the company’s commitment to ensure the decency, transparency and objectivity of employees’ remuneration systems.”*
6. Improvement of health and safety conditions (HR 3.2): *“Assesses the company’s commitment regarding the protection of employees’ health and safety.”*
7. Respect and management of working hours (HR 3.3): *“Assesses the initiatives taken by the company to promote the voluntary flexibility of working hours. ”*

The distribution of HR is given by the graph 7.

Figure 7: Distribution of HR score (Human ressources)



Source: Vigeo (2008), calculation of the authors.

A.3 Environment (ENV)

This item is divided into 11 main criteria:

1. Environmental strategy and eco-design (ENV1.1): *“Assess the company’s commitment to define clear objectives and appropriate measures to ensure management of the environmental impacts of products and services.”*
2. Pollution prevention and control (ENV1.2): *“Assess the extent to which the company is preventing and managing risks of accidental pollution or soil pollution.”*
3. Development of “green” products and services (ENV1.3): *“Assess the company’s commitment to develop products and services with significantly decreased environmental impact and that may be considered as a fundamental diversification for the enterprise, either at the level of the production process (wind turbine for electricity producers), or at the product (hydrogen for oil producers or fuel cells for car makers) or service level (green investment funds in banking sector).”*
4. Protection of biodiversity (ENV1.4): *“Evaluate the company’s commitment to prevent risks of endangering biodiversity and evaluate the company’s commitment to manage animal testing (when relevant for the sector).”*
5. Protection of water resources (ENV2.1): *“Assessment of (i) measures taken to reduce water consumption and (ii) measures taken to improve, reduce or treat wastewater emissions/ water discharges.”*

6. Minimizing environmental impacts from energy use (ENV2.2): *“Assess the consistency of the company’s strategy in addressing energy-related issues (energy consumption and emissions related to energy consumption).”*
7. Management of atmospheric emissions (ENV2.4): *“Assess the steps taken by the company to control atmospheric emissions related to the production of products / projects / services.”*
8. Waste management (ENV2.5): *“Production and delivery of products and services result in great quantities of waste to be incinerated or landfilled. The intended objective is to minimise use of both ways of disposal and promote the development of valorisation and recycling”.*
9. Management of environmental nuisances: dust, odor, noise (ENV2.6): *“Assess the way in which companies minimise local pollution (noise, dust and odors) resulting from the production processes and maintenance of installations, as well as local degradation of the environmental aesthetics.”.*
10. Management of environmental impacts from transportation (ENV2.7): *“Assess the extent to which the company is taking into account environmental impact of its products’ transportation and actions that are implemented to reduce these impacts”.*
11. Management of environmental impacts from the use and disposal of products services (ENV3.1): *“Assess the steps taken by companies to control direct or indirect environmental impacts related to use and disposal of products or services”.*

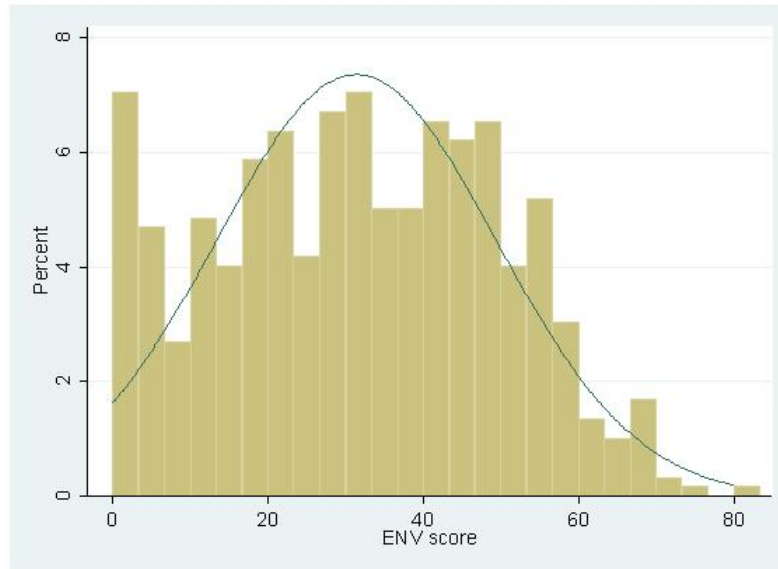
The distribution is given by the graph 8.

A.4 Business Behaviour (Customers and suppliers - CS)

This item is divided into 8 main criteria:

1. Product safety (CS1.1): *“This criterion assesses the extent to which companies take product safety issues into account, and the related steps taken to prevent and repair emergency/crisis situation affecting product safety.”*
2. Information to customers (CS1.2): *“This criterion assesses the extent to which companies are defining and implementing principles of conduct and taking measures to prevent negative impact of marketing practices on financial, moral and ethical issues as well as on the health and safety of users and / or customers.”*
3. Responsible Contractual agreement (CS1.3): *“This criterion assesses the company’s commitment to include guarantees in its contractual relation which promote customers freedom of decision, satisfaction and right to recourse.”*

Figure 8: Distribution of ENV score (Environment)

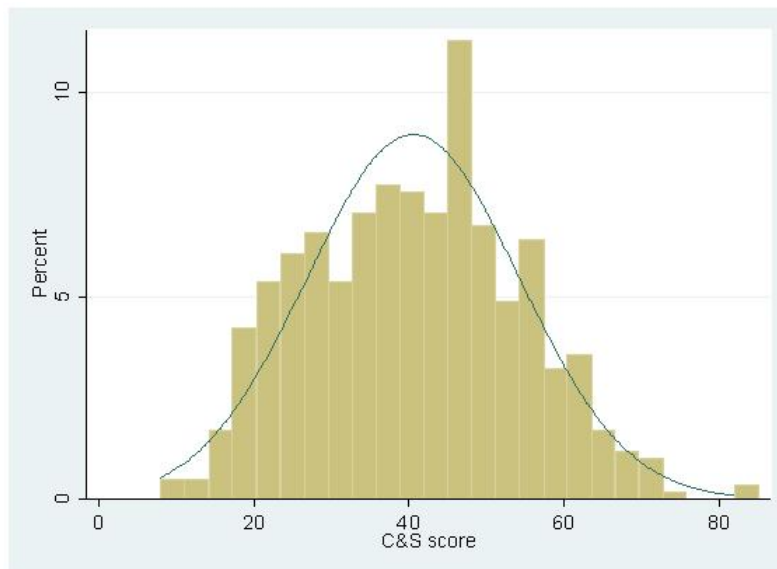


Source: Vigeo (2008), calculation of the authors.

4. Sustainable relationship with suppliers (CS2.2): *“This criterion assesses the company’s commitment to ensure balanced and sustainable relations with suppliers, focusing on: promoting mutually beneficial business relations and optimising mutual profits gained through contract in terms of quality, costs and technical / technological control.”*
5. Integration of environmental factors in the supply chain (CS2.3): *“This criterion assesses the extent to which companies integrate environmental factors in the supply chain, looking at the production and distribution of product / service by suppliers and/or sub-contractors. The integration of environmental factors into the supply chain covers the complete business relationship with suppliers and sub-contractors”.*
6. Integration of social factors in the supply chain (CS2.4): *“This criterion assesses the extent to which companies integrate social standards in the supply chain.”.*
7. Prevention of corruption (CS3.1): *“This criterion assesses the effectiveness of companies anti-corruption management system: founding documents, prevention, information and monitoring systems. Corruption is studied in its broadest sense. Conflicts of interest are also taken into account as they can cast a doubt on the quality of the company decision-making process and on the integrity of people involved.”*
8. Prevention of anti-competitive practices (CS3.2): *“This criterion assesses the extent to which the company takes into account competition laws and the prevention of market distortion rules in its relations with customers, suppliers and competitors.”*

The distribution is given by graph 9.

Figure 9: Distribution of CS score (Business Behaviour)



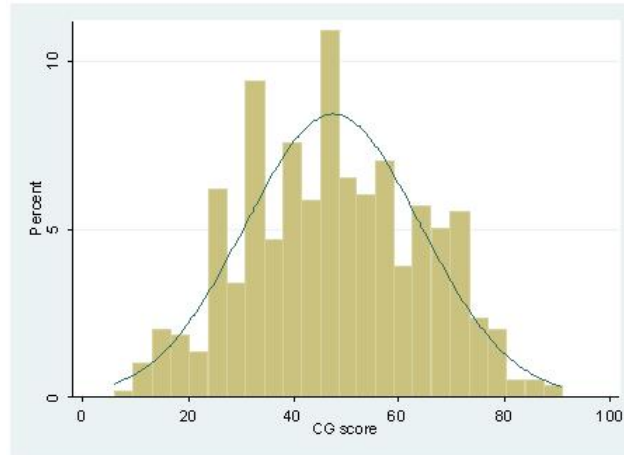
Source: Vigeo (2008), calculation of the authors.

A.5 Corporate Governance (CG)

This item is divided into four main criteria.

1. Board of directors (CG1.1): “*This criterion examines the company commitment to set up a board of directors that is capable of controlling and advising executives and that is held accountable to shareholders.*”
2. Audit and internal controls (CG2.1): “*This criterion examines the company commitment to establish effective risk management systems, ensuring the quality of internal reporting and the extent to which this commitment is reflected in financial information provided to the public. The board of directors is responsible for the objectivity and relevance of the system.*”
3. Shareholders’ Rights (CG3.1): “*This criterion assesses the company’s commitment to ensure the fair treatment of shareholders, allowing them to actively participate in strategic decision-making. Voting rights attached to shares and the right to participate in general meetings are of fundamental importance in this regard.*”
4. Executive remuneration (CG4.2): “*This criterion examines the company’s commitment to use executive remuneration as a tool to align the interests of executives and shareholders.*”

Figure 10: Distribution of CG score (Corporate Governance)



Source: Vigeo (2008), calculation of the authors.

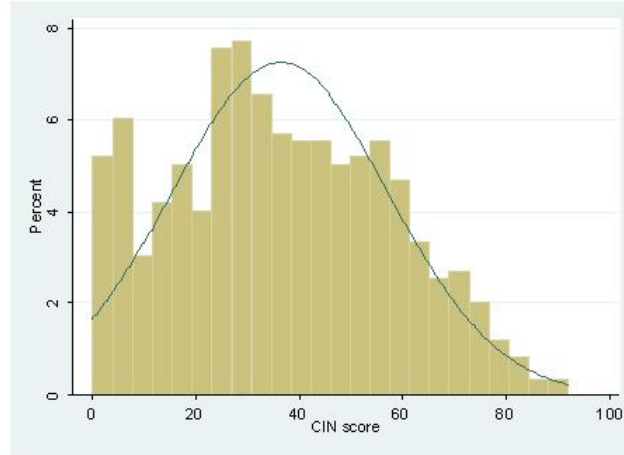
A.6 Community involvement (CIN)

This item is divided into 3 main criteria.

1. Promotion of social and economic development (CIN1.1): *“Assesses commitments to provide sustainable contributions to the economic and social development of local areas and to optimise the economic and social impact of activities : local investment, promotion of local employment, transfer of technologies and skills ; Assesses the way in which companies address the impacts of restructuring on a local labour pool. The criterion is particularly relevant for analysing corporate behaviour when a group exerts a strong influence on a local labour pool. ”*
2. Social impacts of company’s products and services (CIN2.1): *“Assesses the way in which a group develops voluntary initiatives taking into account their product or services’ impact on the community. Two situations may occur (depending on sectorial issues): (1) Preventing or decreasing risks, when a company is manufacturing potentially hazardous products (eg. tobacco, alcohol...) ; (2) Making its product available to the greatest number when the company is developing a product with community interest (eg. pharmaceuticals, telecommunications...).”*
3. Contribution to general interest causes (CIN2.2): *“Assesses corporate commitment to promote voluntary community initiatives not directly related to the company’s products or services : patronage, involvement in various causes of general interest, other forms of sponsorship, as well as contributions to studies or academic research on community interest issues. ”*

Before analysing the data using principal component analysis, we can already observe some figures concerning the links between the different items. The correlation between the level of Human Rights, human resources, environment and business behaviour is quite high. However, the

Figure 11: Distribution of CIN score (Community involvement)



Source: Vigeo (2008), calculation of the authors.

Table 15: Correlation matrix of the VIGEO items

	HR	HRts	ENV	CS	CG	CIN
HR	1					
HRts	0.71	1				
ENV	0.66	0.59	1			
CS	0.63	0.61	0.60	1		
CG	0.15	0.32	0.29	0.33	1	
CIN	-0.03	0.02	-0.02	-0.02	-0.09	1

correlation between these variables and corporate governance is much lower (around 0.3) and is very close to zero with the community involvement. Which means that different behaviour of corporate social responsibility can be observed depending on different factors.

B PCA of CSR data: interpretation of other axis

B.1 The second axis: the nature of CSR (Human Ressources or Corporate Governance?)

The second axis gives a key criteria to discriminate companies according to the *nature* of CSR performed. The companies with a good evaluation in terms of Human resources (HR) will have a positive coordinate on the second axis (0,27). On the other side, companies with a good evaluation in terms of corporate governance (CG) will have a negative coordinate on this axis (-0,87). Human

Table 16: Summary statistics of the VIGEO items

Variables	Mean	Standard deviation	Min	Max
HR	32.1	17.93	0	78
HRts	40.33	14.46	3	86
ENV	31.37	18.06	0	80
CS	40.53	13.71	8	82
CG	47.51	16.74	6	91

Rights, Environment and Business behaviour have a low impact on this axis. The community involvement plays positively on the coordinates of this axis (but in a lower extent than human resources). If we look more into the details of the items, we can observe that the respect of freedom of association and collective bargaining (HRts2.1, 0,24), and product safety (CS1.1, 0,18) has also a strong and positive impact on this factor. On the other side of the axis, the prevention of corruption (CS31, -0,16) has a negative influence on the coordinates.

On the axis, we do not discriminate the companies according to the *level* of CSR but according to the *nature*. Some firms will focus on corporate governance, some others on human resources. It is very significant to observe that the nationality of the companies seems to have a major role on this matter. Countries like France (7,4), Germany (5,0), Spain (4,4) or Italy (3,9) have generally a very positive position on this axis, contrary to the United Kingdom which coordinates are very negative (-17,7).

These observations are coherent with the analysis made by several specialists on CSR Capron and Quairel-Lanoizelée (2007); Matten and Moon (2005), considering there is an opposition between the anglo-saxon vision of CSR and another one from the Continental Europe. This division clearly appears in the data. Normally the opposition is based on the compulsory nature of CSR: the anglo-saxon vision of CSR is fully based on a voluntary basis, and the vision from Continental Europe insists on the regulatory systems and the need to fulfill the compulsory obligations. Here, a new division appears based on the *nature* of CSR performed.

Concerning the sector, we find the banking sector (3,1), the automobile sector (2,6) or transport and logistic (2,0) with positive coordinates on the axis; and the industrial sector (-3,1), the food sector (-2,9) or the financial sector (-2,9) with negative coordinates. Concerning the quotation on stock exchanges, the quotation on Eurostoxx (11,0), SBF (7,6), CAC40 (5,4) is positively correlated with the coordinates on this axis, contrary to the quotation on DJStoxx200 (-10,7).

B.2 The other axes

The **third axis** discriminates the companies according to their performance in terms of Human Resources (0,15), Human Rights (0,21) and Business behaviour (0,35) against their performance in terms of environment (-0,31) and community involvement (-0,20). The positive coordinates are more

based on the social aspects of CSR, the negative coordinates on the environmental aspects²⁶. Italy (3,3) or the Netherlands have positive coordinates, the UK (-3,0) or Greece (-2,1) have negative coordinates. Concerning the sectors, Banks (6,5) and Insurance (4,3) have positive coordinates, eletrconic and gaz utilities (-3,1) or telecommunications have negative coordinates.

The **fourth axis** is mainly explained by the performance in terms of community involvement (0,89). According to this criteria, the best are companies from Iceland (2,1), Portugal (1,6) or Ireland (1,5), and specialized retail (3,2), tourism (2,2) and chemicals (2,3).

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²⁶This is confirmed by the negative coordinate of the criteria CS2.3 which is the integration of environmental factors in the supply chain.

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