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Strategic Corporate Social Responsibility Activities and Corporate Governance in Imperfectly Competitive Markets

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Abstract

We investigate the incentives of firms' owners to commit voluntarily to Corporate Social Responsibility (CSR) activities in an oligopolistic market. The socially responsible attributes attached to products are considered as credence goods, with consumers forming expectations about their existence and level. We show that hiring an "individually" socially responsible CEO and delegating to him the CSR effort and market decisions acts as a commitment device for the firm's owners and credibly signals to consumers that the firm will undertake the "missioned" CSR activities. We also find that CSR activities are welfare enhancing for consumers and firms and thus, they should be encouraged.

Keywords: Oligopoly; Corporate Social Responsibility; Corporate Governance; Credence Goods.

JEL Classification: L15; L22; M14.

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1 Introduction

Corporate Social Responsibility (CSR hereafter), "a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on voluntary basis" (European Commission, 2001, has received recently increased attention from business, consumers, academics and policy makers. This has led many firms to account for the social consequences of their activities, making considerable efforts to become, or at least to appear as, socially responsible.[1] At the same time, the promotion of CSRs is a top priority in the policy agenda for sustainable development in many countries.[2]

The above raise important issues for corporate strategy and public policy. Yet, as Benabou and Tirole (2010, p.2) state, "Despite its growing importance, little is known about the economics of individual and corporate social responsibility." Motivated by the above, this paper addresses a number of questions such as: Given the voluntary basis of firms' CSR activities, how could a firm's owners commit to any CSR activities in the context of the firm's corporate governance charter?[3] Do firms undertaking CSR activities perform better than those not undertaking? Empirical evidence suggests that spending on CSR activities may have either positive (Baron et al., 2008; Harjoto and Jo, 2007a,b; Vogel, 2005), or negative (Wright and Ferris, 1997), or even no effects (Margolis and Walsh, 2003; McWilliams and Siegel, 2000) on firms' market performance. Moreover, is firms' engagement in CSR activities desirable from a social welfare point of view? If yes, what kind of initiatives should policy makers undertake to further encourage CSR?

To address the above questions, we consider a market with two large publicly traded firms, where each firm's owners have the option to follow a "doing well by doing good" strategy (Benabou and Tirole, 2010), through their firms' engagement in CSR activities, in order to meet the corresponding preferences of socially conscious consumers. This strategy can be

[1] For the increasing trends of firms implementing CSR programmes see KPMG (2008), Andries (2008), and Becchetti *et al.* (2006).

[2] Interestingly, when CSR started becoming widespread, its further encouragement became a central policy objective in both the U.S. and the E.U. (European Commission, 2006, 2011). Yet, Doh and Guay (2006) argue that "different institutional structures and political legacies in the US and EU are important factors in explaining how governments, NGOs, and the broader policy determine and implement preferences regarding CSR in these two important world regions".

[3] The issue of *commitment* has been highlighted in the definition of CSR given by the World Business Council for Sustainable Development (1998): "CSR is the commitment of businesses to behave ethically and to contribute to sustainable economic development by working with all relevant stakeholders to improve their lives in ways that are good for business, the sustainable development agenda, and society at large".

represented in the firm's mission picked by its owners (Besley and Ghatak, 2005; 2007). Porter and Cramer (2002; 2006) distinguish two types of CSR activities: (i) philanthropy oriented donations, and (ii) investments in production technologies and business processes, along the value chain, in favor of the firm's stakeholders. We restrict our attention to the latter type, as owners care about their firms' involvement in socially responsible actions (i.e., a "warm glow"), instead of donating to "governments or other philanthropic intermediaries" (Benabou and Tirole, 2010). CSR activities of the latter type are described by Brisley et al. (2011) as actions to reduce the societal and ecological footprint of firms, through the incorporation of their stakeholders' objectives in the corporate value chain. Such programs contain the improvement of employees' health and safety, the support of local suppliers, the reduction of emissions of pollutants and the use of environmentally friendly inputs. CSR activities of this type, and the respective socially responsible (SR henceforth) attributes attached to products, are difficult - if not impossible - to be observed by consumers, even after consumption. Consumers can only form expectations about their existence and level. We thus treat these SR attributes as a credence good.[4]

Firms' products combine horizontal and vertical differentiation aspects (Häckner, 2000; Garella and Petrakis, 2008). The latter is related to firms' CSR activities that socially conscious consumers perceive as a "quality improvement" (Manasakis et al., 2013). Consumers are heterogeneous with respect to their social consciousness and have differential valuations for the products' SR aspects.[5]

The credence aspect of the firms' CSR activities generates an adverse selection problem implying a firm's incentives to cheat consumers and avoid any spending on costly CSR activities.[6] To avoid the failure of the SR related goods' market, there is need for an information disclosure mechanism to credibly signal the firms' CSR efforts to consumers. We argue that this mechanism can be contracted whithin a corporate governance charter. More specifically,

[4] Such attributes contain the conditions under which a product is produced, including externalities associated with production (e.g. pollution) as well as hidden hazards associated with consumption of the product (Calveras and Ganuza, 2010).

[5] Widespread evidence from manufacturing industries (Elfenbein and McManus, 2007), tourism services (Blanco *et al.*, 2009) and agricultural production (Plastina and Arnould, 2007; Becchetti and Costantino, 2006), suggests that consumers express a willingness to pay a premium for goods and services produced by SR firms.

[6] It is evident that firms consistently try to convince consumers about their CSR activities, via advertising them and publishing CSR reports (Becchetti *et al.*, 2006). However, these efforts are not always trustworthy (Klein, 1999) and create considerable doubts to consumers about the firms' commitment to CSR (Porter and Kramer, 2002).

following Besley and Ghatak (2007), we argue that the firm will undertake the missioned CSR activities, only if there is a binding contract to an agent who faces ex-post reputational penalties for cheating consumers. Therefore, if a firm's owners decide to undertake the missioned CSR activities, they hire an "individually" (in the terminology of Benabou and Tirole, 2010) socially responsible CEO ("manager" hereafter) and delegate to him the firm's CSR activities and market decisions.[7,8] The hired manager then, serves as the self-commitment device for this firm's owners. We further consider that potential managers take on a continuum of attitudes towards CSR activities. In line with Miller and Pazgal (2001, 2002, 2005), we argue that each manager is committed to behaving in a certain manner by virtue of his personality type and that firms' owners select managers whose attitude fit to their own competitive goals. Each manager's attitude is captured by his type that is reflected on his curriculum of past SR activities that are common knowledge. A SR manager's objective consists of the firm's profits plus the extra intrinsic utility derived by her engagement in CSR activities.

Our main finding is that in equilibrium, a firm's owners engage in CSR activities in order to meet the corresponding demand by socially conscious consumers. Therefore, by hiring a SR manager and delegating to him the CSR effort and output decisions, owners "strategically" (Baron, 2001) exploit the manager's SR attitude and signal to consumers that the missioned CSR activities will be undertaken. In turn, consumers increase their willingness to pay for this firm's product which then obtains a competitive advantage in the market and increases its profits. In this context, we identify the differential impact that consumers' social consciousness has on firms owners' and managers' behavior. As the average consumer type becomes more socially conscious, firms' owners hire less SR managers because a more socially conscious population has (on average) higher willingness to pay for the firm's good per unit of CSR effort undertaken. The latter implies a higher mark-up for the firm and allows its owners to save on CSR costs by hiring a less SR manager. However, as the average consumer's social

[7] Fernández-Kranz and Santaló (2010, p. 456) argue that "If corporate owners have altruistic preferences for the social welfare they will commission managers to run the firm in a philanthropic manner". Besley and Ghatak (2005) support the view that attracting individuals committed to prosocial behaviors can be a strategy for a CSR firm wishing to make a credible commitment to CSR; and Benabou and Tirole (2010, p. 10) argue for "delegated philanthropy".

[8] It is evident that large corporations, such as "Intel" or "Hewlett-Packard", consistently announce the hiring a socially responsible CEO. These corporations consistently announce their CEOs' pro-social business practices (http://blogs.intel.com/csr/authors; http://www.hp.com/hpinfo/globalcitizenship/gcreport/ethics/approach.html.) and their awards (http://www.thecro.com/awards).

consciousness increases, the hired manager's utility increases on the level of CSR activities and output.

We also find that increased consumers' willingness to pay for CSR shall cause output, price and profits of a SR firm to be higher than the respective ones of a firm not undertaking CSR activities. The intuition goes as follows. Since the SR manager's welfare consists of the firm's profits plus the extra utility from engaging in CSR activities, this manager turns out to be more aggressive than a non-SR manager in the quantity setting game, enjoying a higher extra utility and increasing the firm's profits. At the same time, as consumers are willing to pay relatively more for the SR firm's product, its price is relatively higher. Yet, the SR manager's extra utility through his CSR activities, increase the firm's unit and overall cost. However, this negative cost effect is dominated and the SR firm's profit is higher than the respective of a firm's not undertaking CSR activities.

From a welfare point of view, the existence of a fraction of socially conscious consumers that are willing to pay a higher amount for CSR is welfare increasing. In particular, we find that CSR activities by firms in order to meet the corresponding preferences by consumers, increase consumers' surplus and social welfare, implying that CSR is welfare enhancing and should be encouraged, e.g. by raising consumers' awareness regarding social and environmental issues. We also find that as the goods become less differentiated, and market competition becomes fiercer, consumers' surplus and social welfare decrease because the increase in the equilibrium CSR efforts is dominated by the decrease in firms' profits and consumers' surplus. Our analysis further suggests that policy makers should promote the inclusion of managerial contracts over CSR activities and remuneration on corporate governance charters. This can be a credible information disclosure mechanism signalling to consumers that a firm's missioned CSR efforts will be materialized.

We also consider an industry with $N > 2$ firms producing differentiated products. Interestingly, we find that when the number of firms is relatively small, i.e., competition is not too fierce, the positive revenue increase effect of CSR dominates its negative cost effect and owners' decision to hire more SR managers increases profits. The opposite reasoning applies in highly competitive industries.

The rest of the paper is organized as follows. In Section 2, we place our paper within the relevant literature. In Section 3, we present the basic model and the benchmark cases. In Section 4 we investigate firms' owners' incentives to hire SR managers and Section 5 includes

a welfare analysis. In Section 6 we consider the N-firm case and in Section 7 a number of extensions of the basic model are briefly discussed. Finally, Section 8 concludes.

2 Related literature and contribution

Our paper contributes to three strands of the literature. First, it contributes to the literature studying firms' CSR activities in oligopolistic markets. Closer in spirit to our paper is García-Gallego and Georgantzís (2009). Under full information, where CSR is a vertical differentiation strategy entailing a fixed cost, they study the effects of exogenous changes in consumers' willingness to pay for SR products on market structure, CSR efforts and social welfare. We depart from this paper since we classify CSR activities as a credence good entailing a variable unit cost. Moreover, we argue that for a certain consumers' willingness to pay for SR products, it is the intensity of competition, captured by the degree of product differentiation and the number of firms in the industry, and the types of managers hired that drive the market and societal outcomes. Bagnoli and Watts (2003) link the provision of CSR, as a public good, with the sale of a homogeneous private product, under unit demands and homogeneous consumers' attitudes towards CSR. They find that, under both Cournot and Bertrand competition, the level of CSR efforts is inversely related to the competitiveness of the private-good market. On the contrary, Fernández-Kranz and Santaló (2010) provide strong evidence that firms operating in more competitive industries are more socially responsible. In the terminology of Fernández-Kranz and Santaló (2010), we rather find that the "escape competition effect" dominates the "rent dissipation effect" and firms are more socially responsible, but only if market competition is not too fierce. In an oligopolistic context with heterogeneous consumers, Manasakis et al. (2013) study the effects of alternative certifying institutions, as information disclosure mechanisms of the firms' credence CSR activities, on firms' incentives to invest in CSR as well as their relative market and societal implications. The CSR certification standard is found to be the lowest under for-profit private certifiers, the highest under a Non Governmental Organization, while, under a welfare maximizing public certifier it lies in between.

Second, our paper contributes to the rapidly expanding literature on the corporate governance of SR firms. Brisley et al. (2011) allow firms to incorporate stakeholders' objectives in the corporate value chain, besides the maximization of shareholders' value. In a homogeneous oligopoly, managers decide upon output levels, by maximizing a utility function consisted by

profits and an excess CSR related cost. Yet, in their context, CSR does not affect prices and demand. Kopel and Brand (2012), in a homogeneous duopoly, study firms' incentives for CSR activities under full information and homogeneous consumers' attitudes towards CSR. A SR firm maximizes its profit plus a share of consumers' surplus, with CSR efforts inducing no additional costs to the firms. We contribute to this literature in various ways: First, by assuming heterogeneous consumers regarding their attitudes towards CSR. Second, by focusing on the credence aspect of CSR and the respective imperfect information. We also consider that CSR effort levels increase, at an increasing rate, a firm's unitary costs' and examine how does the intensity of market competition affects market and societal outcomes.

Another line of research offers a contracting approach to CSR. Besley and Ghatak (2007) argue that a firm's opportunism to cheat on CSR promises can be overcome only if there is a binding contract to an agent who faces ex-post reputational/legal penalties for cheating consumers. In a principal-agent context, Besley and Ghatak (2005) argue that the principal can use a certain mission to incentivize an intrinsically motivated agent; and Baron (2008) studies how investors shape the managers' incentives, through compensation contracts including both profit and social performance. We contribute to this strand of the literature by considering how the use of managerial contracts, linking firms' performance with managers' individual prosocial concerns, can be used by firms' owners as a commitment device to overcome the adverse selection problem caused by the credence aspects of CSR activities to consumers.

3 The Model

We consider a market that consists of two publicly traded firms, denoted by i, $j = 1, 2$, $i \neq j$. The objective of each firm's owners - shareholders is to maximize own profits. In order to attain this objective, they have the option to follow a "doing well by doing good" strategy through their firm's engagement in CSR activities along the value chain (Porter and Kramer, 2002; 2006). This strategy can be represented in the firm's *mission* picked by its owners (Besley and Ghatak, 2005; 2007).

Each firm produces one brand of a differentiated good. On the demand side, there is a *unit mass* of consumers with identical preferences on the physical characteristics of the two goods. Yet, consumers are heterogeneous regarding their valuation of the firms' CSR activities. In particular, following Häckner (2000) and Manasakis *et al.* (2013), the utility function of the

θ-type consumer is:

$$U(\theta) = (a + \theta s_i^e)x_i(\theta) + (a + \theta s_j^e)x_j(\theta) - \left[x_i^2(\theta) + x_j^2(\theta) + 2\gamma x_i(\theta)x_j(\theta)\right]/2 + m(\theta) \tag{1}$$

where $x_i(\theta)$, $i = 1, 2$ represents product i's quantity bought by the θ-type consumer and $m(\theta)$ is the respective quantity of the "composite good". The parameter $\gamma \in (0, 1]$ is a measure of the degree of substitutability, with $\gamma \to 0$ ($\gamma = 1$) corresponding to the case of almost independent (homogeneous) goods. Thus, γ is a measure of the market competition's intensity, with a higher γ corresponding to fiercer competition.

In this context, we argue that the SR attributes attached to products, through the firms' CSR activities, are unobservable by consumers even after consumption, i.e., they are classified as a *credence good*. $s_i^e \geq 0$ represents the consumers' *expectations* over firm i's CSR activities, based on firm i's mission. As we shall see below, all consumers form the same expectations about each product's SR attributes. However, the θ-type consumer's valuation for these attributes is proportional to his type θ, i.e. it is equal to θs_i^e per unit of good i purchased. Hence, θ represents the increase of the θ-type consumer's willingness to pay for the firm i's good, per unit of firm i's expected CSR effort. We assume that θ is distributed according to a cumulative distribution function $F(\theta)$, with a density function $f(\theta)$ and $\theta \in [0, 1]$. The more socially conscious a consumer is, the higher is his θ. Then $\bar{\theta} = \int_0^1 \theta f(\theta) d\theta$ is the average consumer type in the population and $var(\theta) = \int_0^1 (\theta - \bar{\theta})^2 f(\theta) d\theta$ is the degree of consumers' heterogeneity. Maximization of $U(\theta)$ with respect to $x_i(\theta)$ and $x_j(\theta)$ gives the θ-type consumer's (inverse) demand functions:

$$p_i = a + \theta s_i^e - x_i(\theta) - \gamma x_j(\theta),\ i, j = 1, 2, i \neq j, \tag{2}$$

p_i is the price of firm i's product. By inverting (2) we obtain the θ-type consumer's demand function:

$$x_i(\theta) = \frac{a(1-\gamma) + \theta(s_i^e - \gamma s_j^e) - p_i + \gamma p_j}{1 - \gamma^2} \tag{3}$$

The price of the composite good has been normalized to unity. By integrating (3) with respect

to θ, we get firm i's demand function:

$$q_i(p_i, p_j) = \int_0^1 x_i(\theta) f(\theta) d\theta = \frac{a(1-\gamma) + \bar{\theta}(s_i^e - \gamma s_j^e) - p_i + \gamma p_j}{1-\gamma^2} \tag{4}$$

By inverting (4), firm i's inverse demand function is:

$$p_i(q_i, q_j) = a + \bar{\theta} s_i^e - q_i - \gamma q_j \tag{5}$$

Observe that $p_i(q_i, q_j)$ is positively related to the average consumer type $\left(\bar{\theta}\right)$ and the consumers' expectations over firm i's CSR effort level s_i^e.

We assume that firms are endowed with identical constant returns to scale production technologies. Firm i's total cost is given by $C_i(q_i, s_i) = c(1 + s_i^2)q_i$ with $0 < c < a$. We further consider that a higher CSR effort level increases, at an increasing rate, firm i's marginal (and unitary) costs.[9] In the sequel we will make the following assumption that guarantees interior solutions in all cases.

Assumption 1 $c(a - c) \geq \bar{\theta}^2$

Assumption 1 requires that the marginal production cost c, even when firm i undertakes zero CSR efforts is neither too low nor too high. Firm i's profits are expressed as:

$$\Pi_i = (a + \bar{\theta} s_i^e - q_i - \gamma q_j)q_i - c(1 + s_i^2)q_i \tag{6}$$

In this context, assuming that all aggregate demand and production parameters are common knowledge, an adverse selection problem may arise: Once consumers' expectations over firm i's CSR effort level are fullfiled ($s_i^e = s_i$), they increase their willingness to pay for firm i's product. Yet, given the credence aspect of the CSR efforts, firm i has incentives to cheat consumers and avoid any spending on CSR activities. Consumers anticipate firm i's incentives to cheat them and rationally believe that there will be zero CSR activities ($s_i^e = 0$). Firm i, in turn, spends zero on CSR in equilibrium ($s_i^e = s_i = 0$). Following Besley and Ghatak

[9] This is justified on the grounds that firm i's CSR activities, such as improving working conditions for its employees, buying more expensive inputs from local suppliers, financing recycling and other SR campaigns, or introducing "green" technologies, have an increasingly negative impact on the firm's unit production costs.

(2007), we consider that this adverse selection problem can be solved with a binding contract to an agent who faces ex-post reputational penalties for cheating consumers. We thus consider that if firm i's owners decide to undertake any CSR effort, they hire a socially responsible CEO - manager and delegate to him the firm's CSR activities and market decisions. The hired manager then serves as a self-commitment device for firm i's owners and credibly signals to consumers that the firm will undertake the *missioned* CSR activities.

In this context, potential managers take on a continuum of attitudes towards CSR activities which is captured by their type t. Each manager's attitude is reflected on his curriculum of past SR activities that are common knowledge and thus observable by all firms' owners and consumers. Since each manager is committed to behaving in a certain manner towards CSR, by virtue of his personality type (Miller and Pazgal, 2001; 2002; 2005), firm i's owners, by hiring a specific t_i-type of manager, commit to a certain entrepreneurial attitude towards CSR. A manager of type $t_i > 0$ has the following objective function:

$$M_i(t_i) = \Pi_i + t_i \frac{s_i^2}{2} q_i \tag{7}$$

Letting $\tau_i = \frac{t_i}{c}$, note that a τ_i-type of manager derives utility not only from firm i's profits but also through his own CSR activities within the firm. Following Benabou and Tirole (2006), Calveras *et al.* (2006) and Baron *et al.* (2008), this extra utility has its source at intrinsic, image and reputational incentives. Manager i's extra personal utility increases, at an increasing rate, with firm i's CSR activities per unit of its output. Owners offer to their risk neutral managers "take it or leave it" incentive contracts. We assume, however, that these contracts cannot touch upon the extra personal utility that the managers obtain from the CSR activities. This, in turn, implies that firm i's owners ask from their manager a franchise fee equal to Π_i and make the manager "residual claimant" of firm i's net profits.[10]

[10] Although in real life the terms of the managerial contracts are often determined via owners-managers negotiations, it is a standard assumption in the strategic delegation literature that the market for managers is perfectly competitive and owners have all the bargaining power during the negotiations, thus offering "take it or leave it" incentive contracts to their managers.

3.1 The Sequence of Moves

We consider a three-stage game. In the first stage, firms' owners, simultaneously and independently, decide whether their firms will undertake CSR activities or not. If firm i's owners decide to undertake CSR activities ($s_i > 0$), they hire a SR manager of type $\tau_i > 0$ and delegate to him the CSR effort and output decisions.[11] If instead, they decide not to undertake CSR activities ($s_i = 0$), they hire a manager who is publicly known to have no prosocial concerns ($\tau_i = 0$) and delegate to him the output decision. Technically speaking, this is identical to the case where the output decision is taken by the firm's owners. In the second stage, if the hired manager is of $\tau_i > 0$, he sets the firm i's CSR effort and output level.[12] If instead, the hired manager is of $\tau_i = 0$, he sets the output level. In the last stage, consumers form beliefs about the firms' CSR efforts, based upon the observed types of managers hired and the firms' output levels, and then they purchase quantities of the two goods accordingly.

3.2 Benchmark case: No CSR Activities

Consider the case where both firms' owners decide not to undertake CSR activities, i.e., each firm's owners hire a manager of type $\tau_i = 0$. This is a standard Cournot game where managers compete in quantities so as to maximize profits $\Pi_i = (a - q_i - \gamma q_j)q_i - cq_i$. From the first order condition, firm i's reaction function is $q_i = R_i^C(q_j) = \frac{a-\gamma q_j - c}{2}$. By symmetry, firm i's equilibrium output, price and profits are $q^C = \frac{a-c}{2+\gamma}$; $p^C = c + \frac{(a-c)}{2+\gamma}$; and $\pi^C = (q^C)^2$ respectively. Since all consumers have identical preferences over the physical characteristics of the two goods and there is a unit mass of them in the population, it turns out that each consumer buys a quantity $x^C = q^C$ from each good. Then, consumers' surplus and social welfare are given by $CS^C = (1+\gamma)(q^C)^2$ and $SW^C = (3+\gamma)(q^C)^2$, respectively.

3.3 Benchmark case: Full Information

Next, consider that firms' CSR activities are observable by consumers, i.e., they are classified as a *search good*. Hence, no firm's owners need to hire a manager of type $\tau_i > 0$. Instead,

[11] Hiring a manager whose type is not publicly observable would induce an informational problem. This problem could be solved via certification (Cason and Gangadharan, 2002), which acts as an information disclosure mechanism to credibly signal a manager's type τ_i to consumers.

[12] The decisions over CSR effort and output are taken in the same stage because we assume that a manager's CSR activities are not observable by the rival manager.

they, hire a manager of type $\tau_i = 0$, who chooses s_i and q_i to maximize firm i's profits, given by (6). Here too, this is identical to the case where the relevant decisions are taken by firm i's owners. The reaction functions regarding output and CSR effort level are $q_i = R_i^q(q_j, s_i) = \frac{a-c-\gamma q_j}{2} + \frac{\bar{\theta}-cs_i}{2}s_i$ and $s_i = R_i^s = \frac{\bar{\theta}}{2c}$ respectively. By symmetry, firm i's equilibrium CSR effort, output, price, and profits are $s^{FI} = \frac{\bar{\theta}}{2c}$; $q^{FI} = \frac{(a-c)}{(2+\gamma)} + \frac{\bar{\theta}^2}{4c(2+\gamma)}$; $p^{FI} = c + \frac{(a-c)}{(2+\gamma)} + \frac{(3+\gamma)\bar{\theta}^2}{4c(2+\gamma)}$; and $\Pi^{FI} = (q^{FI})^2$. Note that these outcomes are higher than the respective under no CSR activities. Replacing the above on (1), we obtain consumers' surplus and social welfare, $CS^{FI} = (1+\gamma)(q^{FI})^2 + \frac{(s^{FI})^2}{(1+\gamma)^2}var(\theta)$ and $SW^{FI} = (3+\gamma)(q^{FI})^2 + \frac{(s^{FI})^2}{(1+\gamma)^2}var(\theta)$ which are also higher than the respective ones under no CSR activities.[13]

4 Equilibrium Incentives for CSR Activities

We proceed our analysis by assuming that both firms' owners decide that their firms will undertake CSR activities (Universal CSR). Hence, each firm's owners hire a manager of type $\tau_i > 0$ and delegate to him the CSR effort and output decisions. We then ask whether this is an equilibrium configuration.

In the last stage of the game, consumers, before making their purchasing decisions, form beliefs about the firms' CSR effort levels (s_i^e, s_j^e), based upon the information that they possess: the hired managers' types (τ_i, τ_j) and the firms' output levels (q_i, q_j). As we will see below, consumers are able to infer the equilibrium values (s_i, s_j) by inverting the managers' strategies. In the second stage, managers anticipate that consumers will form correct expectations about their CSR efforts ($s_i^e = s_i$, $i = 1, 2$). Then, manager i chooses s_i and q_i to maximize his utility:

$$M_i(s_i, q_i) = (a + \bar{\theta}s_i - q_i - \gamma q_j)q_i - c(1 + s_i^2)q_i + \tau_i c\frac{s_i^2}{2}q_i \tag{8}$$

The first order conditions of (8) give manager i's reaction functions for CSR effort and output, respectively:

$$s_i = R_i^s(\tau_i) = \frac{\bar{\theta}}{c(2-\tau_i)} \tag{9}$$

$$q_i = R_i^q(q_j, s_i, \tau_i) = \frac{a-c-\gamma q_j}{2} + \frac{2\bar{\theta} - cs_i(2-\tau_i)}{4}s_i \tag{10}$$

[13] The derivation of CS follows the steps outlined in Section 5.

Consumers, knowing τ_i, can infer s_i from (9). They are also able to verify from (10) whether s_i, $i = 1, 2$ is consistent with the hired managers' types (τ_i, τ_j) and the firms' output levels (q_i, q_j). If they turn out to be consistent, then $s_i^e = s_i$. Otherwise, we specify that consumers expect that firm i's CSR effort is null, i.e., $s_i^e = s_i = 0$.[14]

By substituting (9) into (10), the output reaction function $R_i^q(.)$ as a function of q_j and τ_i alone, is:

$$q_i = R_i^q(q_j, \tau_i) = \frac{a - c - \gamma q_j}{2} + \frac{\bar{\theta}^2}{4c(2 - \tau_i)} \tag{11}$$

Comparing $R_i^q(q_j, \tau_i)$ with the benchmark case with no CSR activities $R_i^C(q_j)$, we observe that the former has an additional positive term, i.e., $R_i^q(q_j, \tau_i)$ shifts outwards. Hence, each firm's owners, by hiring a socially responsible manager, commit to a more aggressive behavior in the output market. Moreover, since $R_i^q(q_j, \tau_i)$ is increasing in τ_i, firm i's owners' commitment in more aggressive behavior is more pronounced here, as compared to the respective under full information. Solving the system of first order conditions, the equilibrium CSR effort and output levels are:

$$s_i^*(\tau_i) = \frac{\bar{\theta}}{c(2 - \tau_i)}; \quad q_i^*(\tau_i, \tau_j) = \frac{a - c}{2 + \gamma} + \frac{\bar{\theta}^2}{2c(4 - \gamma^2)} \left[\frac{2}{2 - \tau_i} - \frac{\gamma}{2 - \tau_j} \right] \tag{12}$$

Clearly, the more socially responsible firm i's manager is (higher τ_i), the higher is firm i's CSR effort. Further, firm i's output increases with τ_i, while it decreases with τ_j, because firm i's manager enjoys a higher extra utility per unit of output produced by firm i, namely $\tau_i c \frac{s_i^*(\tau_i)^2}{2} = \frac{\tau_i \bar{\theta}^2}{2c(2-\tau_i)^2}$. While, when the rival manager is of a higher τ_j-type and sets thus a higher output for firm j, firm i's manager optimally reacts by reducing firm i's output.

In the first stage, firm i's owners choose the type τ_i of manager to hire, in order to maximize their profits:

$$\Pi_i(\tau_i, \tau_j) = q_i^*(\tau_i, \tau_j)^2 - \tau_i c \frac{s_i^*(\tau_i)^2}{2} q_i^*(\tau_i, \tau_j) \tag{13}$$

Taking the first order condition of (13), and exploiting symmetry, the type of manager to be hired in equilibrium is:[15]

[14] This specification of out-of-equilibrium beliefs involves maximum punishment for the firm that cheats, thus rendering any cheating unprofitable.

[15] It can be checked that at the symmetric equilibrium, the second-order conditions are always satisfied, implying an interior solution for the optimal types of managers. The stability conditions are satisfied too.

$$\tau^* = \frac{32 + m^2(12 + 2\gamma - \gamma^2) - B(m,\gamma)}{4(8-\gamma^2)} > 0 \tag{14}$$

where

$$B(m,\gamma) = \sqrt{64(4-\gamma^2)^2 + 16m^2(48 + 8\gamma - 12\gamma^2 + \gamma^4) + m^4(12 + 2\gamma - \gamma^2)^2}$$

It can be checked that $0 < \tau^* < 2/7$, $\frac{d\tau^*}{d\gamma} > 0$ and $\tau^* \to 0$ as $\gamma \to 0$ for all permissible values of m.[16] Ideally, firms' owners would prefer to hire the least possible SR type of managers and use them exclusively as signaling devices, in order to reach as close as possible to their most preferred outcome (i.e., the outcome under full information in which firms' CSR activities are observable by consumers). In the latter case, firms' owners would save on CSR costs and increase profits. Yet, since CSR efforts are unobservable, firms' owners are obliged to hire SR managers who are not strict profit-maximizers. The more SR a firm's manager is, the farther away from strict profit-maximization, i.e., from full information profits, the firm ends up. Indeed, when the goods are almost independent ($\gamma \to 0$), each firm's owners hire the least SR manager in order to credibly signal to consumers the firm's missioned CSR activities. Substituting τ^* into (13), (12), (4) and (6) we obtain the equilibrium CSR effort, output, price and profits, respectively:

$$s^* = \frac{\overline{\theta}}{c(2-\tau^*)}; \quad q^* = \frac{2(2-\tau^*) + m^2}{2(2+\gamma)(2-\tau^*)}(a-c) \tag{15}$$

$$p^* = c + \frac{2(2-\tau^*) + (3+\gamma)m^2}{2(2+\gamma)(2-\tau^*)}(a-c) \tag{16}$$

$$\Pi^* = \frac{[2(2-\tau^*) + m^2][2(2-\tau^*)^2 + m^2(2 - 3\tau^* - \gamma\tau^*)]}{4(2+\gamma)^2(2-\tau^*)^3}(a-c)^2 \tag{17}$$

Finally, (τ^*, τ^*) is an equilibrium configuration only if no firm's owners have incentives to deviate by not hiring a manager of type τ^*. Let firm j's owners stick to hiring a τ^*-type manager. Do firm i's owners have incentives to deviate by hiring a manager with no prosocial

[16] Note that $m(\frac{\overline{\theta}}{a}, \frac{c}{a}) = \overline{\theta}/\sqrt{c(a-c)} = (\overline{\theta}/a)\,/\sqrt{c/a(1-c/a)}$ is a measure of the average consumer's valuation for the firms' CSR activities per unit of market size (adjusted for unit cost relative to market size, $\frac{c}{a}$). Moreover, m is increasing in $\frac{\overline{\theta}}{a}$; moreover, it is U-shaped in $\frac{c}{a}$ reaching its minimum value $\frac{2\overline{\theta}}{a}$ at $c = \frac{a}{2}$, while its maximum value is, by Assumption 1, equal to 1.

concerns? If so, consumers form beliefs that $s_i^e = 0$. Then firm i's manager optimally chooses $s_i = 0$. Using (6) firm i's deviation profits are Π_i^d, with $\Pi_i^d < \Pi^*$ always. Firm i's cost savings because of $s_i = 0$ do not compensate for the revenue losses due to the decreased consumers' valuation for its product. Note that the case where none firm's owners hire a SR manager is not an equilibrium configuration either. Firm j's owners optimal response to firm i's owners not hiring a SR manager, is to hire a SR manager and obtain a competitive advantage in the market. The following Proposition summarizes:

Proposition 1 *In equilibrium both firms' owners hire socially responsible managers and delegate to them CSR effort and output decisions.*

Intuitively, by hiring a SR manager, firm i's owners strategically exploit his certain attitude towards CSR and credibly signal to consumers that their expectations about firm i's effort level s_i^e will be fulfilled, i.e., $s_i^e = s_i$. Consumers increase their valuation for firm i's product and the firm gains a competitive advantage in the market, increasing thus its profits.

Regarding the type of managers that firms' owners hire in equilibrium, it can be checked from (14) that $\frac{d\tau^*}{d\gamma} > 0$, i.e., the less differentiated the goods are (higher γ), the more SR are the managers hired. Intuitively, as γ increases, the brands sold in the market become closer substitutes, i.e., market competition becomes fiercer, and each firm's owners have to hire a more SR manager in order to gain competitive advantage in the market. Moreover, firms' owners hire less SR managers as the average consumer type becomes more socially conscious (higher $\overline{\theta}$). Interestingly, a population with higher $\overline{\theta}$ has (on average) higher willingness to pay for firm i's good, per unit of CSR effort undertaken by this firm. This implies a higher mark-up for firm i and allows its owners to save on CSR costs by hiring a less SR manager. Note also that, the larger the market size is (higher a), the more rentable is a firm's CSR activity, and thus firms' owners hire more SR managers. The following Proposition summarizes:

Proposition 2 *Firms' owners hire more SR managers (higher τ^*) when: (i) the goods are less differentiated and the market competition becomes fiercer (higher γ); (ii) the average consumer type is less socially conscious (lower $\overline{\theta}$); (iii) the market size is larger (higher a).*

Now from (15) it can be checked that $\frac{ds^*}{d\gamma} > 0$, $\frac{ds^*}{d\overline{\theta}} > 0$ and $\frac{ds^*}{dc} < 0$; also, $\frac{dq^*}{d\overline{\theta}} > 0$ and $\frac{dq^*}{dc} < 0$. As expected, when the goods become less differentiated, the more SR hired managers undertake higher CSR effort levels. Further, the equilibrium CSR effort and output increase

with the degree of social consciousness of the average consumer type $\overline{\theta}$, as well as with the efficiency of the CSR (and output) "production technology" (captured by a lower c). The intuition goes as follows. The more socially conscious the average consumer is, the higher is the population's willingness to pay and demand for CSR related products. Although the firm's owners hire a less SR manager (Proposition 2), the manager spends more on CSR activities and sets a higher level of output. This implies increased production costs that tend to decrease the firm's profits and subsequently, the manager's utility. On the other hand, the manager benefits both from the firm's higher revenues (due to the increased demand) and the extra utility of his CSR effort and output chosen. The latter effects dominate the negative cost effect and CSR effort and output increase as $\overline{\theta}$ increases. An increase in the the efficiency of the production technology, i.e., a reduction in c has similar effects. Finally, it can be checked from (17) that equilibrium profits follow a similar pattern, i.e. they increase with $\overline{\theta}$ and decrease with c. Our findings are summarized in the following Proposition:

Proposition 3 *(i) Equilibrium CSR effort increases when the goods are less differentiated and the market competition becomes fiercer (higher γ).*

(ii) Equilibrium CSR effort, output and profits increase when the average consumer type is more socially conscious (higher $\overline{\theta}$), as well as when the CSR "production technology" is more efficient (lower c).

Proposition 3 leads to a number of testable hypotheses on the "performance effects of CSR activities". As mentioned in the Introduction, the empirical literature on this issue is so far inconclusive and thus further investigation is needed on this issue.

We next compare the equilibrium outcomes of Universal CSR with the respective ones in the two benchmark cases. The following observations are in order. First, $s^* > s^{FI}$; $q^* > q^C$ and $q^* > q^{FI}$ always hold. Regarding CSR effort levels, recall that under unobservable SR attributes, the presence of SR managers, deriving utility via their own CSR activities, leads to higher CSR effort as compared to the full information scenario where managers are of type $\tau_i = 0$. Regarding output levels, these findings are rationalized by the SR managers' relative aggressiveness during output setting (see the analysis of (11)). Second, since consumers' willingness to pay for CSR related products increases as firms undertake higher CSR efforts, it is clear that $p^* > p^C$ and $p^* > p^{FI}$ (see (5)). Third, $\Pi^* > \Pi^C$ always holds. Intuitively, firms' profits are affected by three factors. First, CSR activities increase the CSR related products'

demand and revenues. Second, since managers gain an extra utility via their CSR activities, they exert pressure for higher CSR effort, increasing thus the firms' unit and overall costs. Third, higher output by both managers intensifies market competition, decreasing thus firms' profits. It turns out that the first effect dominates and profits are higher under Universal CSR. In contrast, $\Pi^* < \Pi^{FI}$ always holds. Intuitively, in the full information case, managers are relatively less aggressive, in terms of the CSR effort and output levels set, implying that competition is relatively softer, resulting in relatively higher firms' profits. The following Proposition summarizes:

Proposition 4 *(i) Equilibrium output, price and profits are higher under Universal CSR rather than when no CSR activities are undertaken.*

(ii) Equilibrium CSR effort, output and price are higher, while profits are lower, under Universal CSR rather than under full information.

5 Welfare Analysis

In this section we investigate the welfare effects of firms' CSR activities. Social welfare is defined as the sum of consumers' surplus and firms' profits.[17] The θ-type consumer's surplus is:

$$CS(\theta) = (a+\theta s_i)x_i(\theta) + (a+\theta s_j)x_j(\theta) - \left[x_i^2(\theta) + x_j^2(\theta) + 2\gamma x_i(\theta)x_j(\theta)\right]/2 - p_i x_i(\theta) - p_j x_j(\theta) \tag{18}$$

In equilibrium, due to symmetry, $s_i = s_j = s^*$, $p_i = p_j = p^*$ and $x_i(\theta) = x_j(\theta) = x^*(\theta)$. After some manipulations, $CS^* = (1+\gamma)[x^*(\theta)]^2$ where $x^*(\theta) = \frac{a+\theta s^* - p^*}{1+\gamma} = q^* + \frac{(\theta-\bar{\theta})s^*}{(1+\gamma)}$ because $p^* = a + \bar{\theta}s^* - (1+\gamma)q^*$. Then, $CS^* = (1+\gamma)\int [x^*(\theta)]^2 f(\theta)d\theta$, and using $x^*(\theta)$, it becomes:

$$CS^* = (1+\gamma)\left[\int_0^1 q^{*2} f(\theta)d\theta + \int_0^1 2q^* \frac{(\theta-\bar{\theta})s^*}{(1+\gamma)} f(\theta)d\theta + \int_0^1 \frac{(\theta-\bar{\theta})^2 s^{*2}}{(1+\gamma)^2} f(\theta)d\theta\right]$$

[17] In our model, although the market for managers may not be perfectly competitive, we assume that managers are drawn from a sufficiently large population of infinitesimal agents. Thus their extra personal utility in equilibrium counts with a zero weight in social welfare.

$$CS^* = (1+\gamma)q^{*2} + \frac{s^{*2}}{(1+\gamma)} var(\theta) \geq (1+\gamma)q^{*2} \tag{19}$$

because the second term is zero and the third term is proportional to $var(\theta)$. The last inequality holds due to $var(\theta) \geq 0$ (with the equality holding only for degenerate distributions $f(\theta) = \overline{\theta}$, for all θ). One can easily check that $CS^* > CS^C$, because $s^* > 0$ and $q^* > q^C$; and $CS^* > CS^{FI}$ because $s^* > s^{FI}$ and $q^* > q^{FI}$ aways hold.

Under Universal CSR, social welfare is $SW^* = CS^* + 2\Pi^*$. Since both firms' profits (Proposition 4) and CS are higher in this case, rather than under no CSR activities, SW is higher too. Further, as we have seen, under Universal CSR, firms' profits are lower, while CS is higher, than the respective ones under full information. It turns out that the increase in CS more than compensates for the decrease in the firms' profits and SW under Universal CSR is higher than under full information.[18] Surprisingly, certification of CSR activities (Bottega and De Freitas, 2009) guaranteeing full information, would make SR managers to be redundant. In turn, this would decrease CS and SW.

Finally, since s^*, q^* and Π^* increase with $\overline{\theta}$ and decrease with c, it is easy to see that CS^* and TW^* follow the same pattern. Note also that as γ increases, the increase in s^* is dominated by the decrease in Π^* and CS^*. As a consequence, TW^* decreases with γ. Ceteris paribus, an increase in the variance of social consciousness in the population increases both the CS and SW. This is due to the fact that a more heterogeneous consumer population makes more dissimilar purchasing decisions. The utility gain of the highly conscious consumers overcompensates for the utility loss of the low consciousness consumers and CS is higher than under a more homogeneous population.

The following Proposition summarizes:

Proposition 5 *Consumers' surplus and social welfare:*

(i) are higher under Universal CSR rather than under no CSR activities and full information of CSR activities.

(ii) increase when the average consumer type is more socially conscious (higher $\overline{\theta}$) and when the efficiency of CSR "production technology" is higher (lower c).

[18] Our conjecture is that this finding would still hold under more general demand and cost conditions, since the driving force seems to be the complementarity between s_i and q_i that the firms themselves do not take into account under full information.

(iii) decrease when the goods are less differentiated and the market competition becomes fiercer (higher γ).

Two further observations are in order. First, there is alignment of market and social incentives for CSR activities. Firms, by engaging in CSR activities, obtain higher profits due to consumers' increased willingness to pay for their products. At the same time, consumers' surplus increases because firms are satisfying their demand for SR products. Second, Proposition 5 suggests that policy makers should take measures to promote CSR activities, e.g., by raising consumers' awareness (increasing $\bar{\theta}$) via informational campaigns. This can play an "important role in providing incentives for responsible production and responsible business behavior. Consumers are expected to exercise critical choice and encourage good products and good companies" (European Commission, 2006). This policy suggestion is in partial accordance to García-Gallego and Georgantzís (2009), who support that public spending on increasing consumers' willingness to pay for CSR shall be welfare enhancing, only if increasing consumers' willingness to pay for CSR does not change the market structure.[19] Our analysis further suggests that policy makers should promote the inclusion of managerial contracts over CSR activities and remuneration on corporate governance charters. This can be a credible information disclosure mechanism signalling to consumers that a firm's missioned CSR efforts will be materialized.

6 The N-firm case

We now consider an industry with $N > 2$ firms. Each firm i, $i = 1, 2, .., N$ faces an inverse demand function $p_i = a + \bar{\theta} s_i - q_i - \gamma Q_{-i}$, where $Q_{-i} = \sum_{j \neq i} q_j$ and γ is the product substitutability between any pair of goods. All other parameters as well as the timing of the game are as in the duopoly case.[20] In this case, the objective function of type-τ_i manager is: $M_i(s_i, q_i) = (a + \bar{\theta} s_i - q_i - \gamma Q_{-i}) q_i - c(1 + s_i^2) q_i + \tau_i c \frac{s_i^2}{2} q_i$. Maximizing each $M_i(s_i, q_i)$, with

[19] Yet, it is worth mentioning that according to García-Gallego and Georgantzís (2009), if increasing consumers' environmental consciousness alters the market structure, welfare may decrease. Therefore, their policy recommendation, is not always for environmental consciousness campaigns.

[20] The inverse demand functions are derived by aggregating individual demand functions of an heterogeneous, in terms of willingness to pay for firms' CSR performance population, as in Section 3.1. In particular, each $\theta-$type consumer has a utility function which is a generalization of (1): $U = a \sum_{i=1}^{N} q_i + \theta \sum_{i=1}^{N} s_i^e q_i -$

respect to s_i and q_i, and solving the system of first order conditions, gives the equilibrium CSR effort and quantity level in the second stage of the game:

$$s_i^* = \frac{\bar{\theta}}{c(2-\tau_i)};\ q_i^* = \frac{a-c}{[2+\gamma(N-1)]} + \frac{\bar{\theta}^2}{2c(2-\gamma)[2+\gamma(N-1)]}\left[\frac{[2+\gamma(N-2)]}{2-\tau_i} - \sum_{j,\, j\neq i}\frac{\gamma}{2-\tau_j}\right]$$

We reconfirm for the $N-$firm case that manager i's equilibrium CSR efforts depend exclusively on his own type. In the first stage of the game, firms' owners choose the SR-type of their managers, each maximizing own profits $\Pi_i = q_i^{*2} - \tau_i c\frac{s_i^{*2}}{2}q_i^*$. In the symmetric equilibrium, we obtain $\tau^* = \tau^*(a, c, \gamma, \bar{\theta}, N)$, with $0 < \tau^* < 2/3$, and $\tau^* \to 0$ as $\gamma \to 0$ for all permissible parameter values.[21] The following Proposition summarizes:

Proposition 6 *(i) As the average consumer type becomes more socially conscious (higher $\bar{\theta}$), firms' owners hire less SR managers (lower τ^*) and equilibrium CSR effort increases (higher s^*).*

(ii) The type of managers that firms' owners hire and the CSR effort that each manager undertakes in equilibrium have an inverted U-shaped relation with the number of firms in the industry, with the maximum attained at $\widetilde{N}\left(a, c, \gamma, \bar{\theta}\right)$.

(iii) Equilibrium output and profits decrease as the number of firms in the industry increases.

Proposition 6(i) reproduces our result for the duopoly case. According to Proposition 6(ii), when $N < \widetilde{N}$, competition is not too fierce, and the positive revenues increase effect of CSR dominates its negative cost effect. The opposite reasoning applies in highly competitive industries, when $N > \widetilde{N}$. Note that in the polar case in which $N \to +\infty$, we obtain that $\tau^* \to 0$ and as a result, $s^* \to \bar{\theta}/2c$. Proposition 6(iii) reproduces the standard result in the Cournot differentiated goods game, according to which, equilibrium output and profits decrease as market competition becomes fiercer (as N increases).

$\frac{1}{2}\left(\sum_{i=1}^{N} q_i^2 + \gamma\sum_{i=1}^{N}\sum_{\substack{j=1\\ j\neq i}}^{N} q_i q_j\right) + m.$

[21] The expression of τ^* is too long to be included in the main text and is available from the authors upon request.

7 Extensions-Discussion

In this section we consider a number of modifications of the basic model in order to briefly discuss the robustness of our main results.[22]

7.1 Timing of the Game

Consider the case where manager i's CSR activities are observable by manager j before taking the output decisions. We undertake this task by considering a four-stage game. Given the firms owners' decisions in the first stage, in the second stage, manager i chooses and publicly announces the level of firm i's CSR effort. In the third stage, managers compete in quantities. In the fourth stage, consumers form beliefs about the firms' CSR efforts and make their purchasing decisions. Interestingly, all our results remain unaltered under this alternative scenario. This happens because it is the hired manager i's type that signals to consumers firm i's owners' commitment to a certain entrepreneurial attitude towards CSR.

7.2 Types of Decisions Delegated

Consider the case where the CSR effort decision is delegated to a CSR *divisional* manager while the output decision is left to a *production* manager.[23] We undertake this task with a modified four-stage game. In the first stage, if a firm's owners decide to undertake CSR activities, they hire a CSR divisional manager of $\widetilde{\tau}_i$, which is common knowledge, and delegate to him the CSR effort decision alone. In the second stage, SR divisional managers choose and publicly announce the firms' CSR efforts, $\widetilde{s}_i$. In the third stage, production managers compete in quantities and in the fourth stage, consumers form beliefs about the firms' CSR efforts and make their purchasing decisions. We find that in equilibrium, the CSR divisional managers are less SR and the CSR efforts they undertake are lower than the respective ones in the basic model, i.e. $\widetilde{\tau} < \tau^*$and $\widetilde{s} < s^*$. Intuitively, since consumers are aware that the quantity levels have been set not by socially responsible CEOs but from production managers, they realize that the link between CSR efforts and quantities is relatively weak.[24] As a consequence, they

[22] For each extension discussed below, the detailed analysis is available from the authors upon request.

[23] According to Benabou and Tirole (2010), "nominating someone with a good external reputation as a Corporate Sustainability Officer" and delegating to her the firm's CSR activities, is an increasingly popular practice.

[24] In particular, the quantities produced are not a proof to SR consumers that the CSR divisional managers have taken action and really affect the firms' CSR activities, since the latter also affect quantities.

form relatively lower expectations about the firms' CSR activities and their willingness to pay for the CSR related products is lower too. Firms' owners are aware of this and optimally respond by hiring relatively less SR divisional managers, in order to save on CSR costs.

7.3 Managerial Objective Functions

In the basic model we have assumed that the manager's objective function is convex in CSR effort, s_i. Consider now that it is concave in s_i. In particular, we consider that this function takes the form $M_i(q_i, t_i, s_i) = \Pi_i + q_i t_i Log(1 + s_i)$. Our results remain qualitatively robust under this scenario. Yet, the equilibrium CSR effort level is lower in this case. Another modification is to consider that the manager's extra utility from CSR efforts does not depend on q_i, i.e. $M_i(t_i, s_i) = \Pi_i + \frac{1}{2}\tau_i c s_i^2$. Our results remain qualitatively robust under this scenario too. Moreover, the firms' owners will hire the least possible SR managers, i.e., $\tau^* = \underline{\tau}$, with $\underline{\tau} > 0$ but close to zero. Loosely speaking, since there is no direct link between s_i and q_i from the manager's point of view, firms' owners use managers as a signaling device. Hence, they hire the least possible SR managers, in order to reach as close as possible their most preferred s_i, i.e. in case where firms' CSR activities are observable by consumers ($s^{FI} = \bar{\theta}/2c$). The firms' owners thus save on CSR costs and increase profits.

7.4 Bertrand Competition

Consider the case where managers compete in prices. Our results remain qualitatively robust under this scenario too. In the present case we find that the firms' owners will hire the least possible SR managers, i.e., $\tau_B^* = \underline{\tau}$, with $\underline{\tau} > 0$ but close to zero. Intuitively, since competition in prices is too fierce, firms' owners hire managers with the least CSR type in order to keep competition as soft as possible. Hence, they strategically use managers only as signaling devices. A direct consequence is that the CSR efforts undertaken under Bertrand competition are lower than the respective ones under Cournot competition.

7.5 Alternative Managerial Contracts

On a different ground, suppose that managers do not have social responsibility consciousness per se, but they can undertake the missioned CSR activities, only if they are offered by the firms' owners an appropriate incentive contract, in the spirit of Fershtman and Judd (1987),

which is observable by consumers. This is in the spirit of Bhattacharyaa and Dugar (2012) who present evidence according to which, for given monetary earnings, inducing higher status and social recognition incentives (e.g., image and reputation) can cause managers to invest higher levels of effort. In this scenario, all our results remain qualitatively robust.

8 Concluding remarks

The present paper has been motivated by the fact that firms' CSR activities are voluntary, products' SR attributes are unobservable by consumers, who perceive them as quality improvements and express a relatively increased willingness to pay for them. In this context, the present paper links individual and corporate social responsibility and studies firms' owners incentives to commit to CSR activities, in a corporate governance context.

Our core argument is that, since consumers' willingness to pay for CSR products is relatively increased, each firm has incentives to strategically engage in such activities in order to obtain a competitive advantage in the market. Therefore, a firm's owners, by hiring an "individually" SR manager and delegating to him the firm's CSR activities and market decisions, strategically exploit the manager's SR attitude and signal to consumers that the missioned CSR activities will be undertaken. Hence, from a corporate governance point of view, the hired manager serves as the self-commitment device for this firm's owners and acts as an information disclosure mechanism for consumers. In turn, consumers increase their willingness to pay for this firm's product, which then obtains a competitive advantage in the market and increases its profits and the overall welfare. An apparently counterintuitive result is that as consumers become more socially conscious, firms' owners hire less SR managers. Yet, this does not necessarily lead to less CSR activities by firms, since hired managers will increase their CSR spending with a more socially conscious population of consumers.

Two interesting directions for further research would be to investigate whether CSR is a way for firms to achieve a competitive advantage via reducing the market and reputational risks that they face (see, e.g., Heal, 2005), as well as the case where successive CSR efforts lead to an accumulation of reputation for firms and managers. The latter would link our research to the literature approaching CSR from the Resource-Based Theory point of view (see, e.g., McWilliams and Siegel, 2011).

We also believe that our findings may guide future empirical research on CSR with a number

of testable hypotheses: First, CSR effort increases when the goods are less differentiated as well as when the market competition becomes fiercer. Second, output, price and profits of firms undertaking CSR activities are higher than the respective of firms not undertaking. Third, the overall CSR efforts undertaken in an industry increase under an *intermediate* intensity of competition, captured by the number of firms in the industry, while they decrease as the number of firms further increases.

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