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Abstract

In a linear bilateral monopoly with the up-stream manufacturer and the down-stream retailer "consumers' friendly" socially concerned (i.e. caring about a share of consumer surplus), Brand and Grothe (2015, in this Journal) shows that, although (as expected) both firms' owners do not have an incentive to deviate from pure profit maximization when they choose their level of corporate social responsibility (CSR) simultaneously (or the retailer commits itself on social concern before the manufacturerer does), if the manufacturer commits itself on social concern before the retailer does, then both profits are enhanced. This paper shows that Brand and Grothe's result may be strongly modified if there are decreasing returns to the input: only the retailer firm's owners are incentived to adopt CSR and, at the equilibrium, this leads to a Pareto-superior outcome. This offers straightforward policy and empirical implications, arguing that the presence of CSR-type firms – which leads to higher profits and Pareto-superior outcomes, confirming the neoclassical economics point of view with respect to the adoption of CSR behaviors by firms' owners – depends crucially on the technology.

Keywords: Bilateral Monopoly; Corporate Social Responsibility

JEL Classification D21, L12, L22, M14.

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1. Introduction

In the last decades, the adoption of Corporate Social Responsibility (CSR) activities has become a global business practice. In 2002, KPMG surveyed the top 100 companies in 45 countries, disclosing that 23 percent of them declared the accomplishment of CSR activities in their financial reports; those figures grew to 73 percent in 2015. Moreover, in the same time period, the Global Fortune Index (which includes the world's 250 largest companies) has more than doubled those figures, from 45 to 92 percent (KPMG 2005, 2015).

The booming expansion of CSR has raised questions among scholars and policy-makers, exciting the debate on the motives pushing companies to engage in socially concerned activities, and this subject has been approached from different perspectives.[1]

The rationale for firms owned and (directly or indirectly, through opportunely hired and instructed managers) managed by shareholders to embark in unprofitable social activities has so far remained an unanswered puzzle, unless one discards the first principle of the rationality of "homo oeconomicus".

In fact, focusing exclusively on the realm of economics, the first principles of economics states that corporations are only responsible to their shareholders[2], and Milton Friedman (1970), in an article appeared in The New York Times with the evocative title "*The social responsibility of business is to increase its profits*", openly declares that the only objective of corporations is to maximize

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[1] For instance, Garriga and Mele` (2004) categorize the most significant CSR theories (and related approaches) with respect to the following aspects of social reality: economics, politics, social integration and ethics.

[2] With regard to the standpoint of economics, see also the discussion in Benabou and Tirole (2010).

their shareholders' returns, provided that the legal framework and the ethical custom of the country in which the corporations operate are respected.

Therefore, several empirical works have started investigating the correlation between CSR activities and profitability performances. On the whole, the results have been mixed or opposing, even within the same study. It follows that, at the current stage, there is a lack of an unambiguous, general consensus. A large majority of the scholars has identified either an exclusive negative (see, e.g. Bromiley and Marcus, 1989; Davidson et al. 1987; Davidson and Worrel, 1988) or a doubtful empirical evidence (e.g. Aupperle et al., 1985; Ingram and Frazier, 1983). However, a growing number of empirical works has revealed a positive link between the CSR and their financial performance (e.g. Griffin and Mahon, 1997; Roman et al., 1999; Waddock and Graves, 1997). Focusing on the relationship between performance and CSR in retailer firms, empirical evidence is provided by Schramm-Klein et al. (2015) who, through a survey among retailers and applying partial least squares structural equation modeling, argue that CSR generally has positive effects on retailer performance – despite the cost associated with CSR implementation.

However, theoretical explanations of the widespread presence of CSR-type firms have been provided resorting to several standpoints, but substantially abstracting from the above mentioned puzzle. Though no general agreement exists about the precise definition of the term "corporate social responsibility", two different viewpoints describe it: 1) a specific social activity firms conduct in voluntary way (i.e. beyond legal requirements), without inquiring neither the rationale for the occurring of this choice, nor the purely economic effects it induces; or 2) an explicit profit-sacrificing social activity (i.e. the damage caused

to the profits precisely defines the true CSR).[3] It seems to be rather unexpected that, in the domain of economics, the firms' extensive engagement in CSR activities either is not explained and it does not matter to explain it, or is clearly profit-damaging and the main interpretation is that precisely this damage truly identifies CSR. Therefore, taking seriously into consideration the point of view of economics, it is natural to inquire whether the introduction of CSR may contribute to improve the firms' profitability, so also contributing to the solution of the puzzle. In this paper, we start from the basic model of duopolistic Cournot competition, in which it is easy to show that firms – which maximize short-run profits - always reduce their profits by introducing social concerns in their objectives, for instance, under the form of an "interest" for the welfare of consumers.

Indeed, a typical feature shared by several articles is the assumption of CSR activities in terms of a maximization of an objective function which is a weighted sum of profit and consumer surplus, i.e. social responsibility takes the form of "consumers' friendly" activities. However, among those contributions, a typical difference concerns whether and how such CSR activities are chosen:

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[3] Doni and Ricchiuti (2013, 382) describes in an enlightening way these definitions and their different implications: "There are two polar definitions that can appear in sharp contrast. According to a first point of view, a firm is socially responsible when it takes environment-friendly actions not required by law. In this light, CSR can be defined without any regard neither to the motivation of the firm's choices nor to the impact of such choices on the firm's profit. From a different point of view, other authors believe that a firm is truly responsible only when it sacrifices its profit, at least in part, in order to carry out some social objective. Baron (2001) names the first behaviour as strategic CSR and the second one as altruistic CSR. This second concept of CSR is quite disputed: according to some authors an altruistic CSR is neither sustainable in a competitive market nor desirable from a social point of view (see Reinhardt et al., 2008, and literature quoted therein)".

on the one hand, the levels of CSR may be exogenously given for both firms or only one firm chooses the level of CSR while other firms remain profit-seeking (e.g. Kopel, 2009; Kopel and Brand, 2012; Goering 2007, 2009, 2012, 2014; Brand and Grothe, 2013; Lambertini and Tampieri 2012, 2015; Fanti and Buccella, 2017a,b; which focus on the effects of firms' CSR on competition under various aspects such as the environmental outcomes[4], entry game[5] and managerial delegation[6]), and on the other hand, the CSR levels are endogenously chosen by profit-maximizing firms' owners for strategic reasons in oligopolistic contexts (i.e., in a standard Cournot duopoly market), although few authors study the endogenous strategic choice of the CSR parameter (e.g. Hino and Zennyo, 2017; Planer-Friedrich and Sahm, 2016; Fanti and Buccella,

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[4] For instance, Lambertini and Tampieri (2015) assume, in addition to the care for the consumer surplus, an environmental externality and show that, with a sufficiently large market size, the CSR firm obtains higher profits than its profit-seeking competitors. Lambertini, Palestini, and Tampieri (2016) further show – although in a dynamic context with a linear state differential game and capacity accumulation – that, in the presence of environmental externalities, if the market is sufficiently large, the CSR firm sells more, accumulates more capital, and earns higher profits than its profit-seeking rival.

[5] Fanti and Buccella (2017a) show that when the market is adequately large, the adoption of CSR rules acts as an entry barrier in the industry because the incumbent may "penalize" the potential entrant's profits when the former has social concern, and the larger the incumbent's social concern is, the larger the "penalization" is.

[6] More precisely, Goering (2007) and Kopel and Brand (2012) analyze the strategic use of managerial incentives in a non-profit firm mixed duopoly, in which one of the firms is not profit maximizer while the rival is. On the other hand, Goering (2008) studies the same asymmetric structure without managers, in the presence of three firms in which the care of the overall social welfare represents the CSR feature of the non-profit firms. Kopel and Brand (2013), in line with their previous work, investigate the reason why a CSR-type firm pays low-powered incentives to their executives.

2017b Supplement, c).[7] Hino and Zennyo (2017) analyze the endogenous decision-making as regards the level of CSR in a delegation game with Cournot–Stackelberg competition. They show that the follower can derive a greater profit than the leader and achieve maximum profit when firms sequentially choose their CSR level. Planer-Friedrich and Sahm (2016) show that firms prefer to care for all consumers rather than for own customers only, choosing positive levels of CSR, but at the equilibrium choosing CSR reduce firms' profits.

However, independently of the strategic motivations for adopting CSR behaviors (while, however, as highlighted above, lead to lower profits at the market equilibrium), some recent papers have shown that the aim of maximizing profits can be a motive for the firm's engagement in CSR, as the neoclassical economics point of view requires because the adoption of CSR may increase profits of all firms at the market equilibrium. Fanti and Buccella (2017b, Supplement) study the situation in which firms' owners non-cooperatively select their endogenous level of social concerns. Those authors find that, when goods are substitute,[8] a unique sub-game perfect Nash equilibrium exists in which both firms engage in CSR, but this equilibrium is Pareto inefficient: a standard prisoner's dilemma arises. Indeed, Fanti and Buccella (2017c), also introducing managerial delegation (i.e. owners delegate output decisions to a manager), show that in the subgame perfect Nash equilibrium both firms are CSR-type and, in addition, the presence of CSR

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[7] Siegel and Vitaliano (2007) and Fernández-Kranz and Santaló (2010) provide some empirical confirmations that firms' social responsibility can be strategically chosen.

[8] On the other hand, when goods are complement, two pure-strategy asymmetric Nash equilibria emerge, that is, one firm engages in CSR activities while the rival remains profit-seeking: the game becomes an anti-coordination game.

activities improves the firms' profitability while harms the welfare of consumers and society, a result in contrast to the conventional wisdom under non-managerial firms. Moreover, Fanti and Buccella (2017d) show that, when firms non-cooperatively compete on CSR in network industries, the classical conventional prisoner's dilemma result in standard industries – i.e. to have social concerns is the Nash equilibrium but it is harmful for firms' profits – vanishes and, for adequately strong network effects, the equilibrium in which both firms are engaged in CSR is more profitable than simple profit-seeking. When firms cooperatively choose the profit-maximising level of CSR - a profit-maximising CSR level does exist provided that network effects are sufficiently strong.

While all the aforementioned contributions deal with the standard Cournot duopoly, another branch of this literature studying the strategic content of the CSR choices focuses on a vertical structure of the industry and studies the impact of firms' social concern on that. In particular, in a bilateral monopoly model, Goering (2012) and Brand and Grothe (2013) focus on a perfectly coordinated [9] supply chain channel: while the former assumes that either the manufacturer or the retailer can be socially concerned and finds that CSR reduces a firm's profit, the latter authors extend the analysis to the case where both firms are socially concerned and show that the retailer does not have any incentive to be socially concerned, because all the actions are neutralized by the manufacturer through the two-part tariff. Goering (2014) assumes that the manufacturer – which is strictly profit-seeking - will select a two-part contract,

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[9] In such a case, the double marginalization - early investigated by Spengler (1950) - is eliminated by construction through the assumption that the manufacturer absorbs the whole retailer's profit with an optimal two-part tariff.

consisting of a wholesale price for the goods and level of CSR (which its retailer has to include in its business activity) that maximizes its profits, showing that a CSR contract can be used in place of the two-part tariff scheme to coordinate optimally the marketing channel. Brand and Grothe (2015), unlike Goering (2012) and Brand and Grothe (2013), relax the assumption of perfect channel coordination and unlike Goering (2014), assume that both the manufacturer and the retailer maximize the socially responsible objectives. Those authors show that, when both firms simultaneously choose their level of social responsibility or the retailer first commits on the social responsibility, both firms do not have an incentive to deviate from pure profit maximization, while if the choice of the manufacturer on social concerns is prior to that of the retailer then, at the equilibrium, both firms endogenously decide to follow CSR rules, and are better off. Finally, following Wirl (2015)[10], a recent paper by Chen et al. (2016), still examining the influence of CSR strategy in vertically related markets, pays attention to the retailer's effort and different pricing rule under successive duopoly, assuming that downstream retailers do not directly concern over CSR, however they need to choose the optimal efforts to keep or even improve the sales quantity or quality of intermediate goods purchased from the upstream firms, while the upstream firms have CSR concerns, showing that such a concerns may reduce the total surplus of the four firms and the social welfare.

In particular, the latter Brand and Grothe (2015)'s result is important because it shows that, in a vertical industry, the owners of both firms may choose to be

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[10] Wirl (2015) investigates whether is more profitable a wholesale or a retail pricing arrangement, but without considering the implications of CSR.

socially responsible simply because their profits increase (that is, without owners' altruism or stakeholders' pressures). However, Brand and Grothe (2015), as all the above-mentioned received literature, assume constant returns to input (i.e. a one-to-one relationship between input and output). Given the interest of the Brand and Grothe (2015)'s results for the issue of the firms' motivation to engage in CSR as well as the specificity of its predictions (that is, CSR may emerge only if the manufacturer is Stackelberg-leader in the choice of the CSR levels and the weight given to the consumer surplus by the retailer is precisely one third and half of that given by the manufacturer), we question if the alteration of the assumption with regard to the technology in place in the supply chain may modify such results. Therefore, in our framework, the constant return to input assumption is relaxed and substituted by a decreasing return to input, while the rest of the Brand and Grothe's (2015) model is kept unaltered. In detail, we assume increasing marginal costs in line with the short-run context of any Cournot model: indeed, according to the first principles of economics, in the short-run some factors are fixed with remaining factors subject to diminishing returns, so that the short-run marginal cost is increasing in output. With regard to the labor costs, typical arguments for the existence of rising marginal costs are, for instance, the additional costs of overtime work and the higher cost of bringing into use older vintages of equipment to meet the additional demand.[11]

The main findings of the paper are as follows. First, in a vertical industry (with decreasing returns to input), both firms' owners may earn higher profits at the

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[11] Making use of U.S. manufacturing data for 1957-1983, Bils (1987) shows that a short-run increase in production- worker employment of 10 percent was associated with a marginal cost rise of about 2.4 percent, mostly due to overtime payments because employment is not perfectly flexible.

equilibrium adopting CSR behavios. Second, only the downstream firm finds optimal to be of CSR-type and strongly engaged towards the welfare of consumers, reversing the Brand and Grothe's (2015) result; nonetheless, the profit-seeking manufacturer firm's benefits from the consumers' friendly CSR of its retailer, leading to a Pareto-superior outcome.

In the next Section, we introduce the basic ingredients of the model with unions and the cooperative choice of CSR activities. Then, for comparative purposes, Section 3 presents the equilibrium outcomes of the model without CSR. Section 4 compares the outcomes of the models without and with firms endogenously socially concerned and derives the main results. The last Section sums up our findings, offering some policy and empirical insights.

2. The model

We develop a standard linear bilateral monopoly framework, where p is the market price for the final product and q is the final product's quantity. The manufacturer (M) sells its quantity m at the wholesale price c to the retailer (R) before the retailer sells the products to the consumer. We assume a decreasing returns to scale production function in the input:

$$q = \sqrt{m} \tag{1}$$

where m is the input retailer employs. We denote v the constant marginal cost of production in the manufacturer firm. In addition to the manufactured input cost, the retailer has to face a constant marginal (e.g. labour) cost, w.

Given the outlined assumptions, the monopolist manufacturer's profit function is:

$$\pi^M = (c-v)m = (c-v)q^2. \tag{2}$$

The monopolist retailer firm faces the following linear inverse demand function:

$$p = a - q. \tag{3}$$

The monopolist retailer's profit function is:

$$\pi^R = (p-w)q - cm = (a-q-w-cq)q. \tag{4}$$

In line with the recent established literature (e.g. Goering 2007, 2008, 2012; Lambertini and Tampieri, 2015, Brand and Grothe, 2015), the model considers that social concerns can be interpreted as taking care of the welfare of consumers (consumers' friendliness). Therefore, the characteristic of a CSR firm is to be responsive to the consumer surplus, which is, as known,

$$CS = \frac{q^2}{2}. \tag{5}$$

As a consequence, each "consumers' friendly" firm is supposed, in its objective, to maximize its profits plus a fraction of the consumer surplus, which represents the firm's "social concern" or care for consumers. Thus, the CSR-type firm's objective function can be translated into a parameterised combination of profits and consumer's surplus.

It follows that the objective function of the manufacturer firm (W^M) is

$$W^M = \pi^M + kCS = (c-v)q^2 + k\frac{q^2}{2}, \tag{6}$$

where $k \geq 0$ is the weight the manufacturer firm assigns to consumer surplus. On the other hand, the objective function of the retailer firm (W^R) is

$$W^R = \pi^R + rCS = (a-q-w-cq)q + r\frac{q^2}{2}, \tag{7}$$

where $r \geq 0$ is the weight the retailer firm assigns to consumer surplus.[12]
The game is structured as a three-stage game. At stage three, as usual, the retailer chooses output having a CSR objective. At stage two, the manufacturer fixes the input price. Then, at stage one, owners of manufacturer and retailer firms decide non-cooperatively the weight of consumer surplus for the objective function, maximizing their own profits, according to three different sequence of moves: i) M->R: the manufacturer chooses k prior to the choice of r by retailer; ii) M&R: the manufacturer and the retailer simultaneously choose k and r; iii) R->M: the retailer chooses r prior to the manufacturer's choice of k. As usual, the game is solved by backward induction. The sequence of moves for this game is illustrated in Figure 1.
At the third stage, the maximization of the retailer firm objective function in (7) leads to the following output function

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[12] It is easy to see that, for $k = r = 0$, each firm operates as a profit-maximizing firm while, for $k = r = 1$, the whole consumer surplus is considered in the firm's objective function.
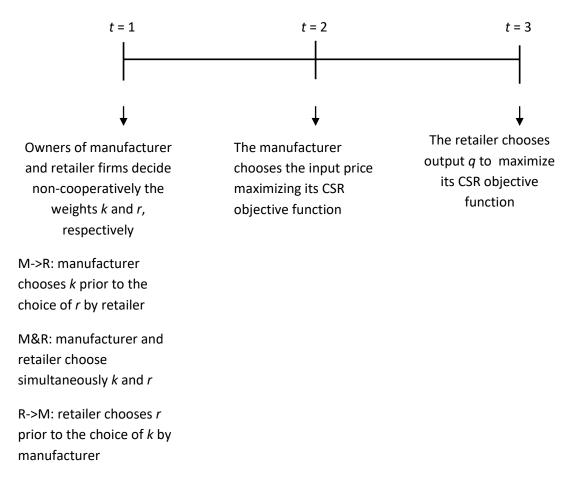
| | t = 1 | t = 2 | t = 3 |

Owners of manufacturer and retailer firms decide non-cooperatively the weights *k* and *r*, respectively

The manufacturer chooses the input price maximizing its CSR objective function

The retailer chooses output *q* to maximize its CSR objective function

M->R: manufacturer chooses *k* prior to the choice of *r* by retailer

M&R: manufacturer and retailer choose simultaneously *k* and *r*

R->M: retailer chooses *r* prior to the choice of *k* by manufacturer

Fig. 1. Sequence of moves

$$q(c,r) = \frac{a-w}{2(1+c)-r} \qquad (8)$$

At the second stage, after substitution of (8) in (6), the manufacturer maximizes its objective function (6) with respect to c, which straightforwardly leads to the input as a function of the CSR parameters:

$$c(k,r) = \frac{2(2v+1)-2k-r}{2}. \qquad (9)$$

Substituting (9) in (8), we obtain the final quantity as function of the CSR parameters:

$$q(k,r) = \frac{a-w}{2[2(1+v)-k-r]}. \tag{10}$$

Substituting backwards (9) and (10) we obtain both firms' profits as function of only CSR parameters:

$$\pi^M(k,r) = \frac{[2(1+v)-2k-r](a-w)^2}{8[2(1+v)-k-r]^2} \tag{11}$$

$$\pi^R(k,r) = \frac{[4(1+v)-2k-3r](a-w)^2}{8[2(1+v)-k-r]^2} \tag{12}$$

We now address the stage of the decision on the CSR parameters. Let us begin with the case M➔R. Under this sequence, the manufacturer decides whether and how introduce the CSR parameter prior to the corresponding retailer's decision. The solutions of this stage are given by the following Lemmas.

Lemma 1. The retailer sets a CSR parameter at the level *r=r°,* whose values depend on the future choice of the *k* level by manufacturer .

Proof: it is easy to see that

$$\left.\frac{\partial \pi^R}{\partial r}\right|_{M \to R} = \frac{[3r+k-2(1+v)](a-w)^2}{8[2(1+v)-k-r]^3} \underset{<}{\overset{>}{\gtrless}} 0 \Leftrightarrow r \underset{<}{\overset{<}{\lessgtr}} r° = \frac{2(1+v)-k}{3}.$$

Lemma 2. The manufacturer, taking into account the decision of the retailer on r=r°, chooses to remain a profit-seeking firm (i.e., k=0).

Proof: it is easy to see that

$$\left.\frac{\partial \pi^M}{\partial k}\right|_{M \to R} = \frac{[3(5k+2(1+v)](a-w)^2}{32[k-2(1+v)]^3} < 0, \quad \forall k \geq 0.$$

Under the sequence M&R, both firms' owners decide independently and simultaneously on their CSR parameters, leading to the following Lemmas.

Lemma 3. Only the retailer decides a positive engagement in CSR activities setting r=r*.

Proof: this straightforwardly derives by observing each derivative of profits with respect to the own CSR parameter:

$$\left.\frac{\partial \pi^M}{\partial k}\right|_{M\&R} = \frac{k(a-w)^2}{4\left[2(1+v)-k-r\right]^3} \leq 0, \quad \forall k \geq 0 \text{, and}$$

$$\left.\frac{\partial \pi^R}{\partial r}\right|_{M\&R} = \frac{\left[3r+k-2(1+v)\right](a-w)^2}{8\left[2(1+v)-k-r\right]^3} \overset{>}{\underset{<}{}} 0 \Leftrightarrow r \overset{<}{\underset{<}{}} r^\circ = \frac{2(1+v)-k}{3} \ .$$

Therefore, the retailer, given the manufacturer's choice of remaining profit-seeking (k=0), selects the optimal (profit-maximizing) CSR parameter at the level

$$r \overset{<}{\underset{<}{}} r^* = \frac{2(1+v)}{3} \ . \tag{13}$$

Remark: By inspection of (13), we observe that the retailer always chooses to take into account in its objective at least two-third of the consumer surplus; because this weight increases with the marginal cost of input production, it follows that, when the latter is sufficiently high, even a weight of the consumer surplus larger than the unity (and then, than own profits) may be optimal for the selfish retailer.

Finally, under the sequence R➔M, the retailer decides whether and how introduce the CSR parameter prior to the corresponding manufacturer's decision. Under this sequence, the following holds.

Lemma 4. The manufacturer does never engage in CSR activities.

Proof: it is easy to see that

$$\frac{\partial \pi^M}{\partial k}\bigg|_{R\to M} = \frac{k(a-w)^2}{4\big[2(1+v)-k-r\big]^3} \leq 0, \quad \forall k \geq 0.$$

Lemma 5. The retailer, embodying the decision of the manufacturer of not being of CSR-type (i.e., k=0), decides a positive engagement in CSR activities setting r=r*.

Proof: it is easy to see that

$$\frac{\partial \pi^R}{\partial r}\bigg|_{R\to M} = \frac{\big[3r-2(1+v)\big](a-w)^2}{8\big[2(1+v)-k-r\big]^3} \overset{>}{\underset{<}{=}} 0 \Leftrightarrow r \overset{<}{\underset{<}{=}} r*.$$

From Lemma 1-5, the following Corollary holds.

Corollary 1. Regardless of the timing of moves as regards the choice of the CSR parameter, the retailer always chooses the some level of CSR, while the manufacturer always choses to remain profit-seeking.

Corollary 1 clearly shows the changes with respect to Brand and Grothe's (2015) results: CSR is adopted only by one firm for whatever timing of moves,

while in Brand and Grothe (2015) is adopted by both firms but only if the timing of moves is M➔R.

Substituting the retailer's CSR parameter positive value *r** in (9), and taking into account for the choice of being only profit-seeking by the manufacturer, that is *k=0*, we obtain the equilibrium wholesale price $c*$:

$$c* = \frac{2+5v}{3} \tag{14}$$

Substitution of *r*, k=0*, and the equilibrium wholesale price $c*$ into the expressions (10), (11) and (12) yields the equilibrium quantity, each firm's profits and total channel profits (Π):

$$q* = \frac{3(a-w)}{8(1+v)} \tag{15}$$

$$\pi^M* = \frac{3(a-w)^2}{32(1+v)} \tag{16}$$

$$\pi^R* = \frac{9(a-w)^2}{64(1+v)} \tag{17}$$

$$\Pi* = \frac{15(a-w)^2}{64(1+v)} \tag{18}$$

Moreover, it is also straightforward to provide the expressions for the consumer surplus and total welfare:

$$CS* = \frac{9(a-w)^2}{128(1+v)^2} \tag{19}$$

$$SW* = \frac{3(10v+13)(a-w)^2}{128(1+v)^2} \tag{20}$$

To compare the classical bilateral monopoly in which both firms are purely profit-maximizing and a bilateral monopoly in which a socially concerned retailer endogenously emerges (while the manufacturer remains profit-maximizing), we report the equilibrium outcomes of the former case[13]:

$$c = 1 + 2v \tag{21}$$

$$q = \frac{(a-w)}{4(1+v)} \tag{22}$$

$$\pi^M = \frac{(a-w)^2}{16(1+v)} \tag{23}$$

$$\pi^R = \frac{(a-w)^2}{8(1+v)} \tag{24}$$

$$\Pi = \frac{3(a-w)^2}{16(1+v)} \tag{25}$$

$$CS = \frac{(a-w)^2}{32(1+v)^2} \tag{26}$$

$$SW = \frac{(6v+7)(a-w)^2}{32(1+v)^2} \tag{27}$$

Lemma 6. The manufacturer always charges a lower input price when the retailer is social concerned.

Proof: by simple comparison of (14) and (21).

The choice of the manufacturer of not being engaged in CSR activities is intuitive. Given the decreasing returns technology, every additional unit of output produced is increasingly costly. Therefore, the manufacturer has not

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[13] Those outcomes are straightforwardly obtained considering that, if both firms are purely profit-maximizing, then *k=r=0* in Eqs. (9)-(12).

any incentive in further expanding production taking into account the consumers' welfare into its objective. On the other hand, the retailer strategically adopts CSR behaviors to obtain a lower input price from the manufacturer (see also eq. (9)). The selection of a positive level of "consumers' friendly" CSR activities leads to an output expansion which has several effects both on the revenues and costs side of the retailer. In fact, on the one hand, an increase in output has a positive effect on revenues; however, it decreases the price for final consumers, with a negative impact on revenues. On the other hand, more products for the final consumers directly increase the retailer's total cost; however, the strategic choice of engaging in CSR reduces the manufacturer's wholesale price of the intermediate input (which has the highest incidence on the retailer's total costs). As a consequence, for the retailer the combined effect of the output expansion and the input price reduction overweighs the effect of the output price reduction, and for the manufacturer the output expansion effect overweighs the price reduction effect, leading to the following results.

Result 1. When the endogenous choice whether to be of CSR-type is allowed in the supply chain, the emergence of downstream firms' concern over CSR realizes an enhancement of profits of each firm, industry profit, consumer surplus and social welfare as a whole.

Proof: by simple comparison of Eqs. (16- 20) and (23-27).

Corollary 2. *i)* Although the downstream firm's CSR concern brings upon a profits increase in both firms, the profits' enhancement of the CSR retailer firm is twice than that of the profit-seeking manufacturer firm; *ii)* while in the

19

standard profit-seeking context the manufacturer's profits are twice those of the retailer, under the retailer's endogenous choice of CSR the profitability ranking is exactly reversed.

Therefore, we note that, in a vertical industry with a convex technology, the choice of being CSR-engaged results in a device in the hand of the retailer to redistribute profits inside the channel with respect to the supplier, however not at the expenses of the latter, which also benefits from the retailer's social responsibility, as does the total value of the channel as well as the welfare of consumers and society.

Corollary 3. The downstream firm's social responsibility not only brings upon a higher profit for its owners but also leads to a Pareto-superior outcome.

6. Conclusions

This paper investigates a standard bilateral monopoly in which a manufacturer sells an intermediate product to the retailer, which in turn offers the final product to end-consumers, allowing for an endogenous strategic choice of the level of care about the consumer surplus (consumers' friendly CSR) by the firms' owners, assuming decreasing return to the input provided by the manufacturer to the retailer. In other words, we revisit the results of Brand and Grothe (2015) who assume a linear bilateral monopoly, and we reveal different findings which can be resumed as follows: 1) the achievement of a higher profit for owners of all firms at the equilibrium, as the motivation behind the presence of social concerns in the firms' behaviors, is also extended to a vertical industry with decreasing returns to input; 2) it is optimal for the

downstream firm - but not for the upstream firm - to be of CSR-type and strongly engaged towards the welfare of consumers (even being sensitive to it more than to own profits), and this holds for whatever timing of moves with respect to the choice of CSR, reversing the Brand and Grothe's (2015) finding; 3) not only the retailer's profits but also the profit-seeking manufacturer firm's profits benefit from the consumers' friendly CSR activities of its retailer and thus this situation constitutes a Pareto-superior outcome; 4) this result may explain real world cases in which in a supply chain only the retailer is engaged in CSR activities; 5) this offers a policy warning about whether either retailers or manufacturers should be more stimulated for engaging in CSR, depending on the prevailing technology (i.e. returns to scale) in the industry; 6) since we have shown that the choice of being CSR-engaged becomes a device in the hand of the retailer to redistribute profits inside the marketing channel then, in a vertical industry with a convex technology, the empirical implication is that it should more often detected a presence of CSR in the downstream rather than in the upstream firm as well as a higher profitability of the retailer than that of the manufacturer when the former engages in CSR activities; 7) the purely selfish owners' behavior of the downstream component of a bilateral monopoly leads to the achievement of a Pareto-improvement. This is another novel example showing the reconciliation between the achievement of social objectives and the sole firm's behaviour admitted by the traditional approach of economics – according to the Friedman (1970)'s opinion - that is, the maximization of profits to the shareholders. In conclusion, our paper sheds new light on whether and how firms in a marketing channel may endogenously choose to be socially concerned under a realistic technology.

As future research agenda, those findings call for an extra robustness check under different model specifications, relaxing the assumptions of this paper.

First, it would be interesting to introduce network externalities to verify the survival of the current results. Moreover, other hypotheses such as the presence of managerial delegation and endogenous costs (such as the presence of unionised labor) within the marketing channel, either only in the upstream/downstream company or in all the channel, are extremely intriguing to be studied.

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