Corporate social responsibility in a unionised duopoly*

Responsabilidad social empresarial en un duopolio sindicalizado

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Abstract

It is commonly believed that the choice of adopting Corporate Social Responsibility (CSR) behaviours is beyond the scope of profit enhancement. In a unionised oligopoly with centralised wage setting and decreasing returns to scale technology, the present paper shows that the owners' choice of the CSR engagement level is dictated by the firms' purely selfish profit-seeking objective. In fact, profits under CSR are higher than under the standard profit-maximising rule. Moreover, the union, consumers and the social welfare on the whole with CSR are higher than without CSR: the firms' owners social concern leads to a Pareto-superior outcome.

Key words: *Cournot Duopoly, labour union, corporate social responsibility.*

JEL Classification: *J51, L13, M14.*

Resumen

Suele considerarse que la adopción de conductas asociadas a la responsabilidad social empresarial está más allá de la maximización de beneficios. Este trabajo muestra que en el contexto de un oligopolio sindicalizado con decisiones centralizadas de fijación de salarios y retornos decrecientes, la elección del

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nivel de adopción de responsabilidad social empresarial se rige por el motivo de maximización de utilidades. De hecho, los beneficios de la empresa y el bienestar social, de los consumidores y trabajadores son mayores, conduciendo a un resultado Pareto superior.

Palabras clave: *Duopolio a la Cournot, sindicatos, responsabilidad social empresarial.*

Clasificación JEL: *J51, L13, M14.*

1. Introduction

In recent decades, a broadly observed stylised fact is the growing worldwide adoption of Corporate Social Responsibility (CSR). In fact, according to KPMG, to embrace CSR activities has become a dominant global business practice: while in 2002 only 23 percent of the top 100 companies surveyed in 45 countries have reported the realisation of CSR activities, those figures increased to 73 percent in 2015. Moreover, as regards the 250 Global Fortune Index companies, the world's 250 largest companies, the figures passed from 45 percent to 92 percent (KPMG 2005, 2015).

Moreover, a growing literature in industrial organisation (IO) has recently recognised the crucial role played by unions in oligopolies (see, for example, Dowrick 1989, 1990; Horn and Wolinsky, 1988; Correa-López and Naylor, 2004). Given that several large companies involved in CSR activities operate in oligopoly industries whose labour market is unionised, it is timely, and rather natural, to study which are the interconnections between CSR and unionisation, and the impact of the union wage-setting for companies and their profitability, and the overall welfare[1].

Though the correlation between CSR performance and profitability performance has been analysed in several empirical works, the results have usually been mixed or contradictory (even within a given analysis). Therefore, a general clear-cut consensus does not exist. In fact, the scholars' majority has found either only a negative (see, inter alias, Bromiley and Marcus, 1989; Davidson *et al.* 1987; Davidson and Worrel, 1988) or an unsatisfying relationship (e.g. Aupperle *et al.*, 1985; Ingram and Frazier, 1983); on the other hand, an increasing number of contributions has shown a positive correlation between the social

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1 For example, according to the Reputation Institute (2015), in the automotive sector, two German carmakers, BMW and Daimler, whose labour force is notably unionized, rank among the top 10 companies with the best CSR reputation (1st and 3rd place, respectively). Also some full time workers in Microsoft, another company worldwide known for its CSR activities (Reputation Institute, 2015), have recently created a union, the Temporary Workers of America (BloombergBusinessweek, 2015).

responsibility and financial performance of corporations (e.g. Griffin and Mahon, 1997; Roman *et al.*, 1999; Waddock and Graves, 1997).

As known, the theme of the CSR has been approached from different point of views[2]. If we want to focus on the approach of economics, then the traditional view may be represented by Milton Friedman's (1970) statement that ''the only one responsibility of business towards society is the maximisation of profits to the shareholders within the legal framework and the ethical custom of the country''.

Although there is not a consensus about what should exactly denote the term "corporate social responsibility", two different points of views define it as either a certain voluntarily social activity (i.e. not forced by law) firms undertake (without inquiring neither the reason why this choice occurs nor the purely economic effects it induces) or an explicitly profit-sacrificing social activity (that is, it is exactly the damage caused to the profits that defines it as true corporate social responsibility)[3]. It seems rather surprising that the main interpretations of the widespread presence of CSR in the field of economics, take for granted that such a presence either is not explained and it does not matter to explain it or is neatly profits-damaging and it does matter that it is exactly it for being truly CSR. The reason why selfish firms' owners should voluntarily make actions either without knowing their economic effects (i.e. the first point of view) or to sacrifice profits (the second point of view) is rather unclear and, in the light of microeconomics, the choice of being of CSR-type is rather puzzling[4].

As a matter of fact, the puzzle appears unresolvable in the realm of the orthodox economic theory, unless either resorting to the idea that the firm is

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2 According to a well-known classification the most relevant CSR theories and related approaches are focused on one of the following aspects of social reality: economics, politics, social integration and ethics (Garriga and Melé, 2004).

3 These different definitions and their implications are clearly illustrated in the words of Doni and Ricchiuti (2013, 382): "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)".

4 Needless to say, the choice of undertaking CSR activities is clearly explained by the augmented profits when there is a demand for CSR-type goods by, broadly speaking, "green" consumers, in that such consumers have a higher willingness to pay for "CSR" products. A branch of the literature analyses this "demand-side" induced profitable CSR behaviour: for instance, Manasakis *et al.* (2014) study the incentives of firms' owners to commit voluntarily to CSR activities in oligopoly, by hiring an 'individually' socially responsible manager and delegating to him the CSR effort and market decisions which represents a commitment device for the firm's owners and credibly signals to consumers that the firm will undertake CSR activities.

an institution owned by the shareholders but managed also by other subjects with other interests different from the remuneration of the owners (i.e. the stakeholders) or admitting that, if the firm is managed by the owners (or by managers hired and instructed by them), they behave in an irrational way. The IO literature dealing with the issue of the CSR has studied the effects of some CSR behaviours, departing from the standard profit-maximisation rule, taking them as exogenously given. In particular, some authors assume that firms take consumer-friendly actions by maximising not only profits, but also, partially, the consumer surplus (e.g. Goering, 2007, 2008, 2012; Brand and Grothe, 2013, Kopel and Brand, 2013, Fanti and Buccella, 2017a). An example of this consumer-friendly approach to CSR is the following. In 2012, the pharmaceutical multinational GlaxoSmithKline adopted an "hybrid" approach in merging their profit-making and CSR activities to expand drug access in African markets leading rivals such as Sanofi and Roche, in some cases, to imitate this business model (Reuters, 2012).

On the other hand, some authors assume the firms take environment-friendly actions, for instance by over-complying the existing environmental regulation (i.e. Rodriguez-Ibeas, 2007; Garcia-Gallego and Georgantzis, 2009; Doni and Ricchiuti, 2013). Finally, other authors assume that the firms undertake both consumer-friendly and environment-friendly activities, as Lambertini and Tampieri (2015), who assume that the firm takes into account its profits, but also internalises its own share of pollution and is sensitive to consumer surplus. The findings of these articles have been various and interesting, revealing that the presence of CSR in its various forms is responsible of novel effects on the market variables and welfare, but always considering as exogenously given the level of the consumer-friendly and environment-friendly activities, thus providing no response on the motives of such activities. Some recent articles give a partial response: in a strategic context such as the oligopolistic competition, a firm's owner may find profitable to commit to CSR activities (Kopel and Brand, 2012; Brand and Grothe, 2015; Fanti and Buccella 2017a; Planer-Friedrich and Sahm, 2018).

Therefore, so far, to explain the presence of those activities, such a literature has highlighted a firm's possible unilateral use of CSR as a strategic device for gaining market shares against the rivals. However, it is easy to show that the firms' use of CSR at equilibrium is profit-damaging because, intuitively, it leads to an excessive output[5]. Therefore, once again, not to maximise profits, although potentially profitable for a single firm's owner, leads ultimately to a reduction of the profits of all firms, confirming the claim of Friedman that social concerns by firms are damaging for the interests of the owners. However, we argue that,

[5] A partial exception may be considered the result of Brand and Grothe (2015), whose analysis, although regarding a bilateral monopoly rather than an oligopoly, shows that when both firms choose their level of social responsibility simultaneously, both firms do not have an incentive to deviate from pure profit maximisation, but if the manufacturer commits itself on social concern before the retailer does, then both firms are better off.

in owner-managed firms, strict economic mechanisms exist that bring back the appearance of CSR behaviours to the field of the sound first principles of economics: firms choose to be of CSR-type because at the market equilibrium the profit - and thus the welfare of their owners - is enhanced.

Our main purpose in this paper is to analyse, in an oligopoly context, how the presence of unionised labour interacts with the role played by the CSR behaviour. Notwithstanding the significance of the subject, the literature on the link between labour unions and CSR is scanty. However, the extant empirical evidence reveals that unionisation has a relevant impact of on CSR activities. The study of Campbell (2007) seems to suggest that companies are more inclined towards socially responsible activities when they participate in institutional dialogues with labour unions, employees, local communities, investors and other groups of stakeholders. Matten and Moon (2008) report that labour unions give a contribution to 'implicit' CSR activities functionally equivalent to voluntary, 'explicit' ones. Dawkins (2016) shows that social responsibility of labour unions can increase their cohesion and inform their strategies. In an empirical study on unions and CSR, Kinderman and Lutter (2018) analyse the expansion of CSR activities in OECD countries. Those authors find that labour unions have a positive impact on CSR activities, and that in some cases unions and companies welcome CSR. On the other hand, the centralization of wage negotiations tends to reduces the level of CSR in a country. Chun and Shin (2018) study the effects of labour union influence on the CSR activities of Korean firms. Their empirical findings report that the presence of labour unions and the unionisation ratio are negatively related to companies' CSR activities. This negative relation is more evident for non-owner manager firms, suggesting unions and non-owner managers may possibly cooperate to decrease firms' CSR activity: lower CSR expenditure creates a favourable wage negotiation process that encourages 1) the rent seeking behaviour of the labour unions; and 2) agreements between non-owner managers and unions in terms of business performance during their tenure.

The present work aims to address the following research questions: If owners simultaneously and non-cooperatively choose to undertake some CSR activities, at equilibrium does a profit-maximising level of CSR activities exist? Are profits enhanced instead of damaged by such a non-profit seeking behaviour? Is the union favourable or adverse to such CSR activities? Can the firms' CSR behaviour lead to a Pareto-improvement?

The main results of our paper are as follows. Comparing the results of the exogenously given industry structures, the one in which consumer-friendly CSR behaviours are adopted with those of the standard unionised model with only profit-seeking firms, we prove that not only to adopt CSR activities may be advantageous for an owner's firm when the other firm does not CSR, as Kopel and Brand (2012) shows, but also that at the equilibrium all the owners' profits benefit from such social concerns. This is due to the wage-dampening effect of the CSR, to the extent that such a costs reduction overcompensates the excessive production (from the point of view of the profit-maximisation) caused by the social interests. Moreover, the lower wage is accompanied with a larger employment, and the net result is that also the workers' welfare beneficiates from the firms' social concerns. Furthermore, as expected, also the welfare of consumers increases and, thus, in the overall, the social welfare. Noteworthy, the selfish interest of owners is the responsible not only for the CSR activities, but also brings up to a Pareto superior outcome: all the single agents –owners, workers and consumers– as well as the society are beneficiated. Thus, to the best of our knowledge, the present paper is the first work that studies the endogenous choice of the level of the CSR[6] in a model with endogenous production costs and (central) unionisation.

The remainder of the article is as follows. In Section 2, we introduce the basic model with unions and endogenous choice of CSR. In Section 3 we present, for comparison purposes, the equilibrium outcomes of the model without CSR. Section 4 extends the analysis, comparing the outcomes of the models without and with firms endogenously socially concerned. The last Section summarises our findings.

2. The model

We assume that firms produce a homogeneous good. As usual, the standard linear inverse market demand is the following

$$p = a - q_i - q_j \tag{1}$$

where p denotes price, q_i and q_j are the firms' output levels for $i,j = 1,2$ and $i \neq j$. We assume the following production function –identical for both firms– with decreasing (marginal) returns to labour:

$$q_i = A\sqrt{L_i} \tag{2}$$

where L_i represents the labour force employed by firm i and A represents an index of the labour productivity, which is fixed, without loss of generality, to one. The wage per unit of labour for the i-th firm is w_i. Therefore, the firm i's cost function is quadratic and described by[7]:

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6 Note that we make endogenous the choice of "how much to do" for exogenously given CSR firms, but not "whether to do" CSR activities. The addition of a further stage in which firms endogenously decide whether to engage in CSR activities is beyond the scope of the present work, and it is left for future research.

7 The assumption of a convex (quadratic) cost function in the IO literature is very frequent (e.g. De Fraja, 1993; Heywood and McGinty, 2007; Fanti and Meccheri, 2011; Fanti and Buccella, 2017b). In this framework, in the case of constant returns to scale (i.e. linear costs), the interdependence between the choice of CSR and the choice of wages would have

(3) $$C_i(q_i) = w_i L_i = w_i q_i^2$$

Thus, the firm *i*'s profits, π_i, are as follows:

(4) $$\pi_i = (a - q_i - q_j)q_i - w_i\, q_i^{\,2},\; i, j = 1,2,\; i \neq j$$

We assume that the wage per unit of labour is unilaterally chosen by a centralised monopoly union (a special case of the right-to-manage model where unions have all the bargaining power) which fixes a uniform wage for the whole industry (i.e. $w_i = w_j = w$)[8]. As usual in the literature on trade union economics, the union's utility function, which is a precise specification of a more general Stone-Geary utility function (e.g., Pencavel, 1984, 1985; Dowrick and Spencer, 1994), is given by:

(5) $$V = (w - w^\circ)(L_i + L_j) = (w - w^\circ)(q_i^{\,2} + q_j^2)$$

where w is the wage level the union chooses, w° is the reservation wage or, alternatively, the competitive wage, that is, the wage that workers could earn in the competitive sector of the economy, and $L_i + L_j$ is total employment in the industry. The expression in (5) reveals that the union, when fixes the wage, is equally concerned about wages and jobs. Note that this functional form encompasses both the case of a total wage bill maximising union (with $w^\circ = 0$) and that in which the union is rent-maximising (when $w^\circ > 0$). From now on, we set, for simplicity, $w^\circ = 0$[9].

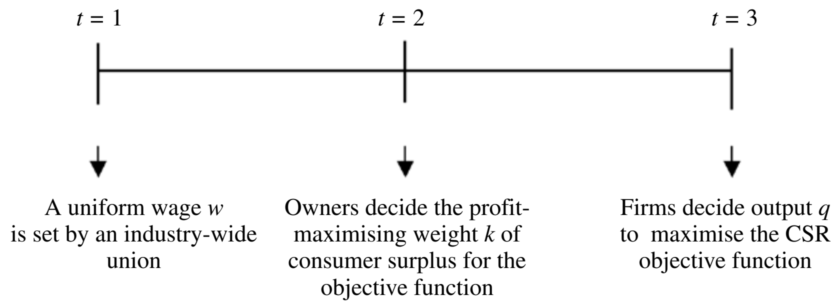
Following the recent established literature (only to mention a few, Goering 2007, 2008; Lambertini and Tampieri, 2015), we consider in our model that all the social concerns can be interpreted as part of consumer surplus; thus, the feature of a CSR firm is to be sensitive to it. In other words, we consider the case of "consumer's friendly" CSR. Therefore, we suppose that each firm, in its objective, wishes to maximize profits plus a fraction of the market consumer surplus k_i, the firm's "social concern" or care for consumer outcomes in the

been lost and, since the focus of this paper is mainly on the effects of such an interaction, then we have assumed decreasing returns to scale (i.e. quadratic costs).

8 To make the model more tractable "the combination of linear Cournot oligopoly and monopoly unions is commonplace in the literature on unionised international oligopoly. […]. We use this model as a simple representation of a situation where wage bargaining is inefficient because workers have a larger degree of control over wage setting than over how employment is determined." (Lommerud *et al.*, 2006, 6).

9 It is worth to note that in this case the union maximisation problem is equivalent to the issue faced by a profit maximising upstream monopoly that is allowed to set the price of a common input it supplies to downstream firms. In other words, all the results of this paper will hold true also in the case of a vertical industry with a common monopoly manufacturer.

FIGURE 1
SEQUENCE OF MOVES



market[10]. Therefore, the objective function of the firm following CSR rules can be specified as a simple parameterised combination of profits and consumer surplus. Consumer surplus, as known, is given by

$$CS = \frac{(q_i^2 + q_j^2 + 2q_i q_j)}{2}. \tag{6}$$

Thus, the CSR objective function (W_i) of each firm is

$$W_i = \pi_i + k_i CS = (a - q_i - q_j)q_i - wq_i^2 + k_i \frac{(q_i^2 + q_j^2 + 2q_i q_j)}{2} \tag{7}$$

where $k_i \in (0,1]$ denotes the fraction (percentage) that a CSR firm assigns to market consumer surplus. This specification allows for a flexible combination of profits and consumer surplus for the CSR firms[11].

In equilibrium, the overall welfare is given by

10 If we believe that such a care is not due to the profit-maximising choice of owners, but to the stakeholders participation in governance (as, for instance, argued by the "stakeholder theory" of firm, e.g., Freeman, 1984), then we might argue that such a participation applies mainly (or exclusively) on market decisions. It seems possible that while stakeholders influences the firm's objective when competing on the product market, private owners make the company's strategic choices (as suggested by the results of the empirical study of Spitzeck and Hansen, 2010).

11 Anecdotal evidence seems to confirm that, in real world, a firm following CSR rules would barely consider the entirety (or even more than it) of the consumer's welfare in its objective. However, "[…] it seems natural to represent the standard social concerns considered by CSR firms, such as monitoring the quality of services, the transparency on the economic performance and the interaction with other stakeholders[..]" (Lambertini and Tampieri, 2015). Notice that a CSR firm regards the overall consumer surplus: in fact, CSR statutes commonly contemplate the interaction with and the development of local communities, whose members not necessarily buy products from the CSR firms.

(8) $$SW = CS + 2\pi + V.$$

We now consider a three-stage game in which, at the first stage, workers' wages are fixed by an industry-wide union; then, at the second stage, owners decide the weight k_i of consumer surplus to consider in the objective function through the maximisation of the own profits with respect to such a weight; finally, at the third stage, firms take the output decisions having a CSR objective. The specific sequence of moves for this game is reported in Figure 1[12]. As usual, the game is solved by backward induction.

At the third stage, maximisation of the firms' objective functions (7) by the i-th firm leads to the following reaction functions[13]

(9) $$q_i(q_j, w, k_i) = \frac{a - q_j(1-k_i)}{2(1+w) - k_i}.$$

Solving the system given by (9) and its counterpart for j, the firms' output as function of the CSR level (and wages) are

(10) $$q_i(k_j, k_i, w) = \frac{a(1+2w+k_i-k_j)}{2(1+2w)(3+2w-k_j-k_i)}.$$

At the second stage, the optimal value of the parameter k_i is obtained maximising eq. (4), i.e. selecting that value of k_i such that the gain of being social responsible rather than following standard pure profit maximisation is maximal for the owner's firm. Substitution of the quantities (10) into the profit functions (4) and subsequent maximisation w.r.t. k_i yields the CSR level reaction functions

12 The rationale for the choice of this timing is as follows. In general, the economic literature has adopted a sequence of moves in which the choice of engaging in CSR occurs at the first stage because those activities are mainly considered as a long-term decision, playing a pivotal role as a core business activity (Brand and Grothe, 2015; Fanti and Buccella 2017a; Fanti and Buccella, 2019; Planer-Friedrich and Sahm, 2019). However, even if at first glance the decision of undertaking CSR activities can be assumed as a long-term decision, we note that, on the one hand, industry-wide centralised wage contracts have a three-years duration in several industrial sectors (therefore, a mid-term term) (see e.g. OECD, 2017), and on the other hand, the companies' choice of the "level" of CSR may change every year, as observed comparing the different yearly reports issued by the companies engaged in CSR activities, also because companies can have short-term CSR objectives (Weber, 2008). As a consequence, the selected timing, in which the union plays a role of leadership by moving first, can be considered sufficiently realistic.

13 Further analytical inspection reveals that the second order condition is satisfied: in fact, given that $k_i \in (0,1]$, then $\frac{\partial^2 W_i}{\partial q_i^2} = -2(1+w) + k_i < 0$.

(11) $$k_i(k_j,w)=\frac{1+2w+k_j^2-(1+2w)k_j}{8w^2+12w+3-k_j(1+4w)}\quad i=1,2,\ i\neq j.$$

It is easy to see that the CSR parameters are strategic substitutes (i.e. $\frac{\partial k_i}{\partial k_j}<0$, for any wage level). Moreover, their dependence on wages may seem at first sight ambiguous, because the direct effect is negative but the indirect strategic effect is positive: $\frac{dk_i}{dw}=\overset{(-)}{\frac{\partial k_i}{\partial w}}+\overbrace{\overset{(-)}{\frac{\partial k_i}{\partial k_j}}\overset{(-)}{\frac{\partial k_j}{\partial w}}}^{(+)}$.

Solving the system of (11) and its counterpart for j, the unique relevant solution[14] leading to the equilibrium level of CSR is

(12) $$k_i=k_j=\frac{4w+5-H}{4},\ \text{where } H=\sqrt{16w^2+40w+17}.$$

Therefore, from (12) it is easy to ascertain that $\frac{dk_i}{dw}<0$, despite the ambiguity above mentioned: the optimal level of CSR for owners is always reduced by the wage level.

Moreover, we may re-write the output equation emerged as the equilibrium of the third stage (eq. 10) taking into account the above sub-game equilibrium of the CSR parameter (eq. 12) expressed in the generic form $k(w)$, that is, $q^{CSR}=\frac{a}{3+2w-2k(w)}$, and then the following Lemma holds.

Lemma 1. The level of production is augmented by the equilibrium level of CSR, as shown by the inspection of the expression above for q^{CSR}.

Substituting back (12) into (10) yield the quantities

(13) $$q_i(w)=\frac{2a}{H+1}.$$

At the first stage, after substitution of (13) in (5), union maximises (5) with respect to w, which leads to the following first-order condition and then the equilibrium wage level:

(14) $$\frac{\partial V}{\partial w}=0\Leftrightarrow\left[H(1+H)-8w(4w+5)\right]=0\Leftarrow w^*=1.294.$$

14 Other three solutions are discarded because picking up a minimum or outside of the positive unitary interval $k_i\in(0,1]$.

Substituting backwards (14), we obtain the equilibrium outcomes of all the variables of the model:

$$k^* = 0.1;\ q^* = 0.1856a;\ \pi^* = 0.072213a^2; \quad (15)$$
$$V^* = 0.08916a^2;\ CS^* = 0.0689a^2;\ SW^* = 0.3023a^2$$

Result 1. A positive profit-maximising level of CSR does exist: owner's firms benefits if, unilaterally, she takes into account –when deciding the market competition strategies– the consumer surplus, and in equilibrium both owners will choose to be careful of a measure of about ten per cent of the consumer surplus.

This means that the value of the CSR in an oligopolistic context is able to make the choice to be CSR a resultant of the purely selfish profit-seeking behaviour of owners' firms.

However, the effect of the firms' introduction of CSR behaviours on the welfare of all the agents –owners' firms, workers and consumers– as well as on the social welfare as a whole has to be investigated. To do this, we have to consider preliminarily the equilibrium outcomes in the case of the absence of CSR behaviours; this will be made in the next section.

3. The benchmark case without CSR

For the following comparisons and discussion, it is useful to derive, in our unionised duopoly, the equilibrium outcomes for profit-maximising firms, that is, when firms do not make CSR activities.

To derive equilibrium results for this two-stage game, where in the first stage the industry-wide union fixes the wages, while in the second stage, the output is chosen to maximise profits, we consider that firm i maximises (4) with respect to q_i, taking q_j and w as given. This leads to the following reaction function in the output space:

$$q_i(q_j, w) = \frac{a - q_j}{2(1+w)}. \quad (16)$$

From (16) and its counterpart for firm j we can obtain firm i's output for given w as:

$$q_i(w) = \frac{a}{2w+3}. \quad (17)$$

By substituting (17) in (5) and maximising with respect to w, we get the following equilibrium value for the wage, where the upper script PP refers to the "pure profits" (or no-CSR) case:

(18) $$w^{PP*} = \frac{3}{2}.$$

By substituting (18) in (17) and (3), we also get the following results for equilibrium output and profits, respectively:

(19) $$q^{PP*} = 0.1667a; \pi^{PP*} = 0.06944a^2.$$

Finally, taking (19) into account, the following results define welfare outcomes for this case:

(20) $$V^{PP*} = 0.08333a^2; CS^{PP*} = 0.05555a^2; SW^{PP*} = 0.27777a^2.$$

4. The comparison between the CSR and the profit-seeking behaviours

In this section, let us discuss the effects of the CSR behaviours with regard to the welfare of the single agents of this model and on the social welfare as a whole. To do this, we compare the equilibrium outcomes between the cases of CSR and profit-seeking behaviours.

Lemma 2. The quantity produced under CSR behaviours is, as expected, larger than that produced under profit-seeking behaviours. Proof: $q^* > q^{PP*}$.

Lemma 3. The wage under the endogenous choice of the CSR parameter is lower than in the absence of CSR behaviours. Proof: $w^* < w^{PP*}$.

The reason why the presence of CSR acts as a brake to the union's wage claims is the following. Preliminarily, we observe that, from Lemma 1, the union may decide over its optimal wage, starting from a higher level of employment under CSR. At first sight, this employment situation could seem favourable for a higher wage claim by the union. However, we may show that the relationship between the CSR level chosen by owners and the wage (derived from eq. (12)) causes the production with CSR to become more negatively sensitive to wage increases, because the employment increases with the CSR activities, but any increase of wages pushes owners to reduce the CSR activities and thus the standard negative effect of wages on employment is magnified in the context of endogenous CSR by the social concern's choice of owners.

Lemma 4. Wage increases negatively affect employment more for CSR-type firms than for profit-seeking firms. Proof: $\left|\frac{\partial L^*}{\partial w}\right| = \left|\frac{\partial q^{*2}}{\partial w}\right| > \left|\frac{\partial L^{PP*}}{\partial w}\right| = \left|\frac{\partial q^{PP*2}}{\partial w}\right|$.

This may be intuitively explained as well as analytically proved by observing that: 1) at the beginning of the third stage of the game in the model with CSR, the union decides the wage level anticipating the equilibrium employment, given by $\left(q^{CSR}\right)^2=\left[\frac{a}{3+2w-2k(w)}\right]^2$ (see Lemma 1 in section 2); as a consequence, the effect of the wage on the employment can be expressed by $\frac{d\left(q^{CSR}\right)^2}{dw}=\overset{(-)}{\frac{\partial\left(q^{CSR}\right)^2}{\partial w}}+\overbrace{\overset{(+)}{\frac{\partial\left(q^{CSR}\right)^2}{\partial w}}\overset{(-)}{\frac{\partial k}{\partial w}}}^{(+)}<0$; 2) the relationship between employment and wage in the benchmark model (without CSR) is shown by $\frac{d\left(q^{PP}\right)^2}{dw}=\overset{(-)}{\frac{\partial\left(q^{PP}\right)^2}{\partial w}}=-\frac{4a^2}{(2w+3)^3}$; 3) since $\overset{(-)}{\frac{\partial\left(q^{CSR}\right)^2}{\partial w}}=-\frac{4a^2}{(2w+3-k(w))^3}$, then $\left|\frac{\partial\left(q^{CSR}\right)^2}{\partial w}\right|>\left|\frac{d\left(q^{PP}\right)^2}{dw}\right|$ and hence it follows that, a fortiori, $\left|\frac{\partial L^*}{\partial w}\right|>\left|\frac{\partial L^{PP*}}{\partial w}\right|$.

In other words the union knows that under CSR the causal relationship "the higher wage the lower employment" will be more exacerbated, relatively to the case of absence of CSR behaviours by firms. As a consequence, the union fixes a lower wage under CSR-type firms than under profit-seeking firms.

Therefore, by observing from the above Lemmas 2 and 3 that wages and employment under CSR are relatively lower and higher, respectively, it is natural to investigate whether the union's utility under CSR relatively increases. In other words, should the union encourage the social concerns of the firms?

Result 2. The presence of CSR always beneficiates the union. Proof: $V^*>V^{PP*}$.

In fact, the increase of the employment –due to the firms' social interest for the welfare of consumers– more than counterbalances the wage reduction, so that the union's utility is higher when firms are of CSR-type.

We now address the crucial question: has the endogenous choice of a positive level of CSR activities produced a sacrifice or an enhancement of the firms' profitability?

Result 3. If the firms' owners have positive social concerns, then both owners are better off. Proof: $\pi^*>\pi^{PP*}$.

The rationale for this result is as follows. The firms' adoption of CSR behaviours has a dampening effect on the union's wage claim. This wage-dampening effect reduces the firms' costs of production to such an extent that more than offset the output expansion effect (from the viewpoint of profit-maximisation) caused by the "consumer's friendly" social interests. Since we know from Lemma 2 that quantities are higher under CSR, and from Results 2 and 3 profits and unions' utility are larger under CSR, the following results directly holds.

Result 4. Consumers are welfare-enhanced under CSR and, in the overall, social welfare is higher under CSR. Proof: $CS^{*} > CS^{PP*}$; $SW^{*} > SW^{PP*}$.

The content of Results 2-4 straightforwardly leads to the following Corollary.

Corollary. The firms' owners social concern yields a Pareto improvement.

6. Conclusions

Up to date, the common wisdom in the economic literature has been that the choice of several companies to include CSR behaviours in their objectives has a goal that is beyond the simple profit enhancement. In the present paper, we have challenged this view, and we have shown that the choice of engaging in CSR falls in the field of the sound first principles of economics: companies choose to be of CSR-type because, in equilibrium, their profitability (and, therefore, the welfare of their owners' welfare) increases.

More in detail, we have presented a unionised duopoly model with centralised wage setting and decreasing returns to scale technology, in which the owners selects the level of the CSR engagement. We have shown that it exists a positive value of the CSR parameter such that profits under CSR are higher than under the standard profit-maximising rule. In other words, the adoption of a certain level of CSR behaviours is dictated by the firms' purely selfish profit-seeking objective. Furthermore, we have shown that, despite the presence of CSR exercises a downward pressure on the union's wage demand, the organised workers' utility increases because the positive effect due to the output expansion (and, therefore, higher employment) more than compensate the negative effect of declining wages. Given that also the consumer's surplus increase, and consequently the overall social welfare under CSR is higher than without CSR, the firms' owners social concern leads to Pareto-superior outcome.

The finding that owners' profits beneficiate from having social concerns seems to reconcile the recent social responsible behaviour of many firms with the sole behaviour admitted by the traditional approach of economics, that is - in the spirit of Friedman (1970)'s opinion - the maximisation of profits to the shareholders is the only one responsibility of business towards society. Moreover, it is worth to highlight that the selfish behaviour of the owners leads to outcomes which are optimal not only for them but also for all the other agents (workers included) and the society as a whole. These findings offer numerous empirical implications. Indeed the following facts should be more often empirically observed: 1) a negative relationship between the levels of CSR activities and wage levels; 2) a positive correlation between presence of CSR and profitability, when firms are unionised; 3) the union should be in favour of the CSR activities. Several extensions to check the robustness of the present model are definitively call for. First, it is natural to find the endogenous equilibria in a game in which companies can freely select whether to adopt CSR behaviours. Second, to study different forms of competition, notably for price competition with differentiated products, is a suitable further direction of research. Third, it would be interesting to introduce into the analysis consumption externalities. Fourth, to introduce a manager to whom the sales and CSR level decisions are delegated can alter the present findings. Finally, despite the increase in the algebraic complexity, also the case of firm-specific unions, departing from the centralised industry - wide union umbrella, can be considered. Those extensions are left for future research.

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