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Why Firms Should Care for All Consumers

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Abstract

We compare the strategic potential of Corporate Social Responsibility (CSR) and Customer Orientation (CO) as commitments to larger quantities in Cournot competition, modeled as a multi-stage game. First, in addition to profits, firms can choose to care for the surplus of either all consumers (CSR) or their own customers only (CO). Second, they decide upon the weight of this additional objective. We find that firms prefer to care for all consumers, choosing positive levels of CSR. This result provides an explanation for the recent shift in corporate culture from CO to CSR.

1. Introduction

Customer Orientation (CO), in the literature also referred to as Market Orientation or Customer Satisfaction, describes the corporate culture of focussing on the needs and wishes of the firms' buyers. Many authors, like Deshpandé et al. (1993) or Kohli and Jaworski (1990), have argued that such a focus on their *own customers* is beneficial for firms. More recently, however, other authors, like Eccles et al. (2014) or Flammer (2015), have found that firms benefit as well from applying the broader concept of Corporate Social Responsibility (CSR). The term CSR includes all social and environmentally friendly activities of a firm beyond its legal requirements (Kitzmueller and Shimshack 2012), implying the well-being of *all consumers.* In this paper, we compare the strategic potential of CO and CSR as commitments to larger quantities in Cournot competition. In particular, we address the question whether firms prefer to care only for their own customers (CO) or for all consumers (CSR).

We model CO as introduced by Königstein and Müller (2001), including the weighted surplus of its *own customers* into the objective function of a firm. As Königstein and Müller (2001) show, CO will outperform pure profit maximization in Cournot competition, because it enables firms to commit to larger quantities. By contrast, in order to model CSR, we include the weighted surplus of *all consumers* into the objective function of a firm. Care for consumers constitutes an example from the wide range of possible socially responsible activities and has recently become a standard way of modeling CSR (e.g., Fanti and Buccella 2016, Goering 2008, Kopel and Brand 2012, Kopel and Lamantia 2016, Kopel et al. 2014, Ouattara 2017, Planer-Friedrich and Sahm 2017). Although this notion of CSR does not relate to all members of the society, including all consumers instead of a firm's own customers only, it takes more stakeholders into account than the concept of CO. But similar to CO, CSR also serves as a commitment to larger quantities in Cournot competition, and thus yields a strategic advantage over pure profit maximizing rivals (Kopel and Brand 2012, Kopel et al. 2014).

In order to explore and compare the strategic potential of the two corporate cultures, CO and CSR, we consider a duopoly market for some homogeneous good with linear demand and constant marginal costs.[1] We stick to the standard assumption of profit maximization but model competition between the two symmetric firms as a three-stage game. In the first stage, the firms simultaneously determine their corporate culture, choosing either CSR or CO. In the second stage, the firms simultaneously specify the extent of engagement into CSR/CO, hiring an executive who is known to have an appropriate concern. In the third stage, the firms' executives simultaneously decide upon output in order to maximize their objective functions.

This modeling choice builds on the concept of strategic delegation, as introduced by Fershtman and Judd (1987), Sklivas (1987) and Vickers (1985) in their seminal papers and further investigated by, e.g., Miller and Pazgal (2001, 2002, 2005) and Ritz (2008). Models of strategic delegation show that firms may profit from employing a manager with a personal motivation or a working contract that differs from the firm's own objective of profit-maximization. Following this concept, Jansen et al. (2007, 2009) and Manasakis et al. (2010) have compared the strategic potential of several managerial incentive schemes. Strategic delegation has also been used as a commitment device in several mod-

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[1]Königstein and Müller (2001) propose a more general model which allows for an arbitrary degree of product differentiation. We discuss the role of differentiated products in Section 4. There, we also relax the assumption of constant marginal costs.

els of CSR (Baron 2008, Kopel and Brand 2012, Kopel and Lamantia 2016, Manasakis et al. 2014, Planer-Friedrich and Sahm 2017).

Solving the game by backward induction for its subgame perfect equilibrium (SPE), we find that both firms choose CSR as their corporate culture, putting positive weight on the surplus of all consumers. In this sense, CSR outperforms CO. To gain some intuition, note that the surplus of all consumers includes the surplus of the firm's own customers, both being increasing and convex functions of the firm's output. The socially responsible firm thus derives, ceteris paribus, a larger marginal benefit from its output. This implies that CSR provides a stronger commitment to large quantities than CO.

Although we interpret our framework as a model of strategic delegation, the three-stage game may as well be understood as an indirect evolutionary game (Güth and Yaari 1992, Königstein and Müller 2001). Following this notion, the choice of CSR with a positive weight on consumer surplus for all firms constitutes the evolutionary stable outcome.

In consideration of the growing importance of strategic aspects in industrial organization and management (Tahai and Meyer 1999), the result provides an explanation why the focus in corporate culture has recently shifted from CO to CSR. KPMG (2015) and PwC (2016) provide evidence for a related change in business practice. According to the KPMG Survey of Corporate Responsibility Reporting 2015 the share of Global Fortune 250 firms reporting on CSR has increased from 35% in 1999 to 92% in 2015. In PwC's 19th Annual Global CEO survey (2016), the large majority of CEOs still names customers and clients as their top priority. However, not least because of consumers' changing prospect on firms, 84% of the CEOs realize that they should meet wider stakeholder expectations.[2]

2. The Model

We consider Cournot competition between two profit maximizing firms on the market for some homogeneous good with normalized linear inverse demand $p = p(q_1, q_2) = 1 - (q_1 + q_2)$, where p denotes the price of the good and q_i denotes the output of firm $i \in \{1, 2\}$. Marginal costs of production are constant, identical for both firms, and, for simplicity, normalized to zero.[3] Duopoly competition is modeled as a three-stage game Γ.

In the first stage, the firms simultaneously take the fundamental decision on their corporate culture to be either socially responsible, indexed by S, or customer oriented, indexed by C. This choice can be thought of as signing an appropriate corporate charter. Formally, CSR differs from CO in the respective objective function V_i: In addition to profits

$$\pi_i = [1 - (q_i + q_j)]q_i, \tag{1}$$

the former contains the surplus of *all consumers*, denoted by CS (e.g., Kopel et al. 2014), where

$$CS = CS(q_i, q_j) = \int_0^{q_i + q_j} p(y, z)d(y + z) - p(q_i, q_j)(q_i + q_j),$$

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[2]Specifically, CEOs believe that five years from now, "the most successful organisations in their sector will have shifted their views and priorities in terms of recognising changing expectations and the value in addressing them, embedding corporate responsibility into their business, reporting on non-financial matters and taking the long-term view" (PwC 2016).

[3]In the appendix, we show that our results also hold under the assumption of quadratic costs as an example of increasing marginal costs.

whereas the latter only contains the surplus of the firm's *own customers*, denoted by C_i (Königstein and Müller 2001), where

$$C_i = C_i(q_i, q_j) = \int_0^{q_i} p(y, q_j) dy - p(q_i, q_j) q_i.$$

Thus

$$V_i^S = \pi_i + \theta_i^S \cdot CS = [1 - (q_i + q_j)] q_i + \frac{1}{2} \cdot \theta_i^S \cdot (q_i + q_j)^2, \tag{2}$$

and

$$V_i^C = \pi_i + \theta_i^C \cdot C_i = [1 - (q_i + q_j)] q_i + \frac{1}{2} \cdot \theta_i^C \cdot q_i^2. \tag{3}$$

In the second stage, the firms simultaneously choose their level of CSR or CO, i.e., the weight $\theta_i^S \geq 0$ or $\theta_i^C \geq 0$ they put on consumer surplus CS or customer surplus C_i. This could be realized by hiring an executive manager with appropriate preferences, i.e., strategic delegation (Vickers 1985, Fershtman and Judd 1987, Sklivas 1987). Allowing for zero weights, our model includes the ordinary case of pure profit maximization.[4] In the third stage, firms' executives decide simultaneously on the output levels $q_i \geq 0$ in order to maximize their objective functions V_i.

This sequence of decisions reflects the fact that fundamental corporate culture is adjusted less frequently than personnel politics, which, in turn, is adjusted less frequently than output.

3. Analysis

We solve game Γ by backward induction for its SPE. To this end, we distinguish the three different constellations that may arise after the first stage.

3.1 Competition between two CSR firms

First suppose that both firms have chosen CSR as corporate culture at the first stage and each firm $i \in \{1, 2\}$ has chosen its CSR level θ_i^S at the second stage. At the third stage, firm i chooses its output q_i in order to maximize its objective function (2) for any given weight θ_j^S of the rival firm. From the first-order condition $\partial V_i^S / \partial q_i = 0$ we derive firm i's best response:

$$q_i(q_j) = \frac{1 - (1 - \theta_i^S) q_j}{(2 - \theta_i^S)}.$$

Inserting one reaction function into the other, we compute the equilibrium quantity of firm $i \in \{1, 2\}$ as a function of θ_i^S and θ_j^S:

$$q_i = \frac{1 + \theta_i^S - \theta_j^S}{3 - (\theta_i^S + \theta_j^S)}.$$

At the second stage, each firm anticipates these quantities and the corresponding price and chooses the CSR level θ_i^S in order to maximize the corresponding profit

$$\pi_i = [1 - (q_i + q_j)] q_i = \frac{(1 - \theta_j^S)^2 - (\theta_i^S)^2}{(3 - \theta_i^S - \theta_j^S)^2}.$$

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[4]Varying θ_i^C between 0 and 1 is equivalent to varying t between 1 and $1/2$ in the model of Königstein and Müller (2001). However, the additional restriction $\theta_i^C \leq 1$ is not necessary because, in equilibrium, it will always be fulfilled.

The first-order condition $\partial \pi_i / \partial \theta_i^S = 0$ yields the best response

$$\theta_i^S(\theta_j^S) = \frac{(1 - \theta_j^S)^2}{3 - \theta_j^S}. \tag{4}$$

Using the symmetry of firms, we compute the equilibrium weights on consumer surplus $\theta_i^S = \theta^{SS} := (5 - \sqrt{17})/4 \approx 0.219$ as well as the corresponding quantities $q_i = q^{SS} \approx 0.3903$ and profits $\pi_i = \pi^{SS} \approx 0.0856$ for $i \in \{1, 2\}$.

3.2 Competition between one CSR firm and one CO firm

Now suppose that one firm, S, has chosen CSR, whereas the other firm, C, has chosen CO as corporate culture at the first stage. Further suppose that each firm $i \in \{S, C\}$ has chosen its weight θ^i at the second stage. At the third stage, firm $i \in \{S, C\}$ chooses its output q^i in order to maximize its objective function V^i for any given weight θ^j of firm $j \neq i$, where V^S and V^C are given by (2) and (3). From the first-order conditions $\partial V^i / \partial q^i = 0$ we derive the best response functions

$$q^S(q^C) = \frac{1 - (1 - \theta^S)q^C}{2 - \theta^S} \qquad \text{and} \qquad q^C(q^S) = \frac{1 - q^S}{2 - \theta^C}.$$

Solving for the equilibrium quantities as functions of θ^S and θ^C yields

$$q^S = \frac{1 - \theta^C + \theta^S}{3 - 2\theta^C - \theta^S + \theta^S\theta^C} \qquad \text{and} \qquad q^C = \frac{1 - \theta^S}{3 - 2\theta^C - \theta^S + \theta^S\theta^C}.$$

At the second stage, the firms maximize their anticipated profits

$$\pi^S = \frac{(1 - \theta^C)(1 - \theta^C + \theta^S\theta^C - (\theta^S)^2)}{(3 - 2\theta^C - \theta^S + \theta^S\theta^C)^2},$$

$$\pi^C = \frac{(1 - \theta^C)(1 - \theta^S)^2}{(3 - 2\theta^C - \theta^S + \theta^S\theta^C)^2}$$

by the simultaneous choice of θ^S and θ^C, respectively. From the first order conditions $\partial \pi^i / \partial \theta^i = 0$ for $i \in \{S, C\}$, we derive the firms' best response functions

$$\theta^S(\theta^C) = \frac{1}{3 - \theta^C} \qquad \text{and} \qquad \theta^C(\theta^S) = \frac{1 - \theta^S}{2 - \theta^S}.$$

Solving this system of equations yields $\theta^S = \theta^C = \theta^{SC} := (3 - \sqrt{5})/2 \approx 0.382$. Although the two firms are not symmetric, both choose the same level of responsibility in equilibrium. Due to their differing objective functions, however, the firms produce different quantities of the good:

$$q^S = \frac{1}{3(1 - \theta^{SC}) + (\theta^{SC})^2} = \frac{1}{2} > \frac{\sqrt{5} - 1}{4} = \frac{1 - \theta^{SC}}{3(1 - \theta^{SC}) + (\theta^{SC})^2} = q^C.$$

Intuitively, because both C_i and CS are increasing and convex functions of the firm's own output, $C_i < CS$ implies that a marginal increase in output is, ceteris paribus, more valuable for the CSR firm than for the CO firm. Put differently, CSR offers a stronger commitment to increase output than CO. Consequently, the CSR firm also makes higher profits than the CO firm:

$$\pi^S = \frac{(1 - \theta^{SC})^2}{[3(1 - \theta^{SC}) + (\theta^{SC})^2]^2} > \frac{(1 - \theta^{SC})^3}{[3(1 - \theta^{SC}) + (\theta^{SC})^2]^2} = \pi^C.$$

3.3 Competition between two CO firms

Finally suppose that both firms have chosen CO as corporate culture at the first stage and each firm $i \in \{1, 2\}$ has chosen its CO level θ_i^C at the second stage. At the third stage, firm i chooses its output q_i in order to maximize its objective function (3) for any given weight θ_j^C of the rival firm. From the first-order condition $\partial V_i^C / \partial q_i = 0$ we derive firm i's best response:

$$q_i(q_j) = \frac{1 - q_j}{2 - \theta_i^C}.$$

Inserting one reaction function into the other, we compute the equilibrium quantity of firm $i \in \{1, 2\}$ as a function of θ_i^C and θ_j^C:

$$q_i = \frac{1 - \theta_j^C}{3 - 2\theta_i^C - 2\theta_j^C + \theta_i^C \theta_j^C}.$$

At the second stage, each firm anticipates these quantities and the corresponding price and chooses the CO level θ_i^C in order to maximize the corresponding profit

$$\pi_i = \frac{(1 - \theta_j^C)(1 - \theta_i^C - \theta_j^C + \theta_i^C \theta_j^C)}{(3 - 2\theta_i^C - 2\theta_j^C + \theta_i^C \theta_j^C)^2}.$$

The first-order condition $\partial \pi_i / \partial \theta_i^C = 0$ yields the best response

$$\theta_i^C(\theta_j^C) = \frac{1}{2 - \theta_j^C}. \tag{5}$$

Using the symmetry of firms, we compute the equilibrium weights on customer surplus $\theta_i^C = \theta^{CC} := 1$ as well as the corresponding quantities $q_i = q^{CC} := 1/2$ and profits $\pi_i = \pi^{CC} := 0$ for $i \in \{1, 2\}$. With homogeneous goods, Cournot competition between two CO firms leads to the same efficient allocation as perfect competition, i.e. zero profits and maximum consumer surplus.[5]

3.4 Choosing corporate culture: CSR or CO?

Combining the results from the three scenarios, we now examine the firms' decisions on corporate culture in the first stage. The possible actions and the corresponding continuation payoffs are represented in Table I. Obviously, CSR is a dominant action for both firms.

Table I. Normal form representation of the first stage decisions

		Firm 2			
		CSR		CO	
Firm 1	CSR	$\pi^{SS} \approx 0.0856$	$\pi^{SS} \approx 0.0856$	$\pi^S \approx 0.0955$	$\pi^C \approx 0.0590$
	CO	$\pi^C \approx 0.0590$	$\pi^S \approx 0.0955$	$\pi^{CC} = 0$	$\pi^{CC} = 0$

Proposition 1 *In the unique SPE of game* Γ*, both firms will choose CSR as their corporate culture, put positive weight* θ^{SS} *on consumer surplus, and produce output* q^{SS}*, thereby making positive profits* π^{SS}*.*

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[5]The result $\theta^{CC} = 1$ is equivalent to the finding that $t^* = 1/2$ for homogeneous goods ($\gamma = 1$) in the model of Königstein and Müller (2001).

As explained in Section 3.2, CSR provides a stronger commitment to large quantities than CO. Moreover, a CSR firm does not only suffer indirectly from a rise in the rival's quantity due to decreasing price and profit, but, unlike a CO firm, also benefits directly from it due to increasing consumer surplus. Compared to a CO firm, this makes a CSR firm react less aggressive to an increase in the rival's θ, i.e., to a tougher commitment to large quantities by the rival. Indeed, as the respective reaction functions (4) and (5) show, CSR levels are strategic substitutes, whereas CO levels are strategic complements. As a result, competition with CSR is less severe than with CO and allows for positive profits.

4. Discussion

The superiority of CSR over CO has been shown under the assumptions of symmetric firms, homogeneous goods, and sequential decisions about the nature of corporate culture and the level of engagement. In what follows, we briefly argue that the main result will hold even if we relax these assumptions.

4.1 Positive marginal costs

For simplicity, we have assumed that constant marginal costs of production equal $c = 0$ for both firms. It is straightforward to show that the firms' decisions on the level of commitment in stage 2 are not affected by the marginal cost parameter c as long as it is identical for both firms. As a consequence, a common marginal cost parameter only scales down profits but has no impact on the strategic decision between CSR and CO in stage 1. Furthermore, as shown in the appendix, our result also holds for quadratic costs as an example of increasing marginal costs.

Allowing for asymmetric (constant) marginal costs, Planer-Friedrich and Sahm (2017) find that the strategic interaction reinforces the cost advantage in the sense that the low-cost firm chooses a higher level of commitment than the high-cost firm and thereby increases its relative profitability compared to the regular Cournot equilibrium without commitment opportunities. Since this effect on the firms' decisions in stage 2 is stable across the three scenarios of Sections 3.1 to 3.3, CSR will remain a dominant strategy for both firms in stage 1 even if they have different marginal costs: intuitively, the low-cost firm uses CSR to further expand its advantage while the high-cost firm uses CSR to compensate for its disadvantage.

4.2 Differentiated products

In their model of Cournot competition between two CO firms, Königstein and Müller (2001) incorporate the possibility of differentiated products. They find, however, that incentives to commit to large quantities are the stronger, the less differentiated the products are.[6] This is intuitive: With fully differentiated goods, the two firms are monopolists on two independent markets and do not need any strategic quantity commitment. The less differentiated the products are, however, the fiercer the competition between the firms and the stronger their strategic motives to commit to large outputs.

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[6]In the language of their model, the equilibrium weight on customer surplus $1 - t^*$ increases in the degree of homogeneity γ (Königstein and Müller 2001, Proposition 1): it is zero ($1 - t^* = 0$) for independent products ($\gamma = 0$) and largest ($1 - t^* = 1/2$) for perfect substitutes ($\gamma = 1$).

We thus conjecture that, qualitatively, the superiority of CSR over CO as a commitment device will hold in markets with differentiated products as well. Because the commitment incentives are weaker then, quantitatively, the advantage of CSR over CO will be less pronounced and will vanish in the limit as the markets become independent.

4.3 Simultaneous choice of corporate culture and level of commitment

Our analysis builds on a sequential set-up with three stages. Alternatively, we can consider a two-stage game in which the firms decide about their type of corporate culture and their level of commitment simultaneously in stage 1, and about their output in stage 2. For each choice θ_j^k, $k \in \{S, C\}$ of his opponent j, player i has then two best responses as depicted in Figure 3: CSR level $\theta_i^S(\theta_j^k)$ and CO level $\theta_i^C(\theta_j^k)$.
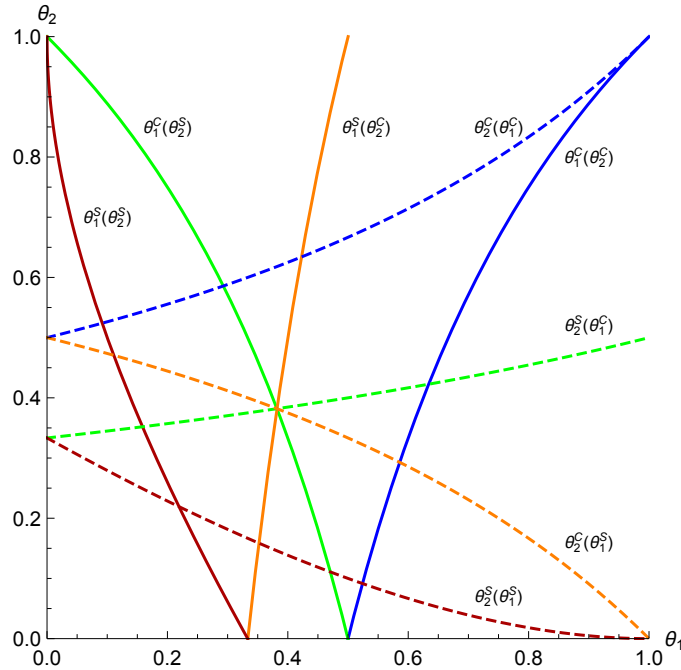

Figure 1. Best Response Correspondences

The modified game thus has four SPE which are represented by the intersections of same-color best responses in Figure 1. The respective payoffs correspond to those given in Table I. While none of the four equilibria is evolutionary stable under the indirect evolutionary approach,[7] the two symmetric ones are neutrally stable with the symmetric CSR equilibrium Pareto-dominating the symmetric CO equilibrium (from the firms' perspective). Following this refinement strategy, the result that CSR outperforms CO is robust.

5.   Conclusion

Comparing the strategic potential of CO and CSR as commitments to larger quantities in Cournot competition, we have shown that firms prefer to care for all consumers rather than for own customers only, choosing positive levels of CSR. The strategic advantage of

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[7]The indirect evolutionary approach has been introduced by Güth and Yaari (1992) and employed by Königstein and Müller (2001) in order to analyze competition between two CO firms.

CSR over CO contributes to an explanation for the recent shift in corporate culture from CO to CSR.

Surprisingly, this shift is associated with a decrease in welfare as measured by total surplus or consumer surplus. In our simple model, both, total surplus and consumer surplus, increase if and only if aggregate output $q_1 + q_2$ increases (as long as it does not exceed 1). Comparing the three different scenarios of Sections 3.1 to 3.3, we find that aggregate output is largest for competition between two CO firms ($q_1 + q_2 = 1$) and smallest for competition between two CSR firms ($q_1 + q_2 \approx 0.7806$). Intuitively, the fact that a firm cares not only for its own but all consumers softens competition. Weaker competition, however, implies higher prices and a reduction in welfare.

Appendix

In this appendix, we reconsider the three-stage set-up of Section 2 with quadratic costs as an example of increasing marginal costs such that firm i's profit is given by

$$\pi_i = [1 - (q_i + q_j)]q_i - \frac{1}{2}q_i^2$$

instead of (1). Again, we distinguish between the three different constellations that may arise after the first stage. For each constellation, we repeat the procedure of backward induction along the lines of Section 3.

In the case of competition between *two CSR firms*, we compute the equilibrium weights on consumer surplus $\theta^{SS} = (7 - \sqrt{41})/4 \approx 0.149$ as well as the corresponding quantities $q^{SS} \approx 0.2702$ and profits $\pi^{SS} \approx 0.0877$.

In the case of competition between *one CSR firm and one CO firm*, we compute the equilibrium weights on consumer surplus and customer surplus $\theta^S \approx 0.189$ and $\theta^C \approx 0.289$, respectively, as well as the corresponding quantities $q^S \approx 0.2790$ and $q^C \approx 0.2659$ and profits $\pi^S \approx 0.0880$ and $\pi^C \approx 0.0857$.

In the case of competition between *two CO firms*, we compute the equilibrium weights on customer surplus $\theta^C = (3 - \sqrt{5})/2 \approx 0.382$ as well as the corresponding quantities $q^{CC} \approx 0.2764$ and profits $\pi^{CC} \approx 0.0854$.

Combining the results from the three scenarios, we can examine the firms' decisions on corporate culture in the first stage. The possible actions and the corresponding continuation payoffs are represented in Table II. Obviously, CSR is again a dominant action for both firms. We thus confirm Proposition 1 also for quadratic costs as an example of increasing marginal costs.

Table II. Normal form representation of the first stage decisions

		Firm 2	
		CSR	CO
Firm 1	CSR	$\pi^{SS} \approx 0.0877$ $\pi^{SS} \approx 0.0877$	$\pi^S \approx 0.0880$ $\pi^C \approx 0.0857$
	CO	$\pi^C \approx 0.0857$ $\pi^S \approx 0.0880$	$\pi^{CC} \approx 0.0854$ $\pi^{CC} \approx 0.0854$

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