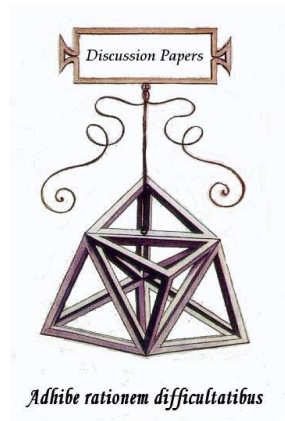




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FIRMS CONTROLLED BY OWNERS AND MANAGERIAL FIRMS: THE
“STRATEGIC” TRADE POLICY GAME REVISITED

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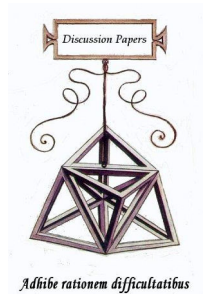
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Luciano Fanti and Domenico Buccella

**Firms controlled by owners and managerial firms:
the “strategic” trade policy game revisited**

Abstract

This paper revisits the strategic trade policy issue by considering a bargaining process over managerial contracts and different firms' organizational structures, that is, either family ownership keeping also the firm's control or atomistic shareholders whose board of directors delegate output choice to managers. We show that, in contrast to the traditional results, a plethora of Nash equilibria emerges and the implementation of trade policies in both countries may be efficient (i.e. national social welfares are higher than under free trade) in the presence of a bargaining process in a sales delegation game, depending on the manager's bargaining power as well as the degree of product competition.

Keywords Export subsidy/tax; Prisoner's dilemma; Managerial Delegation; Owner-Manager Bargaining; Cournot duopoly

JEL Classification F16; J51; L13

1. Introduction

As known, the issue of the activist trade policy versus *laissez faire* is at the heart of the international trade literature, especially after the Brander and Spencer (1984, 1985)'s approach, which has proposed, combining traditional economic analysis and game theory, a rationale for trade policies in "strategic" contexts.

On the one hand, the Brander and Spencer's approach strongly suggests that in an export-rivalry context under quantity competition a Government's trade policy implementation is optimal for the national social welfare. On the other hand, however, once a correct "game-theoretic approach" is considered, the possibility of retaliation not only weakens but totally reverses this suggestion: the well known Prisoner's dilemma structure of the game in which both Governments decide whether to subsidise implies the paradox that, while firms and worldwide consumers benefit from trade policies, national social welfares are harmed.¹

In any case, also for the supporters of the public intervention, the crucial question regards the appropriate selection of firms and industries policymakers have to target. Above all, it is important to identify, theoretically and empirically, the types and characteristics of industries to be targeted with the trade policy instrument, in that "identification of these characteristics is a preliminary step toward translating theory into practical policy proposals" (Spencer, 1986, 70-71). In the words of Branson and Klevorick (1986, 250) "a recurrent question was whether a particular product or particular industry was appropriately on the trade policy agenda. What distinguishes, both positively and normatively, concern about the economic performance of a particular firm, industry and sector as an appropriate target of concern by

¹ Surveys of this literature, with a clear presentation of the activist and non-activist point of views, are, for example, in Grossman and Richardson (1986), Krugman (1986) and Brander (1995).

trade policymakers?”. In this paper we attempt to provide a partial answer to this question, by bringing under study the theoretical effects of the presence of some firms’ characteristics, which are the result of a long-lasting evolution of the organizational structures as well as ownership structure, such as the diffusion of the managerial delegation on output decisions and the increasing manager’s power in the determination of their contracts.

In fact, recent contributions to the managerial delegation literature suggest that managers have significant power to influence their own pay (e.g. Bebchuk and Fried, 2004). This new managerial point of view is also supported by a vast empirical evidence (e.g. Bertrand and Mullainathan, 2001; Bebchuk and Fried, 2006). Following this theoretical and empirical evidence, recent papers have argued that it is reasonable to suppose that the bonus rate is determined via cooperative Nash bargaining between the owners (or the board of directors) and the manager and showed that such a bargaining has relevant effects in many cases of oligopolies with strategic incentives (e.g. van Witteloostuijn et al. 2007; Nakamura, 2008a,b; Kamaga and Nakamura, 2008; Nakamura, 2011, 2012; Fanti et al., 2016 a,b). In particular, such authors show that the distribution of bargaining power between the owner and the manager affects equilibrium quantities, profits, and welfare.² However, none of them applies this new view of managerial contracts to the strategic trade

² In particular, Nakamura (2011) shows that the bargaining over managerial delegation contracts affects the endogenous merger formation in a three-firm asymmetric Cournot industry, while Nakamura (2012) shows that the bargaining power of the manager affects profits and welfare in an extension of van Witteloostuijn et al. (2007) with product differentiation and a general number of (symmetric) quantity-setting or price-setting firms. Fanti et al. (2016a,b) study whether and how the bargaining mechanism between owners and managers over managerial contracts modifies the results of the ‘classical’ managerial delegation literature, showing that none of the previous results may hold when the owner negotiates about managerial compensation with his manager.

policy context. Moreover, an important stylised fact is the co-existence of firms in which the separation between ownership and control is long-standing and firms directly managed by the founders or founder's family. In fact, the presence of managerial delegation may be asymmetric between firms, sectors and countries, depending on whether many small shareholders share an ownership (e.g. North-American public companies) or a family ownership (very present, e.g., in Italy, Japan, Korea) prevail in the firms. On the one side, we observe that in companies with dispersed ownership - predominant characteristic of the United States and the United Kingdom - the management was pursuing objectives other than long-term returns to shareholders "while, at the same time, managers were able to raise their own compensation in spite of poor company performance." (OECD, 2001, 11). On the other side, especially in Asia (i.e. Japan and Korea³) "major shareholders in corporate groups, very often their "founding fathers", sought to retain control and appropriate most of the returns, while broadening their risk base" (OCDE, 2001, 8).⁴

³ "A high concentration of corporate ownership and control of corporations by families in Korea have led to governance structures that enable the dominant shareholding families to make key decisions on their own. Appointments of board members are almost entirely in the hands of the families controlling the firms" (OECD, 2001, 168).

⁴ A typical case in which owners manage their firm could be represented by the so-called *chaebol*, a South Korean form of business conglomerate, which, although it is a multinational owning numerous international firms, is controlled by a chairman with decisional power over all the firms. There are several dozen large chaebol which are almost always owned, controlled, and managed by the same family group. Also Japan's keiretsu business groupings may be considered similar to the South Korea's chaebol, but they are less family based and family oriented than their Korean counterparts.

So far, the literature (e.g. Das, 1997; Colonques, 1997; Miller and Pazgal, 2005; Wang, 2009)⁵ which has introduced the presence of managers delegated by the firms’ owners to choose the market variables (quantity and price) and compensated through incentive contracts (according to the managerial delegation literature) in the Brander and Spencer model, has assumed that the owners hold all the bargaining power, offering the manager a take-it-or-leave-it contract.

None of those contributions has, however, dealt with the observed i) asymmetry between firms controlled by owners and firms controlled by managers, and ii) increasing manager’s power in the determination of their contracts. Two partial exceptions are Wang et al. (2008) and Wei (2010). Following van Witteloustjin et al. (2007), the former authors include the managers' bargaining process in the Das (1997)'s model showing that this introduction leads to a decrease in the export subsidy and optimal tariff relative to the Das' s results, that is, only a “scale” effect is in place without qualitative changes. However, they do not consider the asymmetry in the organizational structure of rival firms. Wei (2010), revisiting the Das (1997)'s model, shows in general the equivalence between the government’s strategic behavior in trade policy and managerial delegation under oligopolistic competition, and in particular, in the case of asymmetric managerial delegation, that at equilibrium the country with a managerial firm chooses free trade, while the country

⁵ Das (1997) and Colonques (1997) adopted the “sales” delegation specification (e.g. Vickers 1985; Fershtman and Judd, 1987), Miller and Pazgal (2005) adopted the “relative performance” delegation (e.g. Salas Fumás (1992) and Miller and Pazgal (2001)), while Wang et al. (2009) adopted the “market share” delegation (i.e. . Jansen et al. (2007) and Ritz (2008)). They investigated how optimal trade policy may be designed in light of changes in managerial incentive contracts, showing that in all the cases managerial delegation, irrespective of whether firms compete in quantities or prices, has the qualitative effect to lower levels of the trade policy instruments, because the delegation by itself qualitatively acts like the subsidy.

without a managerial firm chooses a subsidy rate.⁶ However, the latter author does not consider the managers' bargaining process. Furthermore, all of them abstract from the investigation of the crucial issue of the Pareto-inefficiency of the public policy (which is the drawback of the public activism) and only consider the special case of homogeneous product.

Therefore, in a "game-theoretic" context, we investigate the effects of trade policies when the rival firms have different ownership structures and, thus, one of them is "managerial" while the other one is traditionally directly managed by owners. This market context might be represented, only for illustrative purposes, by the phone mobile world market in which two giants such as the North-American Apple and the Korean Samsung⁷ compete. We show that the conventional wisdom inherited from the above mentioned literature, according to which the game has the structure of a Prisoner's dilemma (and, thus, public intervention is the inefficient equilibrium), is modified: the non-cooperative game between Governments presents a plethora of equilibria,⁸ and the implementation of trade policies in both countries may be efficient either for at least one or for both of them, depending on the interplay between the degree of products competition and manager's power in the managerial firm.

The remainder of the paper proceeds as follows. In section 2, we describe a three-stage Government-owner-manager

⁶ This results because "when only firm 1 delegates a manager, country 1's government has no incentive to subsidize, while country 2's government strengthens its subsidization incentive, playing as a Stackelberg leader to firm 1's owner in the subsidy competition. Hence, firm 1's unilateral delegation puts itself at a disadvantage as a Stackelberg follower. Since total subsidy of each firm is just the Stackelberg leader-follower subsidy, the equilibrium outputs also yield Stackelberg solution" (Wei, 2010, 123).

⁷ "For instance, the dominant shareholder of the Samsung group, one of the largest *chaebols* in Korea, controls more than 46% of the shares of the companies even though his personal shares are around 4%" (OECD, 2001, 167).

⁸ This result extends that of Wei (2010) according to which only an asymmetric equilibrium does exist.

game with bargaining over managerial contracts and asymmetric managerial delegation. In section 3, we solve the game between Governments and discuss the main results. Concluding remarks are summarised in section 4.

2. The model with strategic trade policy.

Following the approach of Brander-Spencer (1985), we consider two exporting countries, each with a firm. Both firms (1 and 2) produce heterogeneous goods, which are sold to a third country (i.e. an importing country) and compete between them on quantity (i.e. a duopolistic Cournot market). The two firms face the same constant marginal cost, c .

Country 1 and 2's governments provide specific export subsidies, s_i , to their producers. Therefore, the firm i 's cost function is linear and described by:

$$C_i(q_i) = (c - s_i)q_i, \quad i=1, \quad 2. \quad (1)$$

We assume the standard linear inverse demand for each differentiated product, given by (e.g. Singh and Vives, 1984)

$$p_i = a - \gamma q_j - q_i \quad (2)$$

where p_i denotes price, q_i and q_j are the output levels of the two firms and $\gamma \in (-1, 1)$ represents the degree of substitutability between products.

Therefore, profits of firm i can be written as

$$\pi_i = p_i q_i - (c - s_i)q_i, \quad (3)$$

As known, the presence of delegation of the firm's control to managers depends mainly on whether the firm is a familiar business or a public company. Because the

ownership structure may strongly differ between firms, sectors and countries, then international markets can be characterised by the co-existence of both managerial firms and firms controlled by owners. For simplicity, we capture this asymmetry in the organizational structure of the firms by assuming conventionally that firm 1 is "managerial" while firm 2 is traditionally profit-maximising.

The timing of our game is the following. At stage 1, Governments choose the trade policy (*the policy stage*). At stage 2, as regards only the firm 1, owners and managers are engaged in a bargaining process to choose executive remuneration (*the bargaining stage*). At stage 3, managers choose the quantity in the product market (*the market stage*).

With sales delegation contracts (Vickers 1985; Fershtman and Judd, 1987), the owner hires a manager and delegates the output decision to him. The manager receives a fixed salary and a bonus related to a weighted combination of firm's profits and sales. The manager's compensation, therefore, can be expressed as $\omega = A + Bu \geq 0$, where $A \geq 0$ is the fixed salary component in manager's compensation, $B \geq 0$ is a constant, and u is the manager's utility. Without loss of generality, we set the fixed salary component of executive compensation to zero throughout the paper. The manager's utility takes the following form:

$$u = \pi + dq, \tag{4}$$

where d is the incentive parameter the owner and manager of the firm 1 negotiates in the bargaining stage. It may be positive or negative⁹ depending on whether the owner provides incentives or disincentives to the manager. If $d > 0$ (resp. $d < 0$) the manager becomes more (resp. less) aggressive in the market.

Given that the owners of the firm 1 delegates output decisions to their manager under sales delegation, the

⁹ Of course the incentive scheme (4) holds only when profits are positive. If profits are negative, managers have no bonus.

backward logic argument allows us to proceed as follows. Given decisions taken in the trade policy stage and the bargaining stage, in the market stage the manager of the firm 1 maximises utility in (4) with respect to quantity. Therefore, the reaction function of managers of firm 1 and firm 2 (as a function of rival’s quantity, his own bonus and the subsidy rate) are given by:

$$\frac{\partial u_1}{\partial q_1} = 0 \Leftrightarrow q_1(q_2, d_1, s_1) = \frac{a - c - \gamma q_2 + d_1 + s_1}{2},$$

and

$$\frac{\partial \pi_2}{\partial q_2} = 0 \Leftrightarrow q_2(q_1, s_2) = \frac{a - c - \gamma q_1 + s_2}{2}.$$

The reaction function (5) clearly show that if weight d is positive (resp. negative), firm 1's manager has an incentive to increase (resp. reduce) output.

From (5) and (6), we get quantities as function of both weights and subsidy rates, that is:

$$q_1(d, s_1, s_2) = \frac{(a - c)(2 - \gamma) - \gamma s_2 + 2(d + s_1)}{4 - \gamma^2},$$

and

$$q_2(d, s_1, s_2) = \frac{(a - c)(2 - \gamma) - \gamma(d + s_1) + 2s_2}{4 - \gamma^2}.$$

It is easy to see, from (7) and (8), that - given that the Cournot competition is in strategic substitutes - the manager’s incentive parameter increases the home production and reduces the foreign firm’s production.

We assume that, in the second stage of the game, the weight of the bonus in the managerial contract is chosen by both owners and manager of the firm 1 through a bargaining process – in line with the previous contributions cited in the introduction - that weights manager’s utility and owners’ profits (instead of being chosen by owners only by means of profit maximisation, as in the previous literature). Since owners and manager have a conflict of interest, “it makes sense for them to bargain over the weight $[z_i]$ ” (van Witteloostuijn, 2007, p.

899). Then, the firm 1's bargaining unit maximises the following Nash product by choosing d :

$$N = u^b \pi^{1-b}, \quad (9)$$

where $0 \leq b < 1$ is the relative bargaining power of the manager hired in firm 1. When $b=0$, eq. (9) boils down to the standard case in which only the owner is involved in determining the weight of the bonus in the managerial contract. Therefore, the incentive parameter, as a function of policy parameters, is given by:

$$\frac{\partial N}{\partial d} = 0 \Leftrightarrow d(s_1, s_2) = \frac{[(a-c)(2-\gamma) - \gamma s_2 + 2s_1][b(4-\gamma^2) + \gamma^2]}{4(2-\gamma^2)}. \quad (10)$$

Ceteris paribus, an increase in b (the relative bargaining power of the manager) increases d .

Following the procedure of the previous section, after standard calculations, we obtain the (asymmetric) quantities, which are given by

$$q_1(s_1, s_2) = \frac{(1+b)[(a-c)(2-\gamma) + 2s_1 - \gamma s_2]}{2(2-\gamma^2)} \quad (11)$$

$$q_2(s_1, s_2) = \frac{[4(a-c+s_2) - 2(1+b)(a-c+s_1) - \gamma^2(1-b)(a-c+s_2)]}{4(2-\gamma^2)} \quad (12)$$

The social welfare (SW) expressions of the two countries are

$$SW_i = \pi_i - s_i q_i, \quad i = 1, 2; \quad (13)$$

By exploiting (11) and (12), profits and social welfare as a function of trade policy instruments are easily calculated (omitted here for brevity). First we analyse the equilibrium outcomes in the case of both Governments

intervene. They, simultaneously and independently, maximise their social welfares choosing the optimal subsidy/tax rates, and the following reaction functions in trade policy instruments are derived:

$$s_1(s_2) = \frac{b[(a-c)(2-\gamma) + \gamma s_2]}{2(1+b)} \quad (14)$$

$$s_2(s_1) = \frac{\gamma^2(1+b)[a[b\gamma(\gamma-2) - \gamma^2 - 2\gamma + 4] - [b\gamma[2s_1 - c(2-\gamma)] - c(\gamma^2 + 2\gamma - 4) + 2\gamma s_1]}{b^2\gamma^4 + 2b\gamma^4 - (3\gamma^4 - 16\gamma^2 + 16)} \quad (15)$$

At the equilibrium, the subsidies in the two countries are

$$s_1 = \frac{(a-c)b(\gamma^2 - 2)[b\gamma^3 - (\gamma^3 - 4\gamma^2 - 4\gamma + 8)]}{(1+b)[(b-3)\gamma^4 + 16(\gamma^2 - 1)]} \quad (16)$$

$$s_2 = \frac{(1+b)(a-c)\gamma^2(\gamma^2 + 2\gamma - 4)}{[(b-3)\gamma^4 + 16(\gamma^2 - 1)]} \quad (17)$$

The analysis of the non-cooperative welfare-maximising trade policy choices by Governments leads to the following Lemma.

Lemma 1. Government 1 finds optimal to set a tax. Government 2 always sets a subsidy. Proof: As regards Government 1 (resp. 2), the proof follows by simple inspection of (14) (resp. 15) observing that $s_1 < 0$ (resp. $s_2 > 0$).

It is easy to see that 1) the competition between Governments is in strategic complements as for the Government 1 (i.e. $\frac{\partial s_1}{\partial s_2} > 0$), while it is in strategic

substitutes as for the Government 2 (i.e. $\frac{\partial s_2}{\partial s_1} < 0$); 2) if the

manager's power is zero, Government 1 does not intervene.

In the traditional Brander and Spencer's model the competition between Governments is, as is known, in strategic substitutes. In the present model the unilateral managerial delegation is by itself an instrument used by the owner for an aggressive behaviour and, thus, it is additive to the subsidy instrument used by the Government. Indeed, in the absence of manager's power, the best that Government 1 may make is to abstain to intervene, because the aggressiveness originated by the managerial delegation is exactly substitutive of that originated by the subsidy. Therefore, when also the manager's power is present and works for a further increase of the aggressive output behaviour, Government 1 has to intervene to reduce this aggressiveness fixing an export tax instead of a subsidy.

By exploiting (16) and (17), after the usual algebra, we obtain the equilibrium values of the incentive parameter for firm 1's managerial contract, quantities and social welfares are derived (S again denotes the case with trade policy), as it follows:

$$d^{s,s} = \frac{(a-c)[b\gamma^3 - (\gamma^3 - 4\gamma^2 - 4\gamma + 8)][b(4-\gamma^2) + \gamma^2]}{2(1+b)[(b-3)\gamma^4 + 16(\gamma^2 - 1)]}$$

(18)

$$q_1^{s,s} = \frac{(a-c)[b\gamma^3 - (\gamma^3 - 4\gamma^2 - 4\gamma + 8)]}{[(b-3)\gamma^4 + 16(\gamma^2 - 1)]}$$

(19)

$$q_2^{s,s} = \frac{(a-c)[(b\gamma^2 + 4 - \gamma^2)(\gamma^2 + 2\gamma - 4)]}{2[(b-3)\gamma^4 + 16(\gamma^2 - 1)]}$$

(20)

$$SW_1^{s,s} = \frac{(a-c)^2(2-\gamma^2)[b\gamma^3 - (\gamma^3 - 4\gamma^2 - 4\gamma + 8)]^2}{2[(b-3)\gamma^4 + 16(\gamma^2 - 1)]^2},$$

(21)

$$SW_2^{s,s} = \frac{(a-c)^2(\gamma^2 + 2\gamma - 4)^2[(b+3)\gamma^2 - 4][(b-1)\gamma^2 + 4]}{4[(b-3)\gamma^4 + 16(\gamma^2 - 1)]^2}$$

(22)

Then, the equilibrium outcomes in the case of free-trade are straightforwardly derived:

$$d^{FT,FT} = \frac{(a-c)(2-\gamma)[b(4-\gamma^2)+\gamma^2]}{4(2-\gamma^2)}$$

(23)

$$q_1^{FT,FT} = \frac{(a-c)(2-\gamma)(1+b)}{2(2-\gamma^2)}$$

(24)

$$q_2^{FT,FT} = \frac{(a-c)[b\gamma(\gamma-2)-(\gamma^2+2\gamma-4)]}{4(2-\gamma^2)}$$

(25)

$$SW_1^{FT,FT} = \frac{(a-c)^2(2-\gamma^2)^2(1-b)(1+b)}{8(2-\gamma^2)},$$

(26)

$$SW_2^{FT,FT} = \frac{(a-c)^2[b\gamma^2-2b\gamma-(\gamma^2+2\gamma-4)]^2}{16(2-\gamma^2)^2}$$

(27)

To determine the SPNE of the Governments' game we have to evaluate the pay-offs in the asymmetric cases, in which, alternatively, one Government subsidises while the other one allows free-trade.

Standard calculations for the game in which Government 1 (resp. Government 2) intervenes, while Government 2 (resp. Government 1) does not intervene, that is $s_2=0$ (resp. $s_1=0$), lead to the following subsidy/tax rates for firm 1 (resp. firm 2):

$$s_{1|s_2=0} = -\frac{(a-c)(2-\gamma)b}{2(1+b)}$$

(28)

$$s_{2|s_1=0} = -\frac{\gamma^2(a-c)(1+b)[b\gamma^2-2b\gamma-(\gamma^2+2\gamma-4)]}{b^2\gamma^4+2b\gamma^4-(3\gamma^4-16\gamma^2+16)}.$$

(29)

By substituting backwards (28) (and $s_2 = 0$) (resp. (29) and $s_1 = 0$) we obtain the following incentive parameter for firm 1's managerial contract, quantities and social welfares of countries 1 and 2 in the cases of the asymmetric Governments' behaviours:

$$d^{S,FT} = \frac{(a-c)(2-\gamma)[b(4-\gamma^2)+\gamma^2]}{4(1+b)(2-\gamma^2)}$$

(30)

$$d^{FT,S} = \frac{(a-c)[b\gamma^3 - (\gamma^3 - 4\gamma^2 - 4\gamma + 8)][b(4-\gamma^2) + \gamma^2]}{2[b^2\gamma^4 + 2b\gamma^4 - (3\gamma^4 - 16\gamma^2 + 16)]}$$

(31)

$$q_1^{S,FT} = \frac{(a-c)(2-\gamma)}{2(2-\gamma^2)}$$

(32)

$$q_2^{S,FT} = \frac{(a-c)(\gamma^2 + 2\gamma - 4)}{4(\gamma^2 - 2)}$$

(33)

$$q_1^{FT,S} = \frac{(a-c)(1+b)[b\gamma^3 - (\gamma^3 - 4\gamma^2 - 4\gamma + 8)]}{b^2\gamma^4 + 2b\gamma^4 - (3\gamma^4 - 16\gamma^2 + 16)}$$

(34)

$$q_2^{FT,S} = \frac{(a-c)[b\gamma(\gamma - 2) - (\gamma^2 + 2\gamma - 4)]}{2(b\gamma^2 + 3\gamma^2 - 4)}$$

(35)

$$SW_1^{S,FT} = \frac{(a-c)^2(2-\gamma)^2}{8(2-\gamma^2)}$$

(36)

$$SW_2^{S,FT} = \frac{(a-c)^2(\gamma^2 + 2\gamma - 4)^2}{16(\gamma^2 - 2)^2}$$

(37)

$$SW_1^{FT,S} = \frac{(a-c)^2(1+b)(1-b)(\gamma^2 - 2)[b\gamma^3 - (\gamma^3 - 4\gamma^2 - 4\gamma + 8)]}{2[b^2\gamma^4 - 2b(\gamma^4 - 8\gamma^2 + 8) - (3\gamma^4 - 16\gamma^2 + 16)]}$$

(38)

$$SW_2^{FT,S} = -\frac{(a-c)^2[b\gamma(\gamma - 2) - (\gamma^2 + 2\gamma - 4)]^2}{4(b\gamma^2 - \gamma^2 + 4)((b+3)\gamma^2 - 4)} \quad (39)$$

Note (from (32), (33), (36) and (37)) that when only Government 1 intervenes, the manager's power has effect neither on the national social welfares nor on the consumer's welfare.

Lemma 2. When only one Government intervenes, Government 1 (resp. 2) always sets a tax (resp. subsidy), as in the case in which both intervene (Lemma 1).

Proof: As regards Government 1 (resp. 2), the proof follows from the simple inspection of (28) (resp. (29)).

3. The equilibrium of the game played by Governments

Now we are in a position, first, to solve for the sub-perfect Nash equilibrium (SPNE) of the game represented in Tab. 1, and second, to investigate the efficiency properties of the emerged SPNE.

The countries' benefits of the different policy regimes are summarised in the governments pay-off matrix in Table 1. The strategies for each Government are to be interventionist (S) or to adopt a non-interventionist

	FT	S
FT	$SW_1^{FT,FT}, SW_2^{FT,FT}$	$SW_1^{FT,S}, SW_2^{FT,S}$
S	$SW_1^{S,FT}, SW_2^{S,FT}$	$SW_1^{S,S}, SW_2^{S,S}$

Tab. 1. *Pay-offs matrix of the game between Governments*

stance (free trade, FT). As usual, the first element in each entry represents the country 1's payoff, while the second element represent the country 2's payoff. Along the top, Government 2's strategies are listed, and along the left Government 1's strategies are represented.

Let us define the following six national social welfare differentials, where the first subscript denotes the type of differential, while the second one denotes the country:¹⁰

$$\begin{aligned}\Delta_{1,1} &= SW_1^{S/FT} - SW_1^{FT/FT}, \quad \Delta_{2,1} = SW_1^{FT/S} - SW_1^{S/S}, \\ \Delta_{1,2} &= SW_2^{FT/S} - SW_2^{FT/FT}, \quad \Delta_{2,2} = SW_2^{S/FT} - SW_2^{S/S}, \\ \Delta_{3,1} &= SW_1^{S/S} - SW_1^{FT/FT}, \quad \Delta_{3,2} = SW_2^{S/S} - SW_2^{FT/FT}.\end{aligned}$$

Result 1. *In an export-rivalry model with asymmetric organizational structure of rival firms, the analysis of the SPNE of the game identifies in the parametric $[\gamma, b)$ space the following ten regions (displayed in Fig. 1), characterised by different SPNEs as follows: 1) Regions I - II - X: one asymmetric equilibrium FT/S; 2) Regions III - VIII: two asymmetric equilibria, FT/S and S/FT; 3) Regions IV - VII: one asymmetric equilibrium S/FT; 4) Regions V - VI - IX: one common equilibrium S/S.*

Proof: the proof straightforwardly follow from each point by the following set of inequalities in Fig. 1:

- 1) *Regions I - II - X:* $\Delta_{1,1} > 0, \Delta_{2,1} > 0, \Delta_{1,2} > 0, \Delta_{2,2} < 0$;
- 2) *Regions III - VIII:* $\Delta_{1,1} > 0, \Delta_{2,1} > 0, \Delta_{1,2} > 0, \Delta_{2,2} > 0$;
- 3) *Regions IV - VII:* $\Delta_{1,1} > 0, \Delta_{2,1} < 0, \Delta_{1,2} > 0, \Delta_{2,2} > 0$;
- 4) *Regions V - VI - IX:* $\Delta_{1,1} > 0, \Delta_{2,1} < 0, \Delta_{1,2} > 0, \Delta_{2,2} < 0$.

The intuition behind the appearance of the asymmetric sub-game perfect equilibrium FT/S is straightforward: since the managerial delegation

¹⁰ As known, through the analysis of the first four differentials we may obtain any possible Nash equilibrium of the game.

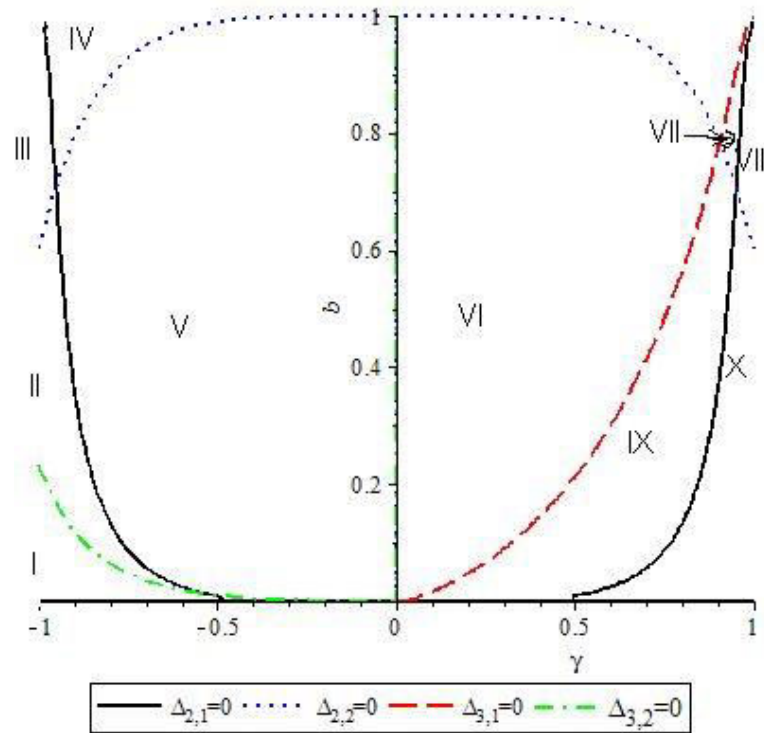


Fig. 1. Plot of the indifference curve $\Delta_{2,1} = 0, \Delta_{2,2} = 0, \Delta_{3,1} = 0, \Delta_{3,2} = 0$ (the plot is drawn for the parameters' value $a=1, c=0$).

gives the firm 1 a leadership in quantity (reinforced by the manager's power which raises the firm's attitude for quantity), its Government could not further ameliorate the firm's competitive advantage through a subsidy, while Government 2 subsidising reduces the competitive advantage of the rival firm. Interestingly, the symmetric sub-game perfect equilibrium S/S emerges when products are sufficiently differentiated (that is the competition is less fierce) and manager's power is sufficiently high (that is firm 1's manager is sufficiently aggressive in producing) such that Government 1 finds convenient the intervention through a tax because the lower the competition and the higher output of its firm, the higher the support for price and profits of a tax-induced reduction of output (all else being equal). Therefore a level of product differentiation (which is lower the higher the manager's power) such that not only country 2 but also country 1 are better off by their activist policies does always exist. That is for a large set of values of the degree of differentiation and manager's

power (i.e. Region VI) the interventions of both Governments are Pareto-optimal (for their national welfares).

Finally, when the manager's power is very high (regions IV and VII) and thus the quantity offered by firm 1 would be very high, not only the Government 1 taxes but also Government 2 finds convenient to cease the subsidisation and to abstain from the intervention for a stronger support for prices and profits.

Therefore, Result 1 shows that the recently observed increase of the managers' power may have rich effects on the trade policy design emerging in a world economy with asymmetric ownership and organizational structures between rival firms.

The analysis of the efficiency properties (as regards producing countries, importing country and world as whole) of the different equilibria leads to a rich taxonomy of results. We focus on the case when products are substitute, comparing the equilibrium with an activist regime to that with free trade regime in both countries.¹¹ In particular, we highlight the following Results, first regarding producing countries, and then all the countries:

Result 2. *In an export-rivalry model, with asymmetric organizational structure of rival firms, when at SPNE both Governments intervene (i.e. Regions VI – IX), social welfare may better off for both countries: in particular it is always better off for country 2, while it is better off for country 1 only in the ample region VI where products are sufficiently differentiated and/or manager's power is sufficiently high.*

Proof: by inspection of Fig. 1, where in Region I : $\Delta_{3,1} > 0, \Delta_{3,2} > 0$; Region II – III – IV – V : $\Delta_{3,1} > 0, \Delta_{3,2} < 0$; Region

¹¹ Other results comparing the welfare properties in the cases of product complementarity and 'mixed regime' endogenous equilibria for the two producing countries as well as consumers and world are omitted here for brevity and are available on request.

VI: $\Delta_{3,1} > 0, \Delta_{3,2} > 0$; Regions VII – VIII – IX – X:
 $\Delta_{3,1} < 0, \Delta_{3,2} > 0$.

Result 3. *When the equilibrium prescribes activist policies which are welfare-superior for both countries (i.e. region VI of Fig. 1, as shown in Res. 2) there also exist a region C - in Fig. 2 - in which both exporting countries and the world's welfare are better-off.*¹²

These results show that, under the presence of product differentiation and manager's power, the prisoner's dilemma structure typical of the strategic trade policy game (e.g. see the discussion in Krugman, 1986) disappears, and public intervention may be Pareto-superior for producing countries

¹² For the sake of precision, in all the other regions, as easily observed by Fig. 2, there exists a conflict of interest in terms of welfare between each exporter country, consumers and world on the preferred trade regime more ample than that in region C. However, such a conflict is always less than that existing in the Brander and Spencer's model. Nonetheless, in region A, as in the original model, the interests of both exporter countries are opposite to those of consumers and world as a whole (although, as discussed in the main text, with a ranking reversed with respect to that emerging in the Brander and Spencer model).

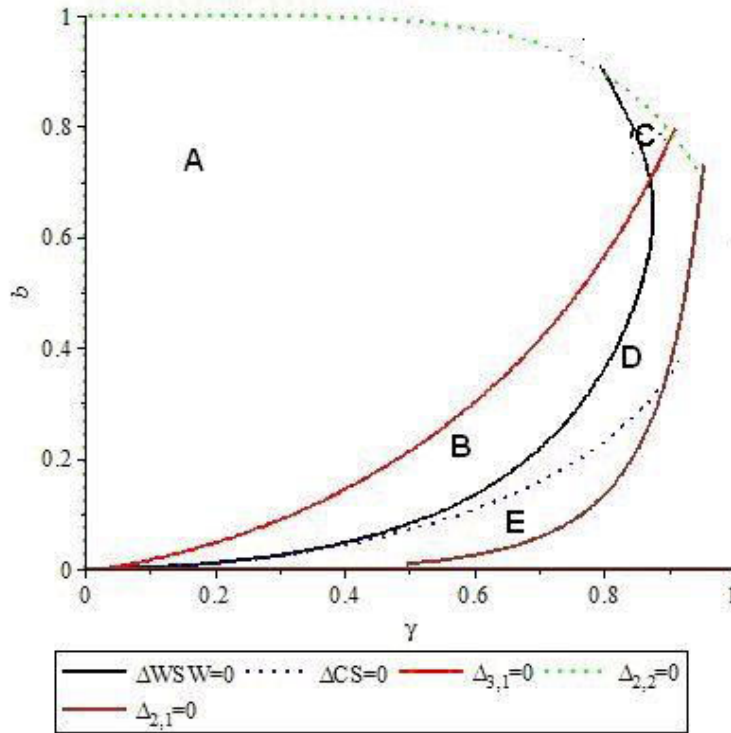


Fig. 2. Plot of the (consumer's, world, exporter countries') welfare features inside the region of the S/S equilibrium (corresponding to the Regions VI and IX of Fig. 1) for substitute products.

$\Delta WSW < 0, \Delta CS < 0, \Delta_{3,1} > 0, \Delta_{3,2} > 0;$	Region A:
$\Delta WSW < 0, \Delta CS < 0, \Delta_{3,1} < 0, \Delta_{3,2} > 0;$	Region B:
$\Delta WSW > 0, \Delta CS < 0, \Delta_{3,1} > 0, \Delta_{3,2} > 0;$	Region C:
$\Delta WSW > 0, \Delta CS < 0, \Delta_{3,1} < 0, \Delta_{3,2} > 0;$	Region D:
$\Delta WSW > 0, \Delta CS > 0, \Delta_{3,1} < 0, \Delta_{3,2} > 0.$	Region E:

with respect to laissez-faire regime for most part of the values of the parameter set (i.e. region VI in Fig. 1) and even preferred by the world as a whole (i.e. region C in Fig. 2).

4. Conclusions

This paper has revisited the traditional issue of the strategic trade policy - in which Governments set subsidies for their own exporter firms - by considering, on the one hand, the presence of a bargaining process between

owners and managers over managerial contracts - which has been considered as a source of the recently observed increase of the managers' power - and, on the other hand, the existence of different firms' organizational structures, due to the prevalence either of family ownership keeping also the firm's control (as in many Asian and European countries) or atomistic shareholders (as in the Anglo-saxon public company) whose board of directors delegate output choice to managers. We show that tax/subsidy policies may be Pareto-superior for exporting countries (i.e. national social welfares are higher than under free trade) in the presence of a bargaining process in a sales delegation game, depending in a very rich way on the manager's bargaining power as well as the degree of product competition.

In particular the main findings are: in sharp contrast i) to the case of the absence of the owner-manager bargaining over the contract, it is shown that a vast spectrum of (symmetric or asymmetric) equilibria does exist, ii) to the received literature under quantity competition, where public intervention is 1) always under the form of a subsidy and 2) always leads to an inefficient (resp. efficient) equilibrium when products are substitutes (resp. complements), it is shown that with the owner-manager bargaining it may 1) also assume the form of a tax for the managerial firm and 2) lead to an efficient (resp. inefficient) equilibrium provided that products are sufficiently differentiated (resp. not too complements). These results suggest that if in a context of strategic managerial delegation the owners negotiate with their managers about executive incentive scheme, then the unilateral public intervention may be optimal because, also in the case of the rival Government's intervention (that is a non-cooperative equilibrium), welfares will be superior to those under free trade for a vast parametric range. Moreover, some empirical implications are offered: when there is high competition (i.e. low products differentiation), then with low (resp. high) manager's power, free trade in the managerial firm's country and

subsidisation in the profit maximising firm's country (resp. export taxes in the managerial firm's country and free trade in the profit maximising firm's country) should be more often evidenced. Conversely, with intermediate levels of managers' power it should be more often found that both Governments are activist (i.e. export taxes in the managerial firm's country and export subsidies in the profit maximising firm's country).

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