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Should countries control international profit shifting?

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Abstract

We present a fiscal competition model with two policy instruments: the level of corporate taxation and the tightness of control of profit shifting by multinational firms (MNF). We show that a country may optimally decide not to monitor the MNF for two reasons. Firstly, this country becomes an attractive location for MNF activity despite a high corporate tax. Secondly, as the profits of the MNF become mobile, the focus of tax competition is shifted. Taxation then influences both an MNF's location and the place where it declares its profits.

Keywords: Taxation of multi-national firms; Profit shifting; Transfer prices; Tax competition; Equilibrium existence

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1. Introduction

In the globalized economy, raising tax revenues on multinational firms has become increasingly difficult for governments, for at least two reasons. First, competition to

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attract mobile firms creates a downward pressure on profit taxation. Second, multinational firms may take advantage of tax differentials by manipulating profits across jurisdictions.

Because of this fiercer tax competition, we tend to observe a transfer of the fiscal burden from mobile capital to immobile labor and domestic small and medium firms, which are less likely to move in response to tax changes. Both the European Union and the OECD have reacted to this by recommending tax coordination efforts among countries and the non-use of discriminatory taxation (European Communities, 1992, 1998; OECD, 1998). The non-discrimination principle increases the fiscal cost of attracting firms via tax cuts, thus alleviating the downward pressure on profit taxation. This may push countries to comply with it. Nevertheless, by making direct tax competition more costly, this principle also tends to move competition to other dimensions. Indeed, each country still wishes to offer targeted fiscal breaks. In the case of multinational firms, a national authority may actually rely on the ability of these firms to shift profits out of high tax into low tax regions to offer such indirect fiscal breaks.

Multinational firms have several tools to shift profits out of high into low tax regions. These include the option to finance an affiliate with debt or equity, the organizational form (e.g., to own the affiliate or to engage in a joint-venture with a local firm), or the payment of management fees or royalties between the parent company and its affiliates. The manipulation of transfer prices (i.e., the prices that are used for intrafirm international trade in goods and services) is another widely used instrument. Although the OECD (1995) recommends the "arm's length principle", according to which intrafirm trade should be priced as if it were conducted between independent firms (i.e., the market price should be used), there is extensive evidence of transfer price manipulation.[1] For example, Clausing (2003) uses explicit observations of both intrafirm and non-intrafirm (market) prices of US international trade. She concludes that export (import) intrafirm prices increase (decrease) with the tax rate of the destination (origin) country, as compared to the market ones.

As regards government policy, Bartelsman and Beetsma (2003) provide evidence that countries differ in the enforcement of transfer pricing rules. Some countries do not regulate transfer pricing at all, some simply have some transfer pricing regulatory provisions, and others go further in requiring that firms prepare and maintain written documentation to justify their transfer pricing decisions. An even smaller subset of countries imposes specific penalties if the firm is found not complying with the transfer pricing rules. Moreover, the enforcement seems to play a role in the transfer pricing behavior of firms. The authors analyze profit shifting among 16 OECD countries and conclude that (i) there is robust evidence of transfer pricing manipulation in response to tax differences and (ii) profit shifting decreases with the degree of enforcement of the country.

From the governments' viewpoint, being tougher on the enforcement of transfer pricing rules is costly if multinational firms respond by delocalizing. A country may be appealing to multinational firms simply because it offers them a greater latitude to manipulate transfer prices. In particular, even with a high profit tax, it may attract the firm by

[1] See Hines (1997, 1999) for comprehensive surveys of the empirical literature.

committing to be loose on profit shifting monitoring. In other words, a loose enforcement policy can be viewed as a substitute to upfront tax competition. It is not surprising that the transfer pricing issue is on the political agenda of governments. The following quotation illustrates this point. "(...). So multinationals spend a fortune on economists and accountants to justify the transfer prices that suit their tax needs. (...) There are plenty of opportunities: according to the OECD, around 60% of international trade involves transactions between two related parts of multinationals. But tax authorities are increasingly looking out for such wheezes. In America, in particular, the taxman has been putting the squeeze on companies, which have responded by allowing more of their taxable profits to arise there to keep him happy. This is prompting other countries to get tougher, too." (The Economist, 2000).

In this paper we model the optimal choice of transfer pricing monitoring policies in a tax competition setting. In our model, countries cannot directly discriminate profit taxation of multinational firms (MNF) against immobile domestic ones. The cost to attract the MNF by lowering taxes is thus high, as it consists in (almost) completely giving up on profit tax revenue from domestic firms. By deciding not to enforce the arms' length principle, the government may be capable of hosting the MNF, while collecting a high revenue on domestic firms. We consider a multistage game where, before deciding profit tax rates, governments choose how strictly to control the MNF transfer pricing behavior. Announcing a loose monitoring policy in the first stage of the game is a way for governments to change the focus of tax competition in the second stage. If the MNF is not allowed to shift profits, it responds to tax differences by changing its location, whereas if profit shifting is tolerated in some country, the MNF's location there no longer depends on tax differences. Tax differences now matter for where the firm declares its profits, and the choice of the control policy determines whether countries compete for the firm or for its profit.

Our paper features three aspects which have not, to the best of our knowledge, been simultaneously studied in the literature. First, we provide a detailed analysis of tax competition when fiscal authorities cannot discriminate among tax bases with different elasticities. In a way, tax competition becomes less intense, though more unstable. Janeba and Peters (1999) already pointed out this implication of non-discrimination, however, their analysis is only partial. Their objective, as that of Keen (2001), is different from ours in that they compare the relative merits of discriminatory vs. non-discriminatory taxation.[2] The other two contributions are specific to the transfer pricing literature. On the one hand, while we set a very simple transfer pricing rule (equal to marginal cost of production), *we let the countries decide whether or not to enforce it*. On the other hand, *location is not given* and is not trivial due to the existence of a *transport cost*.

We show that in a subgame perfect equilibrium, at most, one country is loose, typically the one that benefits from a "location" advantage. There is no run to the bottom on this policy instrument, unlike the widely known result on tax competition (see, e.g., the survey by Wilson, 1999), nor is there a run to the top, unlike usual results on transfer pricing regulations for immobile multinationals (Raimondos-Møller and Scharf, 2002; Mansori

[2] We thank Ben Lockwood for attracting our attention to these references.

and Weichenrieder, 2001). For example, the former paper takes location of the multinational as given and supposes that it will respect the transfer pricing rule. In this context, governments set transfer pricing rules which lead to excess effective taxation and depressed international trade — a race to the top. The result that when competition in tax rates is banned countries may be less stringent in enforcing tax laws has been obtained by Cremer and Gahvari (2000). They model countries competing in indirect taxation of a consumption good (collected by firms) and show that auditing probabilities are cut in response to a ban in tax competition. Other papers linked to ours include Elitzur and Mintz (1996), who address tax competition when transfer pricing is used both to shift profit and as a strategic device to give proper incentives to the affiliate. Haufler and Schjelderup (2000) show that a full deduction of investment expenditures may not be optimal for an open economy hosting MNFs which shift profits by manipulating transfer prices. Kind et al. (2002, 2005) also study tax competition in a profit shifting setting and introduce transport costs and foreign property of the MNF to show under which circumstances economic integration (a decrease in the former and/or an increase in the latter) leads to a decrease in corporate taxation.

The remainder of the paper is organized as follows. Section 2 presents the model and basic derivations. We compute the subgame perfect equilibrium and present results in Section 3. Finally, Section 4 concludes.

2. The model

2.1. The firm

We consider a partial equilibrium model in which two regions (or countries), A and B, compete for a single multinational firm. For simplicity, we assume that the multinational operates as a monopolist in each market, where it faces a linear demand $q_i(p_i)$ where p_i and q_i are the price and quantity prevailing in region i. Regional demands are identical.

The firm sets its production plant in one of the regions and a sales-office in the other. We will often refer to the production plant as the firm's headquarters or simply *the firm* and to its location as *home*. Analogously, *abroad* designates the location of the sales-office. The plant produces a good at a constant marginal cost. Shipping the good from one region to the other costs τ per unit.

We follow Keen (1993) who argues that the effective taxation of multinationals is source based, even though tax codes may stipulate differently. Hence, both the production plant and the sales office pay taxes locally. Implicitly, we assume that the sales-office is a legal resident of the foreign country, i.e. it is a subsidiary (rather than a branch) of the MNF (see Gresik, 2001, Footnote 20, for the different tax treatment of branches and subsidiaries).

The firm chooses quantities so as to maximize its gross-of-tax profit. Due to the existence of positive transport costs, the price is higher (and the quantity lower) abroad than at home. Profits actually realized by the firm at each location are denoted by Π_h – the profit of the production plant – and by Π_f – the profit of the sales office. Given

that regional demands are identical, we have that, whenever $\tau>0$, $\Pi_h>\Pi_f$. One should also note that while Π_h is independent of the transport cost, Π_f decreases with τ.

The firm imputes its production cost between the headquarters and the sales-office by setting a constant transfer price at which the former sells the good to the latter. According to the "arm's length principle" the transfer price should be equal to the marginal production cost. Nevertheless, the firm can manipulate it to shift profits from the high to the low tax region. By increasing the transfer price the firm shifts profits from the sales office to the production plant. This means that the declared and actual profits in each need not coincide. We shall use π_h and π_f to denote the declared profits of the production plant and the sales office, respectively. The firm must declare the totality of its profits, i.e., $\pi_h+\pi_f=\Pi_h+\Pi_f$.

The net of tax MNF profit is given by:

$$(1-t_h)\pi_h+\left(1-t_f\right)\pi_f \tag{1}$$

The MNF compares its net profit in both regions and chooses location accordingly. We assume that, when indifferent, it locates in B. This preference for B may be due to any (however small) advantage from B (or conversely cost in A), as, e.g., a marginal difference in the population size.[3]

2.2. The government

Each government faces a trade-off between the advantage of hosting the firm and the fiscal cost of attracting it. The advantage is the increase in consumer surplus due to transport costs savings. The fiscal cost stems from the marginal cost of public funds. Implicitly we have in mind a general equilibrium model where governments tax sources other than corporate profits (like labor and consumption) to finance a fixed budget. If profit taxation decreases, other forms of taxation must increase. The trade-off is captured by the following reduced form of the government's objective function, where the marginal cost of public funds is normalized to unity:

$$\mathrm{CS}_i+T_i \tag{2}$$

where CS_i is the consumer surplus and T_i is the profit tax revenue of region i.[4]

Due to the transport cost, the consumer surplus is higher if the country hosts the firm (CS_h) than if it hosts the sales office (CS_f). This is the reason why a given country prefers to be the home one rather than the foreign one.

The government of region i has two policy instruments: the profit tax t_i and the control policy δ_i. The government may either control or not the transfer price decision of the firm.

[3] This assumption plays an important role. We use it to avoid having our results based on the perfect symmetry of the regions, as they would be non-robust to a slight change in the model. We discuss its implications in Section 4.

[4] This specification for the government's objective function would be obtained in a model in which consumers have quasi-linear preferences and the government redistributes fiscal revenue to the representative consumer.

We use the terms control and monitor interchangeably to refer to the δ_i policy of government i. When it does not control, we say it is *loose* ($\delta_i = L$). When it chooses to control, we refer to it as *strict* ($\delta_i = S$). This policy is assumed to refer only to outgoing profit and not to incoming one. In other words, governments are always eager to have an enlarged tax base (through repatriated profits from foreign regions), while they worry about having their tax base diminished. Hence, the low tax region never controls (incoming) profit shifting. This implies that only the high tax region policy affects the firm's decision. We shall refer to this as the *effective policy*. To simplify the analysis, we assume that if the effective policy is strict, the cost is dissuasive and the firm does not manipulate the transfer price at all. If it is loose, there is no manipulation cost and the firm transfers all its profit to the low tax region. We also make the simplifying hypothesis that the cost of implementing a monitoring policy is zero.[5]

The same profit tax must apply to both multinational and domestic firms. We shall refer to the profits of the latter as the *domestic tax base*, where the size of the domestic tax base determines the cost to attract the firm. The larger it is, the more funds have to be collected from other sources when the profit tax decreases. We keep things simple by considering an inelastic domestic tax base but we allow it to differ across regions.[6] We let R_i denote the domestic tax base of region i with $R_A = R$ and $R_B = \gamma R$, and $\gamma \in [0, \infty[$. Governments may subsidize as much as they want but they cannot tax more than the existing tax base: $t_i \leq 1$ for $i = \mathrm{A}, \mathrm{B}$.

The profit tax revenue of government i is given by:

$$T_i = t_i(R_i + \pi_h) \qquad \text{if the firm locates in } i$$

$$T_i = t_i\left(R_i + \pi_f\right) \qquad \text{if the firm locates in } j$$

Substituting T_i into (2) one gets the payoff of each regional government. We denote A's payoff by u_i and B's payoff by U_i, where $i = \mathrm{h,f}$ depending on where the firm locates. Letting t denote the tax vector (t_A, t_B) and δ the control vector (δ_A, δ_B), we have, for A:

$$u_h(t, \delta) = \mathrm{CS}_h + t_A(R + \pi_h)$$

$$u_f(t,\ \delta) = \mathrm{CS}_f + t_A\left(R + \pi_f\right) \tag{3}$$

Similarly, for B:

$$U_h(t,\ \delta) = \mathrm{CS}_h + t_B(R\gamma + \pi_h)$$

$$U_f(t,\ \delta) = \mathrm{CS}_f + t_B\left(R\gamma + \pi_f\right) \tag{4}$$

[5] We show that even under this hypothesis the government may decide to make no effort in equilibrium. Extending the model to allow for a cost of monitoring would, if anything, make the loose policy more likely.

[6] The alternative of an elastic tax base is discussed in Peralta et al. (2003), where we conclude that our results would be qualitatively similar under the alternative assumption.

3. Equilibrium

The game is played in three stages. In the first stage, governments choose δ_A and δ_B. They then set t_A and t_B.[7] Governments decide simultaneously. In the third stage the firm decides where to locate. Finally, production and consumption take place.

3.1. Profit shifting and location decision

The firm's decision of where to declare its profits is very simple. Whenever the effective policy is loose, the firm declares all its profit in the low tax region. If on the contrary the firm is subject to a strict policy, then it has no choice but to declare the actual profit. In other words, the declared profit may take one of four values: 0, Π_f, Π_h, or $\Pi_h+\Pi_f$.[8]

Table 1 shows the after tax MNF profit as given by (1) under each of the possible tax and control policy scenarios. The MNF compares the profit it obtains by locating its production plant in each of the countries and decides location accordingly. One should notice that profit shifting takes place in the only two cases of a loose effective policy. The firm declares the totality of profits in Region A when $\delta_B=L$ and $t_B>t_A$, while it declares it in Region B when $t_A>t_B$ and $\delta_A=L$. Apart from these two scenarios, the firm always declares actual profits.

Table 1
After-tax profit and location decision

	$t_A>t_B$		$t_B>t_A$	
Effective δ	$\delta_A=L$	$\delta_A=S$	$\delta_B=L$	$\delta_B=S$
(1) Profit if home is A	$(1-t_A)0+$ $(1-t_B)(\Pi_h+\Pi_f)$	$(1-t_A)\Pi_h+$ $(1-t_B)\Pi_f$	$(1-t_A)(\Pi_h+\Pi_f)+$ $(1-t_B)0$	$(1-t_A)\Pi_h+$ $(1-t_B)\Pi_f$
(2) Profit if home is B	$(1-t_A)0+$ $(1-t_B)(\Pi_h+\Pi_f)$	$(1-t_A)\Pi_f+$ $(1-t_B)\Pi_h$	$(1-t_A)(\Pi_h+\Pi_f)+$ $(1-t_B)0$	$(1-t_A)\Pi_f+$ $(1-t_B)\Pi_h$
(1)–(2)	0	$(\Pi_h-\Pi_f)(t_B-t_A)$	0	$(\Pi_h-\Pi_f)(t_B-t_A)$
Localization	Region B	Region A	Region B	Region A

One should notice also that, under the hypothesis of the firm's marginal preference for B, δ_A is irrelevant for location. Indeed, whenever $\delta_B=L$ the firm always sets up its production plant in B. It locates in its favorite region and, if B has the highest tax, it may

[7] By choosing this sequence of decisions, we implicitly assume that δ is essentially determined by reputation and therefore is a long-term policy variable. It can be shown that both regions obtain the same payoffs at equilibrium under the alternative timing, except for A in a small part of the parameter space. The only substantial difference is that, for intermediate values of τ the control policy of B depends on the particular first stage realization of the mixed strategy in taxes (calculations available upon request).

[8] In this sense, any other tool to shift profits (besides transfer pricing manipulation) that endows the firm with this set of possible declared profits would not change the results.

shift its profit to the low tax region, A. When $\delta_B = S$, A may decide to be loose. This turns out to be the effective policy only if $t_A > t_B$; then the firm chooses to locate in B. Region A could otherwise decide to be strict and then attract the firm if $t_A < t_B$. In both cases it is the tax difference that determines location and not the value of δ_A.

Obviously, the region marginally preferred by the firm is better armed to compete for it. It may use both taxes and a loose policy, while the other region may only compete through taxes. Once $\delta_B = L$, governments may only compete for the taxation of the multinational's profit. Region A may either choose $t_A < t_B$ and tax the total profit or $t_A > t_B$ and, if strict, tax the sales office profit.

3.2. Tax game

In this stage of the game, governments simultaneously choose tax rates given their previous control policy choice and anticipating the MNF location. Whatever the first stage policy choice, regions' payoffs in the tax game are structurally identical. A region's payoff has two distinct branches. The relevant one depends on whether its tax is higher or lower than that of the other region. To see this, it suffices to look at Table 1 and expressions (3) and (4). Whatever δ, if $t_i > t_j$ country i will be on a given branch of its payoff function, which we denote $\mathcal{H}_i^{\delta}(t_i)$ as a mnemonic for the fact that country i has the highest tax. When $t_i < t_j$, the payoff branch is denoted $\mathcal{L}_i^{\delta}(t_i)$. One should note that one always has $\mathcal{L}_i^{\delta}(t_i) > \mathcal{H}_i^{\delta}(t_i)$. Hence, for a given tax rate, each region would prefer its tax to be the lowest of the two.[9] Region i jumps down from the $\mathcal{L}_i^{\delta}$ to the $\mathcal{H}_i^{\delta}$ branch when $t_i = t_j$. One should also note that both $\mathcal{L}_i^{\delta}$ and $\mathcal{H}_i^{\delta}$ are increasing in t_i. Therefore, along the $\mathcal{L}_i^{\delta}$ branch the region will set its tax as close to t_j as possible and along the $\mathcal{H}_i^{\delta}$ it will set $t_i = 1$. Stated differently, each region faces a choice between setting a tax rate of 1 and being paid along the $\mathcal{H}_i^{\delta}$ branch or undercutting the other region and getting $\mathcal{L}_i^{\delta}$. Thus, given region j's strategy, there are two local maxima in region i's utility. Moreover, the payoffs are discontinuous at $t_i = t_j$. Given this payoff structure, a pure strategy equilibrium cannot exist.[10]

In order to capture the intuition underlying our equilibrium analysis, one should notice that $\mathcal{H}_i^{\delta}(1)$ is the utility the region may obtain whatever the other region's decision. We shall refer to this as *region i's security utility level*. In each subgame, there is a tax rate t_i that leaves the region indifferent between $\mathcal{L}_i^{\delta}(t_i)$ and its security utility level. Region i never wants to play a tax rate lower than this one, since it would then enjoy a lower utility level than the one it can secure by playing $t_i = 1$. Hence, we denote this tax rate $t_i^{\min\delta}$, formally defined as $t_i^{\min\delta} = \left\{t_i : \mathcal{H}_i^{\delta}(1) = \mathcal{L}_i^{\delta}(t_i)\right\}$. Given this fact, $t_i^{\min\delta}$ is a measure of what we shall call the *aggressiveness* of region i; that is, how low the region is willing to go in undercutting the other. The aggressiveness of the region reflects a tradeoff between undercutting gains and costs.

[9] This is true only for tax rates to the right of the intersection of $\mathcal{H}_i^{\delta}$ and $\mathcal{L}_i^{\delta}$. However, it is straightforward to show that all taxes to the left of this intersection are dominated (see Peralta et al., 2003).

[10] This payoff structure is actually quite common in economic games. For existence analysis and early examples, see Dasgupta and Maskin (1986a,b).

If, say, B has a high tax (i.e. higher than $t_A^{\min\delta}$) then A prefers to undercut it. On the other hand, if B has a low tax, A prefers to set $t_A=1$ and get its security utility level. The structure of such an equilibrium is summarized in the following proposition:[11]

Proposition 1. *Take subgame δ. If region i is more aggressive than region j (i.e. $t_i^{min\,\delta}<t_j^{min\,\delta}$) then, at the unique Nash Equilibrium in taxes, region j is held down to its security utility level ($\mathcal{H}_j^{\delta}(1)$), while region i attains more than its security utility level ($\mathcal{L}_i^{\delta}(t_j^{min\,\delta})$).*

Equilibrium utilities are quite intuitive to interpret.[12] The more aggressive region prefers to undercut any tax that the other is willing to play, rather than getting its security utility. Hence, in equilibrium, the less aggressive region cannot do better than its security utility level. By undercutting $t_j^{\min\delta}$, region i is sure to be on the $\mathcal{L}_i^{\delta}$ branch of its payoff.

From the above discussion it is obvious that the main determinant of the equilibrium in taxes is the relative aggressiveness of regions. On the one hand, for a given subgame, relative aggressiveness depends on the fundamentals of the model. For instance, as γ increases B becomes less aggressive as compared to A because it has more domestic fiscal revenue to lose when undercutting. When τ increases, the consumer surplus difference CS_h-CS_f increases, whereas the total profit of the MNF, $\Pi_h+\Pi_f$, decreases. When undercutting gains stem from the former, aggressiveness is increasing in the transport cost, but they are decreasing in τ when they stem from the latter. On the other hand, given the fundamentals, relative aggressiveness changes amongst subgames. It directly depends on monitoring policies because they affect undercutting gains and costs. Table 2 shows each region i's undercutting gains and costs when it undercuts with a tax rate t_i (i.e., when compared to i's security utility level). Undercutting costs are twofold. On the one hand, fiscal revenue from the domestic tax base decreases. This cost is equal to $(1-t_i)R_i$. On the other hand, a strict region hosting the sales office loses fiscal revenue in the amount Π_f.[13]

Table 2
Undercutting gains and costs in each subgame

		Region A	Region B
(L, L)	Gain	$t_A(\Pi_h+\Pi_f)$	$t_B(\Pi_h+\Pi_f)$
	Cost	$(1-t_A)R$	$(1-t_B)\gamma R$
(S, L)	Gain	$t_A(\Pi_h+\Pi_f)$	$t_B\Pi_h$
	Cost	$(1-t_A)R+\Pi_f$	$(1-t_B)\gamma R$
(S, S)	Gain	$CS_h-CS_f+t_A\ \Pi_h$	$CS_h-CS_f+t_B\Pi_h$
	Cost	$(1-t_A)R+\Pi_f$	$(1-t_B)\gamma R+\Pi_f$
(L, S)	Gain	$CS_h-CS_f+t_A\ \Pi_h$	$CS_h-CS_f+t_B(\Pi_h+\Pi_f)$
	Cost	$(1-t_A)R$	$(1-t_B)\gamma R+\Pi_f$

We summarize the conclusions of this section in Fig. 1, which characterizes equilibrium utilities in each subgame as a function of the fundamentals τ and γ. For each subgame, there is a threshold γ above which A is more aggressive than B. Suppose that $R_A=R_B$ (i.e.,

[11] The interested reader is referred to Peralta et al. (2003) for a formal proof of the existence and uniqueness of a mixed strategy equilibrium in the present setup.

[12] Equilibrium utilities are the expected payoffs when each region plays its equilibrium mixed strategy.

[13] Since at its security utility level its tax rate is equal to 1.

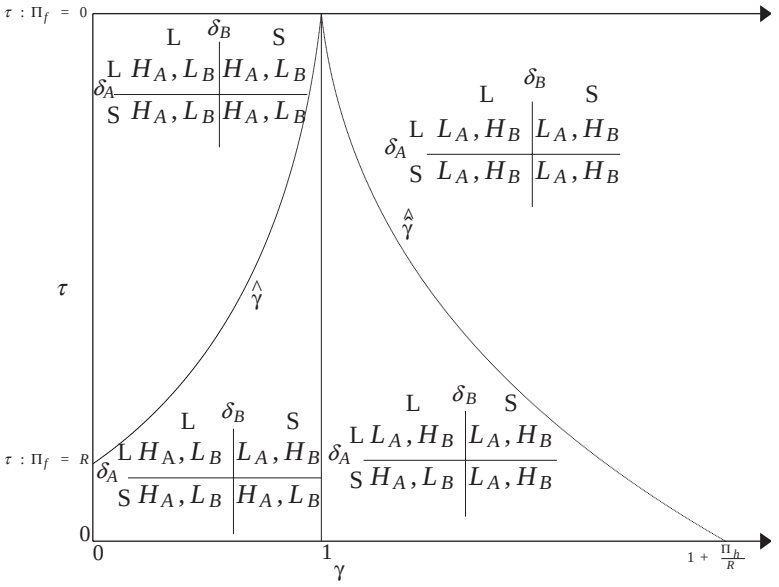

Fig. 1. Equilibrium utilities of the tax game.

$\gamma=1$) and both regions are loose. From Table 2, it is clear that regions are equally aggressive. If instead A is strict, then it faces an extra undercutting cost (equal to Π_f) and thus is less aggressive than B. If we now let γ increase, B's undercutting cost becomes larger whereas nothing changes for A. In the (L, L) subgame, A is now more aggressive than B. As regards subgame (S, L), there must be a threshold value of γ above which A becomes more aggressive than B. This is denoted by $\hat{\hat{\gamma}}$ in Fig. 1.[14] We may use a similar argument to compute γ thresholds for the two remaining subgames, (S, S) and (L, S). When both regions are strict, it is clear that such a threshold is $\gamma=1$. When A is loose and B is strict, an analogous argument as the one for (S, L) above yields $\gamma=\hat{\gamma}<1$ in Fig. 1.[15] Each entry in Fig. 1 gives us the normal form of the monitoring subgame. Equilibrium utilities are identified by the relevant payoff branch (the less aggressive region, say i, gets $\mathcal{H}_i(1)$ and the more aggressive one, j, $\mathcal{L}_j^{\delta}\left(t_i^{\min\delta}\right)$, as shown in Proposition 1).

3.3. Choice of monitoring policy

In order to analyze the control policy choice, we assume that the policy of, say, A, is given and inspect what drives B's optimal decision. From Proposition 1 we know the only thing that matters for B is relative aggressiveness, i.e., the ranking of $t_i^{\min\delta}$, $i=A, B$ in each subgame δ. According to Fig. 1 there are three possibilities. Firstly, B may be less aggressive than A irrespective of δ_B. This happens when γ is high. In this case, B's payoff

[14] The threshold $\hat{\hat{\gamma}}$ depends on τ since A's cost to undercut Π_f varies with τ. Simple computations using Table 2 yield $\hat{\hat{\gamma}}$.

[15] Simple computations using Table 2 yield $\hat{\gamma}$.

does not depend on A's aggressiveness and B chooses the control policy yielding the highest security utility level $\mathcal{H}_B^{\delta}(1)$. Secondly, B may be more aggressive than A irrespective of δ_B (low γ). In this case B selects δ_B so as to minimize A's aggressiveness (recall that B's payoff is given by $\mathcal{L}_B^{\delta}(t_A^{\min\delta})$). Finally, for intermediate values of γ, B is more or less aggressive than A depending on the choice of δ_B. In this case B's decision amounts to comparing $\mathcal{H}_B^{(\delta_A,S)}(1)$ with $\mathcal{L}_B^{(\delta_A,\ L)}\left(t_1^{\min(\delta_A,\ L)}\right)$. Region A's choice of the control policy follows a similar logic. The only relevant difference is that A is less aggressive independently of δ_A for high γ and more aggressive for low γ. Equilibrium choices stem from the interaction of these forces (for both regions). The following proposition addresses this issue.

Proposition 2. *In equilibrium region A always implements a strict control policy, whereas region B implements a strict policy only when transport costs are low enough.*

In order to understand Proposition 2, we characterize the shape of the best replies informally.[16] Let us take A. When B is loose, A's best reply is to be strict. When $\gamma<1$, A is less aggressive in both subgames and by playing $\delta_A=S$ it secures a fiscal revenue of Π_f. When $1<\gamma<\hat{\hat{\gamma}}$, A becomes the most aggressive in subgame (L, L). Since B's aggressiveness in the (L, L) subgame is too high, it does not pay for A to be loose and give up Π_f of fiscal revenue. For $\gamma>\hat{\hat{\gamma}}$, it is clear that A prefers to be strict as B is less aggressive in subgame (S, L) than in (L, L). This is evident from Table 2, for B has a further undercutting gain in (L, L) (equal to $t_B\ \Pi_f$). Now take $\delta_B=S$. It may be the case that being loose is a best reply for A when $\hat{\gamma}<\gamma<1$. Indeed, when loose, A obtains the firm and a fiscal revenue of Π_h. For $\gamma>1$, A is strict in order to decrease B's aggressiveness (Table 2 clearly shows why B is more aggressive under (L, S)).

We now characterize B's best reply. Suppose A is strict. When $\gamma<1$ B is more aggressive than A in both subgames, (S, S) and (S, L). It therefore acts as to minimize A's aggressiveness, thus the monitoring policy entails an *aggressiveness effect*. As A competes for the firm if B is strict and for the taxation of $\Pi_h+\Pi_f$ if B is loose, we have that A's aggressiveness is higher (lower) in the (S, S) subgame than in the (S, L) one for high (low) τ. This is due to the consumer surplus difference being increasing and Π_f decreasing in τ. When $\gamma>1$, B does not host the firm in subgame (S, S) and the choice of the control policy amounts to whether it is profitable to attract the firm by being loose: the *location effect*. Region B prefers to have the firm when τ is high, for losing it would entail a high consumer surplus decrease, and to let go of it when τ is low. Now take the case $\delta_A=L$. We know this can only happen for $\hat{\gamma}<\gamma<1$. In this case B's best reply is to be loose, thereby attracting the firm and having a fiscal revenue of $\Pi_h+\Pi_f$. Were it to be strict, it would lose the firm and only tax Π_f.

Fig. 2 displays equilibrium control policies, the corresponding location of the firm, and taxation of its profits in the (γ,τ) space.[17] The thick line is the threshold τ above which B is loose. As we pointed out, for $\gamma<1$ the choice of δ_B is governed by the *aggressiveness effect*, but for sufficiently high γ it is the *location effect* that matters. The threshold τ is

[16] For a formal proof of Proposition 2 refer to Peralta et al. (2003).
[17] Refer to Peralta et al. (2003) for the exact expressions of $\check{\tau}$, $\hat{\tau}$ and $\hat{\hat{\gamma}}$.

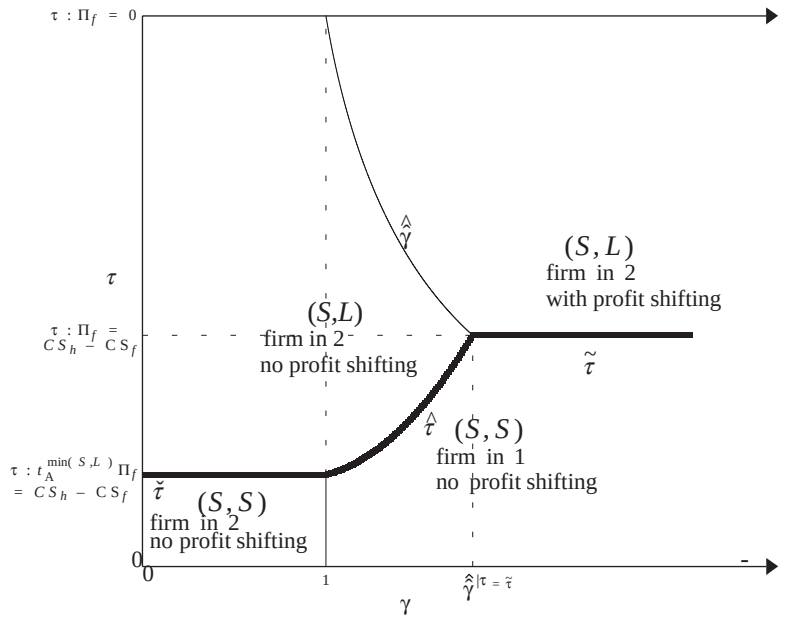

Fig. 2. Monitoring equilibrium in the (γ, τ) space.

smaller under the former than under the latter effect. To see why, one should note that the location effect amounts to comparing $CS_h - CS_f$ with Π_f, i.e., by being loose B attracts the firm and loses a fiscal revenue of Π_f. On the other hand, we may see from Table 2 that the aggressiveness effect entails a comparison of $CS_h - CS_f$ with $t_A\ \Pi_f$, i.e., A competes for the firm in subgame (S, S) and for the firm's profits in (S, L). In both cases B prefers to be loose when the consumer surplus difference is larger than fiscal revenue from taxation of the sales office, the former being increasing and the latter decreasing in τ. For sufficiently low τ, Π_f is high and B prefers to be strict. Since $t_A\ \Pi_f < \Pi_f$, the threshold τ above which $t_A\ \Pi_f < CS_h - CS_f$ is smaller than the one above which $\Pi_f < CS_h - CS_f$. Stated differently, in both cases, B compares the consumer surplus advantage with a certain level of fiscal revenue. The latter is higher for the location effect, which makes the strict policy optimal for a wider range of the transport cost. For intermediate values of γ both effects are present since B compares $\mathcal{H}_B^{(S,\ S)}(1)$ with $\mathcal{L}_B^{(S,\ L)}\left(t_A^{\min(S,\ L)}\right)$. The fact that by being loose B loses a fiscal revenue amounting to $R_B = \gamma R$ explains why the threshold τ is increasing in γ.

Proposition 3 addresses the issue of profit shifting.

Proposition 3. *For profit shifting to occur in equilibrium, it must be that B is loose and hosts the firm ($\tau > \tilde{\tau}$) and region A is more aggressive than region B ($\gamma > \hat{\hat{\gamma}}$).*

4. Final remarks

This paper shows how the leniency of governments in the control of transfer pricing behavior can be used as a complement to profit taxation. Such an instrument is

particularly useful when governments cannot discriminate profit taxation of mobile multinational firms against domestic ones. By being lenient the government allows the multinational to benefit from low effective taxation, even if the profit tax prevailing in the country is quite high.

We identify two effects of the monitoring policy: the location and the aggressiveness effects. The first one allows the region to attract the firm by being loose irrespective of its tax rate. In this respect, the monitoring policy can be used as a substitute to discriminatory taxation. However, the monitoring policy is more than just a substitute, since it entails an aggressiveness effect, thus may be used as a device to relax tax competition.

We have put a lot of structure in our model in order to establish our results. Accordingly, it is only fair to wonder to what extent our conclusions depend on its details. More specifically, several hypotheses could be relaxed without qualitatively changing the results: the rigidity of domestic tax bases, the number of multinational firms, and the market structure. On the contrary, abandoning regional asymmetry (i.e., letting the firm toss a fair coin to decide location when after tax profit is the same in both regions) has important consequences on the conclusions. This is not surprising as it entails a non-trivial change in the payoffs of the game. In particular, A may gain in being loose, as this allows it to attract the firm with some probability.[18]

Our model has clear empirical predictions. Countries with a relatively large domestic tax base are less likely to be loose. Moreover, a decrease in the transport cost makes countries more willing to control profit shifting. Whether these predictions are verified or not is an empirical question that goes beyond the scope of this paper. According to Bartelsman and Beetsma (2003) the emergence of profit shifting laws is relatively new. This does not contradict the second prediction. The fact that almost all small open economies are lenient may be taken as an indication that the first prediction is not contradicted. The precursor role of the US in the implementation of profit shifting rules could also be interpreted in this direction.

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[18] The interested reader is referred to the discussion paper version for a full fledged discussion of the possible extensions.

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