

**How does the international distribution of firm ownership affect the
intensity of tax competition?***

Preliminary and Incomplete

Abstract

A common simplifying assumption in theoretical analyses of tax competition for the investments of large, internationally mobile firms is that none of the firms' owners resides in the bidding countries (e.g., Hauffer and Wooton, *Journal of Public Economics*, 1999). This assumption might be reasonable, for example, in the case of competition between European states for the investments of Japanese MNEs. However, in many cases (e.g., competition between EU member countries for the investments of European MNEs), substantial portions of the firms concerned are owned *within* the bidding countries themselves. In such cases, a benevolent government will care about how tax competition affects *both* its consumers through final-goods prices *and* the after-tax profit income accruing to its citizens.

We begin by proving, and providing straightforward intuition for, a strong invariance result in the case where two potential host countries compete for a monopoly firm's plant. We show that *all* features of the equilibrium are independent of the distribution of the monopoly firm's ownership across the host countries and the rest of the world. Next, we extend the analysis to include a second investing firm, where we assume that the firms arrive sequentially and that the host governments can discriminate between them when bidding. We further allow the shares of ownership of the firms to differ internationally. In this environment, our invariance result no longer holds, and we completely characterise how the international firm-ownership distributions determine equilibrium bids and plant locations.

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1 Introduction

In many economic theory and policy contexts, we are accustomed to thinking of national governments as competing with tax and subsidy instruments for the production plants of “foreign” firms. However, in reality, potential host countries frequently own shares of the firms whose plants they compete for. A benevolent government will therefore be concerned about how its participation in bidding contests for firms affects its citizens’ after-tax profit income.¹ We explore how the international distribution of firm ownership affects the outcome of tax competition—both in terms of equilibrium plant locations and in terms of equilibrium tax/subsidy payments—in the context of international monopoly and oligopoly.

Our modelling structure allows a given firm’s ownership to be distributed in any proportions between the competing countries A and B (the “region”), and the rest of the world, RoW . We also allow the distribution of the region’s total population between countries A and B to vary. Therefore, our model allows the international distribution of factors of production (capital ownership and labour) to be arbitrary. In this setting we derive three main results, one for a monopolized industry and the others for an industry with two competing firms.

We first derive an “invariance result” for a monopoly firm. We show that the equilibrium of tax competition is invariant with respect to changes in the international distribution of the firm’s ownership. This is a striking result for which there is also clear intuition, based around the observation that any bidding equilibrium must equalise the firm’s after-tax profits across locations and thereby make capitalists indifferent towards the location of production.²

¹ Throughout the paper, we shall assume that profits are taxed at source.

² The invariance result under monopoly is also very strong. Not only is the equilibrium point independent of the international distribution of ownership, but also the entire best response plot in bid space.

2 Geography, Notation and Sequence of Moves

Two countries, A and B , are competing for the plants of perfectly mobile firms. We want to study the impact of the international distribution of factor ownership on countries' incentives in, and the equilibrium of, tax competition. Labour is internationally immobile, and the population of the region composed of countries A and B is normalized to 1. A 's population share is $n \in [0.5, 1]$ while that of B is $1 - n$, so A is by assumption the larger country.³

Firms are (perfectly) internationally mobile, and firm ownership is spread between A , B and RoW —notation to describe the international distribution of firm ownership is introduced below.

Per capita demand and production cost conditions are identical to those in Haufler and Wooton (1999). However, in terms of Haufler and Wooton's notation, we normalize $\alpha = \beta = 1$ (demand) and $w = 0$ (MC) because these variables are not central to the analysis. Firms can establish at most one plant in the region, and the plant fixed cost is normalized to 0.⁴ A specific trade cost of τ , which we will assume to be non-prohibitive, applies to international shipping of goods. We assume that firms cannot serve markets A and B from production facilities in RoW .

We analyse two tax competition games, which are distinguished by the number of investing firms. Both are solved backwards to isolate pure-strategy SPNE. In the next section, we assume that A and B compete for a single investing firm. There are three stages: in *stage one*, countries A and B simultaneously and irreversibly post bids, B_A and B_B , which can be either taxes (< 0) or subsidies (> 0) and act as location-specific fixed costs. The governments are motivated by national social welfare, which comprises consumer surplus plus after-tax

³ This halves the taxonomy by eliminating cases that are distinguished only by labelling.

⁴ Justifications for the 1-plant assumption: (a) prohibitive firm-level diseconomies of scale from 2-plant production (because of a lack of “competence”); (b) relatedly, firms typically expand geographically in stages, so a 1-plant restriction is probably appropriate for the early stages of investment liberalization.

profit income less total bid payments.⁵ In *stage two*, the monopolist decides where to locate its plant, choosing between $\{A, B, \emptyset\}$. Finally, the product markets in A and B are served in *stage three*.

We now introduce our notation. With a monopoly firm, consumer surplus per capita is

$$\begin{aligned} S_L &\equiv \frac{1}{8} \text{ if the monopolist produces locally;} \\ S_F &\equiv \frac{1}{8} (1 - \tau)^2 \text{ if the monopolist produces abroad.} \end{aligned}$$

$S_L > S_F$ because the trade cost means that imports are more expensive than local production.

Operating profits per capita in monopoly are $\pi_L \equiv \frac{1}{4}$ on local sales and $\pi_F \equiv \frac{1}{4} (1 - \tau)^2$ on export sales. Therefore, the monopolist's total operating profits are

$$\begin{aligned} \Pi_A &\equiv n\pi_L + (1 - n)\pi_F, \text{ if located in } A; \\ \Pi_B &\equiv (1 - n)\pi_L + n\pi_F, \text{ if located in } B. \end{aligned}$$

Of course, $\Pi_A > \Pi_B$ for all $n \in (0.5, 1]$ and $\tau > 0$. However, the firm's location decision is also affected by B_A and B_B .

Post-tax profits are $\Pi_{ij} + B_i$ and are distributed to owners. For the monopoly firm, we use e_A and e_B to denote the equity shares of the firm owned in countries A and B respectively, where $e_A, e_B \geq 0$ and $e_A + e_B \leq 1$.

Finally, we assume that τ is non-prohibitive (equivalently, that all possible Cournot equilibria are interior), which requires $\pi_{FL} > 0 \Leftrightarrow \tau < 0.5$.

⁵ Profits are taxed on a "source" basis by the host country. Once the host country's tax has been deducted, net profits are distributed to shareholders without further (dividend) taxation at home. Therefore, there is no "double taxation" problem.

3 An Invariance Result

Firm preferences, labelled BR_\emptyset : $A \succ B$ iff

$$\Pi_A + B_A > \Pi_B + B_B \quad (1)$$

$$\text{i.e., } B_A > \Pi_B - \Pi_A + B_B$$

(Also need $A, B \succ \emptyset$: For the monopolist to enter, it must break even in its preferred location – i.e., $B_i \geq -\Pi_i$ if i is preferred to j , where $\Pi_i > 0$ because there are no plant fixed costs. However, as we will show, B bids $V_B \geq 0$ in equilibrium, so the monopolist could (more than) break even in B – i.e., the eqm point lies on the upward-sloping part of BR_\emptyset .)

Let $e_A \in [0, 1]$ be the share of the monopolist owned in A . Therefore, A 's welfare if it hosts the firm is

$$W_L^A \equiv nS_L + e_A(\Pi_A + B_A) - B_A,$$

and A 's welfare if B hosts the firm is

$$W_F^A \equiv nS_F + e_A(\Pi_B + B_B).$$

A 's optimal winning bid is s.t. (1) just holds. Given that A posts its smallest winning bid, A prefers hosting the firm iff

$$W_L^A > W_F^A \Big|_{(1) \text{ binds}} \Leftrightarrow B_A < V_A \equiv n(S_L - S_F).$$

This is also A 's valuation of the monopolist in the case of extra-regional ownership (Hauffer and Wooton, 1999). Similarly, for any share $e_B \in [0, 1 - e_A]$ of the monopolist owned in B , we get $V_B \equiv (1 - n)(S_L - S_F)$. Therefore, the countries' BR fns, R_A and R_B , and consequently the equilibrium point are all identical to those given in Fig. 4 of Ferrett and Wooton (2005).⁶ The “invariance” of equilibrium choices w.r.t. changes in the international

⁶ Fig. 4 of F&W (2005) assumes that the countries never post weakly dominated bids, i.e. $R_A \leq V_A$ and $R_B \leq V_B$.

distribution of ownership is summed up in Proposition 1:

Proposition 1 For *any* international distribution of the monopoly firm's ownership, equilibrium plant location and bids are identical to those in the "outside ownership" case (Haufler and Wooton, 1999): (i) For $n = 0.5$ and any international distribution of the monopoly's ownership, the monopolist is indifferent between A and B in SPNE, and it receives a subsidy of $V_A = V_B$. (ii) For $n \in (0.5, 1]$ and any international distribution of the monopoly's ownership, the monopolist locates in country A in SPNE, and it receives a subsidy of (just above) $\Pi_B - \Pi_A + V_B$.

Part (ii) is particularly striking. One might have hypothesized that, to the extent that country A owned a proportion of the monopolist ($k_A > 0$), its willingness to bid (V_A) would be *increased* because the profit income of capitalists in A would be highest when the monopolist located in A, the larger market. This false intuition is based on ranking *pre-tax* profits: $\Pi_A > \Pi_B$. However, it forgets that the countries' bids, which determine *after-tax* profit income, are endogenously determined. The "optimal" (i.e., smallest) winning bid by either country is s.t. the monopolist is (approximately) *indifferent* between the two countries – therefore, whenever at least one country plays its best response, capitalists will be indifferent towards the location of production.

4 Conclusion

To be written.

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