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Free entry and regulatory competition in a global economy

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ABSTRACT

This paper examines the optimal entry policy toward oligopoly in a global economy. We show that free entry results in too much competition for the world, but each country's corrective tax policy, unless internationally coordinated, proves suboptimal because of international policy spillovers. Thus, globalization prevents countries from pursuing the optimal entry policy. However, globalization also generates the gains from trade. When countries are small, the gains from trade dominate the losses from a suboptimal entry policy, but as markets grow the result is reversed, making trade inferior to autarky. Therefore, the need for tax harmonization grows as the world economy grows. This paper also contributes to the international tax competition literature through the discovery of the reverse home market effect.

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1. Introduction

The idea that free entry leads to a social optimum has long been cherished as an irrefragable truth in economics. However, this shibboleth is not without criticism.[1] In particular, Mankiw and Whinston (1986) demonstrate that free entry results in too much competition in oligopoly if entry reduces output per firm at the margin. This condition, dubbed the "business stealing effect," holds in a wide variety of situations; in particular, in Cournot competition. The Mankiw–Whinston analysis pertains to a closed economy, but we now live in a globalized world. It is natural to wonder whether their result carries over intact to a global environment.

In a globalized economy the question whether unrestricted entry results in too much competition – and, if so, what constitutes an optimal intervention policy – can be approached from the perspective of an individual country or the entire world. The added dimensionality gives rise to possible policy conflicts and dilemmas among individual countries. It is possible, for example, that entry is excessive for the whole world but too little from an individual country's perspective. Even if all countries agree that entry is excessive, it is another matter whether they can correct the entry problem in a globalized environment.

If they fail to institute a corrective tax policy, individual countries face yet another policy dilemma, which concerns the choice between free trade and autarky. As shown by Brander and Krugman (1983), an open economy enjoys the gains from trade under oligopoly with free entry. Thus, by retreating to autarky, a country can pursue the optimal entry policy but must forgo the gains from trade. If open to trade, a country faces the opposite tradeoff.

The objective of the present paper is to address these policy issues brought about by globalization. To that end, we extend the Mankiw–Whinston model of Cournot oligopoly with free entry to a two-country setting.[2] In doing so, we also make an important departure. While Mankiw and Whinston (1986) consider a governmental edict to directly determine the number of active firms, we explore the corrective role of corporate income tax as an indirect entry control instrument. The two approaches are equivalent as they yield the same results in a closed economy, provided that the tax revenues are rebated back to society in lump-sum fashion. However, our approach has the advantage in

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[1] See von Weizsacker (1980), Perry (1984), and in particular Suzumura and Kiyono (1987).

[2] In line with Mankiw and Whinston (1986) we use the partial-equilibrium model. Our model however can be recast in a general equilibrium setting by adding another tradable good, assuming that it is produced competitively and serves as numéraire so as to balance each country's trade account, and endowing consumers with quasilinear preferences over the two goods.

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that it also contributes to the growing literature on international tax competition.

Our main findings can be summarized as follows. Firstly, free entry results in excessive competition for individual countries and for the world in a globalized environment. Thus, each country has the unilateral incentive to tax domestic firms to curb entry. However, taxation of domestic firms promotes entry in the foreign country and undermines the efficacy of domestic tax policy. As a result, each country chooses too low a tax rate relative to when there are no such tax policy spillovers. Thus, even with the corrective corporate tax policy, competition remains excessive in each country. Our analysis implies that international tax policy harmonization is indispensable for the achievement of a social optimum in a global economy.

As for the dilemma concerning the choice between free trade and autarky, the answer depends on market size. When markets are small, the gains from trade dominate the welfare losses from excessive entry, so globalization benefits open economies. However, when markets are sufficiently large, this result is reversed; autarky becomes welfare-dominant. Thus, as the world economy grows, the need for coordinated tax policy also grows.

These results are obtained analytically under the assumptions that include symmetry, linearity and arbitrarily low transport costs. Relaxing these conditions makes the model analytically intractable, but numerical analysis yields similar results, demonstrating that the basic mechanism yielding our analytical results is also at work in more general settings. In addition, when we relax the symmetry assumption, we obtain two new results. First, we find that the larger country hosts a smaller number of national firms relative to its market size compared with the smaller country. This finding, which we call the reverse home market effect, contrasts sharply with the standard result in economic geography and trade (see e.g., Krugman (1980); Fujita et al. (1999)). Second, we find that the larger country sets the tax rate lower than the smaller country. Moreover, this tax-rate difference widens as the countries become more asymmetric in size. These results also contrast sharply with those well known in the standard tax competition literature.

We now mention the contributions of the present work to the international tax competition literature. Our first contribution is to the strand of research that goes back to Wilson (1986) and Zodrow and Mieszkowski (1986). These authors examine unilateral taxation of internationally mobile factors and show that they are taxed below the optimal rates. This suboptimality is due to the fact that taxing internationally mobile factors causes factor flight and thereby erodes each country's tax base for the provision of public goods. In the present study, factors are internationally immobile, but similar results emerge since unilateral corporate taxation curbs entry of domestic firms but promotes entry overseas.

Our analysis also contributes to the new strand of literature investigating international capital tax competition under imperfect competition. For example, Ludema and Wooton (2000) and Haufler and Wooton (2010) examine how the market (population) size affects the tax rates and welfare under Cournot competition when the number of firms is fixed. In contrast, here the number of firms is determined endogenously through entry and exit. Thus, our model can be regarded as an extension of their works to a longer run in which the distribution of firms across countries changes endogenously.

The remainder of the paper is organized as follows. Section 2 sets up the general model. Section 3 examines the case of symmetric demands and negligible trade costs. Section 4 considers symmetric linear demands and introduces non-negligible trade costs. Section 5 extends the analysis to the case of asymmetric markets. Section 6 discusses limitations of our analysis and suggests extensions for future research.

2. The model

In this section we describe the model. Suppose there are two countries (or regions) in the world. Call them East and West. Each country has a large number of potential firms capable of producing the homogeneous good. Firms are immobile across national borders, so there is no confusion in referring to a representative firm domiciled in country i as firm i $(=e, w)$. Let $p_i(Q_i)$ denote (inverse) demand for the good in country i, where Q_i is total quantity in country i. Assume continuous differentiability with first derivatives denoted by $p_i' < 0$. (Primes denote derivatives.)

On the production side, firms face constant marginal cost c and incur setup cost k_i on entry. In addition, firms pay transport cost t for each unit they export. (There is no transport cost for domestic sales.) Transport cost is low enough for firms to always export positive quantities, the condition to be made more precise below. If q_{ij} denotes the quantity sold by firm i in country j $(i, j = e, w)$, industry supply in market i equals

$$Q_i = m_i q_{ii} + m_j q_{ji} \tag{1}$$

where m_i represents the number of firms in country i. Firms i pay the corporate income tax τ_i to their home country i, earning the net profit[3]

$$\pi_i = (1-\tau_i)\left[(p_i(Q_i)-c)q_{ii} + \left(p_j\left(Q_j\right)-c-t\right)q_{ij}\right]-k_i. \tag{2}$$

The entry cost k_i in country i is assumed to increase with the number of active firms there, so we write

$$k_i = k(m_i)$$

with $k_i' > 0$.[4] This assumption implies that entry entails negative externalities or congestion. Such is the case, for example, if there is limited land supply so entry of new firms drives up the land rent, an important component of setup cost.

Firms consider the two national markets segmented and choose home and foreign sales, q_{ii} and q_{ij}, separately to maximize total profits (2), given all other firms' outputs. The first-order conditions for firm i are

$$\begin{aligned} &p_i(Q_i) + p_i'(Q_i)q_{ii}-c = 0 \\ &p_j\left(Q_j\right) + p_j'\left(Q_j\right)q_{ij}-c-t = 0. \end{aligned} \tag{3}$$

The second-order conditions are assumed to hold; i.e.,

$$2p_i'(Q_i) + p_i''(Q_i)q_{ij}<0 \qquad (\text{for all } i \text{ and } j).$$

The first-order conditions can be arranged to yield the equilibrium outputs:

$$\begin{aligned} q_{ii}^* &= -\frac{p_i(Q_i)-c}{p_i'(Q_i)} \equiv q_{ii}(Q_i) \\ q_{ij}^* &= -\frac{p_j\left(Q_j\right)-c-t}{p_j'\left(Q_j\right)} \equiv q_{ij}\left(Q_j\right). \end{aligned} \tag{4}$$

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[3] We consider tax on operating profits. Taxing the profit net of entry cost has no impact on our qualitative results.

[4] This assumption is needed only for the determination of the number of firms in each country when $t = 0$. For $t > 0$, the numbers of firms are determined uniquely when firms face constant entry cost. Thus, we could let $t > 0$ and constant entry cost at the outset, solve the model and then take the limit $t \to 0$ to characterize the equilibrium when t is arbitrarily low. This alternative approach yields the same results, summarized as our propositions below, but is not pursued here because the proofs are longer. Note also that here we specifically preclude the possibility of positive externalities (i.e., $k_i < 0$), since that would allow an infinite number of firms to be active under free entry.

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