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Imperfect tax competition for profits, asymmetric equilibrium and beneficial tax havens

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ABSTRACT

We present a model of tax competition for real investment and profits and show that the presence of tax havens in some cases increases the tax revenue of countries. In the first part of the paper, we argue that tax competition for profits is likely to be imperfect in the sense that the jurisdiction with the lowest tax rate does not necessarily attract all shifted profits. Under this assumption, tax competition between a large number of identical countries may lead to either a symmetric equilibrium with no profit shifting or an asymmetric equilibrium where firms shift profits from high-tax to low-tax countries. In the second part of the paper, we introduce tax havens. Starting from a symmetric equilibrium, tax havens unambiguously reduce the tax revenue of countries due to a 'leakage effect' — tax havens attract tax base from countries — and a 'competition effect' — the optimal response to the increased tax sensitivity of tax bases involves a reduction of tax rates. Starting from an asymmetric equilibrium, however, tax havens also raise the tax revenue of countries through a 'crowding effect' — tax havens make it less attractive to compete for profits and thus induce low-tax countries to become high-tax countries. We demonstrate that the latter effect may dominate the former effects so that countries, on balance, benefit from the presence of tax havens.

1. Introduction

While most of the theoretical literature on tax competition has focused on competition for mobile real capital, there is now ample empirical evidence that multinational firms also respond to tax differences by shifting profits between jurisdictions. Bartelsman and Beetsma, (2003) and Clausing, (2003) demonstrate that multinational firms manipulate transfer prices in order to minimize global tax costs whereas Desai et al., (2004), Huizinga et al. (2008) and a number of studies reviewed by Hines (1999) report results consistent with profit shifting through finance structures.

A number of recent papers have contributed to the emerging understanding that profit shifting fundamentally reshapes the incentives underlying optimal taxation of capital. Haufler and Schjelderup (2000) find that profit shifting introduces an incentive to reduce tax rates and broaden tax bases.[1] Mintz and Smart (2004) show that profit shifting lowers the tax sensitivity of real investment, which suggests that profit shifting softens tax competition for real investment. Hong and Smart (2010) demonstrate that high-tax countries may benefit from profit shifting since it allows them to establish a *de facto* differentiated corporate tax system with mobile multinational firms facing a lower effective tax rate than immobile domestic firms.[2]

In the first part of the paper, we contribute to the literature on profit shifting by setting up a model of tax competition for real investment and profits between a large number of identical countries. Assuming that tax competition for profits is imperfect in the sense that the jurisdiction with the lowest tax rate does not necessarily attract all shifted profits, we show that the equilibrium may be either symmetric with all countries applying the same tax rate t^S or asymmetric with an endogenous fraction of countries applying a low tax rate t^L and the remaining countries applying a high tax rate t^H. The possibility of asymmetric equilibrium provides an explanation for the observed heterogeneity in capital taxes across countries and for the somewhat weak empirical evidence of convergence in capital tax rates (Slemrod, 2004). Our contribution thus compliments a number of earlier papers that attribute asymmetric outcomes in capital taxation to differences in country size (Bucovetsky, 1991), industrial clusters sustained by agglomeration forces (Baldwin and Krugman, 2004) and specialization in goods with different capital intensities (Wilson, 1987).

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[1] A similar point is made by Fuest and Hemmelgarn (2005) in a context where the corporate tax acts as a backstop to the personal income tax.

[2] Much in a similar spirit, Peralta et al. (2006) show that countries may optimally decide not to enforce transfer pricing rules since this works as a means to attract mobile multinational firms while maintaining a high tax rate on immobile domestic firms.

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The evidence that multinational firms engage in profit shifting has spurred an increased interest in the role of tax havens. Slemrod and Wilson (2009) present an elaborate model of profit shifting to tax havens and show that tax havens unambiguously reduce the welfare of countries due to wasteful use of resources by tax havens providing tax evasion services to firms and by tax administrations seeking to limit this tax evasion. Conversely, in the framework of Hong and Smart (2010), the presence of tax havens improves efficiency by facilitating profit shifting of multinational firms.

In the second part of the paper, we introduce tax havens into the model. Following Slemrod and Wilson (2009), we let 'tax havens' refer to jurisdictions that do not levy capital taxes and use 'countries' to refer to other jurisdictions. Our main result is that the presence of tax havens may increase the revenue of countries. Starting from an asymmetric equilibrium, introducing tax havens reduces the revenue of low-tax countries more than the revenue of high-tax countries and therefore induces low-tax countries to become high-tax countries. When the number of tax havens is sufficiently large, the asymmetric equilibrium is replaced by a separating equilibrium where all countries apply the same high tax rate. Although tax havens reduce the tax bases of countries ('leakage effect'), they also induce low-tax countries to raise their tax rates, which increases revenue in countries ('crowding effect'). In some cases, the crowding effect dominates the leakage effect and the presence of tax havens increases tax revenues of countries. The immediate policy implication is that cooperation between OECD countries should not necessarily aim at eliminating tax havens as a means of raising corporate tax revenues since this could induce countries to engage in tax competition for profits and thus result in lower equilibrium tax revenues.

The outline of the paper is as follows: in Section 2, we analyze a world economy without tax havens and characterize the symmetric and asymmetric equilibria. In Section 3, we introduce tax havens and characterize the separating equilibrium in order to compare tax revenues in equilibria with and without tax havens. In Section 4, we conclude. In order to keep a flow in the text, all proofs are relegated to the Appendix.

2. A world economy without tax havens

We consider a world economy with N *ex ante* identical countries and one multinational corporation (the 'MNC'). The MNC has production plants in all N countries and each plant is represented by a production function $f(k_n)$ where k_n is the input of capital in country n. We assume that mobility of real capital is costless and that N is very large. The only source of government revenue is a tax on capital.[3] The gross tax base of the MNC in country n equals the capital investment k_n. We allow, however, for the possibility that the MNC shifts profits between jurisdictions and let q_{nm} denote the tax base that is shifted from country n to country m in this fashion. In the spirit of Haufler and Schjelderup (2000), we assume that profit shifting is associated with shifting costs in the country from which profits are shifted, hence in the most general specification shifting costs in country n are given by $C_n = C_n(q_{n1},...,q_{nN})$.

In the following, we analyze a two-stage game in which governments set tax rates simultaneously and non-cooperatively in the first stage while correctly anticipating the behavioral responses of the MNC in the second stage. In Sections 2.1–2.4, we solve the problem of the MNC and derive the optimal allocation of real capital and profits conditional on tax rates. In Section 2.5, we derive first-order conditions to the government problem. In Sections 2.6 and 2.7, we identify the symmetric and asymmetric Nash equilibria of the tax game.

2.1. The problem of the MNC

The MNC sets real investment levels k_n and profit shifting levels q_{nm} in order to maximize global profits net of taxes and shifting costs while facing the constraint that global real investment cannot exceed the global capital endowment. Hence, the maximization problem of the MNC looks the following:

$$\max_{k_n, q_{nm}} \sum_{n=1}^{N} \left\{ f(k_n) - \left(k_n - \sum_m q_{nm} + \sum_m q_{mn} \right) t_n - C_n(q_{n1}, q_{n2} \ldots q_{nN}) \right\} \quad (1)$$

subject to:

$$\sum_n k_n = Ns \quad (1a)$$

$$q_{nm} \geq 0 \ \forall n, m \quad (1b)$$

$$k_n \geq 0 \ \forall n \quad (1c)$$

$$\left(k_n - \sum_m q_{nm} + \sum_m q_{mn} \right) \geq 0 \ \forall n \quad (1d)$$

where t_n is the statutory tax rate in country n and s is an exogenous capital endowment in each of the N countries. The constraints (1b)–(1d) require that profit shifting levels, real investment levels and tax bases are non-negative. To avoid unnecessary complications, we assume that the exogenous capital endowment s is sufficiently large to ensure that the constraints (1c)–(1d) are not binding in the equilibria considered.

We note that the MNC maximization problem is separable in real investment levels k_n and profit shifting levels q_{nm} which enables us to solve the MNC problem with respect to the optimal allocation of profits and the optimal allocation of real capital separately.[4] Since $C_n(\cdot)$ plays a very important role in shaping tax competition for shifted profits, we devote the following section to a discussion of shifting costs.

2.2. Shifting costs

Shifting costs are usually thought to capture either costly efforts by the MNC to conceal tax evasion from the tax authorities or a risk of detection. In either case, it seems reasonable to assume increasing marginal costs of shifting profits reflecting, for instance, that tax audits tend to focus on large scale irregularities. Such considerations have led related papers to assume that shifting costs are a convex function of total shifted profits. While this assumption is appealing in two-country models, such as Haufler and Schjelderup (2000) and Stöwhase (2005), there is reason to reconsider it in our multi-country model. When the MNC faces an international tax environment with several low-tax countries, it seems natural to introduce a cost advantage of diversification reflecting that shifting large amounts of profits to one country is more conspicuous and therefore requires more concealment efforts or entails a larger risk of detection than shifting the same amount of profits to several countries. This reasoning is probably most convincing if we think of the MNC as shifting profits to low-tax countries by means of manipulated transfer prices. Were the MNC to shift a given amount of profits to only one

[3] We assume throughout the paper that countries apply a uniform tax rate to capital. Hence, we do not pursue the analysis of optimal tax policy under the alternative assumption that countries can apply preferential regimes to certain types of capital (Keen, 2001).

[4] It would probably be more realistic to let costs of shifting profits from country n to country m depend negatively on the real investment level in country m since, arguably, detection is more likely when profits are shifted to countries where the MNC has little real activity. This point has previously been made by Mintz and Smart (2004). Such an extension, however, falls outside the scope of this paper.