Tax competition when firms choose their organizational form: Should tax loopholes for multinationals be closed?

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Abstract

We analyze a sequential game between two symmetric countries when firms can invest in a multinational structure that confers tax savings. Governments are able to commit to long-run tax discrimination policies before firms’ decisions are made and before statutory capital tax rates are chosen non-cooperatively. Whether a coordinated reduction in the tax preferences granted to mobile firms is beneficial or harmful for the competing countries depends critically on the elasticity with which the firms’ organizational structure responds to tax discrimination incentives. A model extension with countries of different size shows that small countries are likely to grant more tax preferences than larger ones, along with having lower effective tax rates.

Keywords: Tax competition; Multinational firms; Preferential treatment

JEL classification: H73; F23

1. Introduction

The issue of why firms choose a multinational structure has received much attention in the modern theory of international trade. According to this theory, savings in transportation costs and tariff-jumping arguments are among the core reasons for firms investing in more than a single country (Horstmann and Markusen, 1992). Tax savings, on the other hand, have so far played hardly any role in this literature. This is surprising, because 70% of FDI inflows and more than 90% of FDI outflows occur between the developed countries (Markusen, 2002, Table 1.2) which are characterized, on average, by high corporate taxes, but relatively low tariffs and transportation costs.\textsuperscript{1} There is by now substantial empirical evidence that multinational firms are able to significantly reduce their corporate tax burden by

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\textsuperscript{1} Using revenue collections as an indicator, tariff revenue was only about 10% of corporate tax revenue in the United States in 2003 ($ 21 billion vs. $ 200 billion). In the European Union, the share of tariff collections over corporate tax revenue is even lower, due to the high volume of tariff-free intra-European trade. See OECD (2005).

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transfer pricing and other profit shifting strategies (Hines, 1999; Bartelsman and Beetsma, 2003). Moreover, a rising share of FDI occurs in knowledge-based industries where a large part of earnings consists of royalties and license fees that can easily be shifted internationally. While precise quantifications remain difficult, these tax savings are arguably at least as important from the perspective of multinational firms as the reduction of transportation costs or tariffs. Nevertheless, the extensive literature on taxation and foreign direct investment (see Gresik, 2001 for a survey) has so far not considered taxes as a potential cause for the choice of a multinational form, but has instead focussed almost exclusively on the consequences for tax policy of the existence of multinational firms.

In this paper we present a model where firms endogenously choose a national or a multinational form, in response to the tax advantages accorded to a multinational status. These tax advantages may come in several forms. In Europe, for example, governments increasingly grant special tax preferences to multinational enterprises (MNEs) that are not extended to domestic firms. The EU’s Primarolo Report (1999) lists a total of 66 examples of discriminatory tax preferences in favour of MNEs. A typical case are Belgium’s special tax rules for large, foreign-based corporations that establish a coordination center in the country. Under this law, the normal statutory tax rate is applied to a very narrow notional tax base, leading to effective tax rates that are close to zero for most of the benefitting firms (Primarolo Report, 1999, A 001).

While special tax laws favouring MNEs are a particularly visible kind of tax discrimination, they are not the only one. Some MNEs can shift profits elsewhere, for instance to the 35 offshore tax havens identified by the OECD (1998, 2000). A weak enforcement of transfer pricing rules equally grants MNEs a tax advantage over domestic firms, and thus acts as a discriminatory device. These examples demonstrate that discriminatory tax reductions in favour of mobile, multinational firms have become widespread. Moreover, tax discrimination can be actively influenced or controlled by national governments, and can therefore itself be viewed as a strategic policy variable.

In the political debate, the current consensus in both the OECD and the European Union seems to be that tax discrimination in favour of mobile firms is both ‘unfair’ and ‘harmful’. The EU has adopted a Code of Conduct for business taxation (European Communities, 1998) under which member states have committed themselves to phase out existing tax preferences, and a similar policy goal is pursued by the OECD. From a theoretical perspective it is by no means obvious, however, that discriminatory tax policies are harmful in a world where national or sub-national jurisdictions are free to choose corporate tax rates independently. Instead, tax rate competition may well be intensified when the possibility to tax-discriminate between internationally mobile and immobile firms is reduced.

To capture the central features of the resulting interaction between countries and firms, two model elements are important in our view. As mentioned above, the first element is that tax concessions offer an incentive for firms to invest in a multinational structure, in order to benefit from these tax advantages. The second element is the long-term nature of most tax concessions, which are changed far less frequently than statutory tax rates. This observation applies to both the formal enforcement of transfer pricing rules, codified in national tax laws, and to many of the special tax preference schemes that explicitly aim at organizational adjustments within the tax-favoured multinational group. In the example of the Belgian coordination centers mentioned above, the tax preferences implied by the narrow tax base have been in effect continuously since 1983. Given the long-term commitment to maintain its tax preference, a large number of multinational groups have been attracted to Belgium, despite the uncertainty about the development of statutory tax rates, which were changed five times since the beginning of the preferential tax rule.

In this paper we set up a model that incorporates these elements and analyze the effects that the firms’ endogenous choice of organizational form has on optimal corporate tax policy. Specifically, we model a sequential game between two symmetric countries in which governments decide in a first stage on the degree of tax preferences for internationally mobile firms. Firms then decide on whether to invest a fixed cost and set up a foreign division in order to qualify for these tax reductions. In the third stage, governments compete for mobile capital by means of statutory corporate tax rates, before firms make their investment decisions.

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2 As an example, Microsoft has moved some of its R&D operations to a subsidiary in Dublin, allowing the company to channel a disproportionate share of its profits from European sales to low-tax Ireland (12.5% corporation tax). See Wall Street Journal, November 7, 2005.

3 One exception is Janeba (2000), who analyzes the incentives for a monopolist to install capacities in each of two countries, in order to induce tax competition between them.

4 Bartelsman and Beetsma (2003, Table 1) give details – based on information collected by Ernst & Young – on the formal enforcement of transfer pricing rules in 16 OECD countries. This comparison documents substantial international differences in the enforcement of transfer pricing rules and their econometric results indicate that a stricter control of these rules does indeed reduce profit shifting.

5 See Weichenrieder (1996) for an account of the response of German firms to this and other special tax schemes in the EU.

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Our analysis yields the following results. When the firms’ choice of organizational form responds inelastically to tax advantages, then countries will choose a high level of tax preferences in the first stage of the game, and set the statutory tax rate on immobile firms at the maximum possible level. In this regime, the optimal coordinated policy is indeed to reduce the number of tax loopholes for multinationals. If, however, the response of firms’ organizational form to tax preferences is elastic, then non-cooperative policies will consist of a moderate level of tax discrimination chosen in the first stage of the game, and an interior level of the statutory tax rate in the third. A coordinated policy should then increase, rather than reduce, the degree of tax discrimination, in order to soften the competition via corporate tax rates. A further, positive result is obtained when we extend the model to account for differences in country size. Our numerical results show that small countries are likely to grant more tax preferences than larger ones, in addition to having lower effective tax rates.

Our analysis relates to two different strands in the literature. A first group of papers explicitly compares inter-jurisdictional tax competition under discriminatory vs. nondiscriminatory tax regimes. Janeba and Peters (1999) show that a mutual agreement to refrain from tax discrimination is Pareto improving in a setting where two countries compete for a tax base that is perfectly mobile internationally, but at the same time are able to tax a completely inelastic domestic tax base. Keen (2001), in contrast, reaches the opposite conclusion in a model where both tax bases are internationally mobile, albeit to a different degree, and the aggregate size of each tax base is fixed. Janeba and Smart (2003) generalize Keen’s model and provide a synthesis of the conditions under which a preferential tax treatment of the more mobile base is beneficial or harmful for the competing countries. Finally, Haupt and Peters (2005) show that the policy case for a ban on preferential tax regimes is strengthened when investors have a ‘home bias’. All these contributions model tax discrimination as a single-stage game and assume that capital tax bases differ exogenously in the degree of international mobility.6

A second, recent strand in the literature focuses on the strategic use of tax enforcement policies. Peralta et al. (2006) analyze a two-stage game between asymmetric countries which compete for the profits of a single multinational firm by means of the corporation tax rate and a tax enforcement variable. In their analysis, tax enforcement is used as a strategic instrument to influence the rival country’s subsequent choice of tax rate. A direct precursor to our work is Hong and Smart (2007) who consider a small open economy which chooses both its statutory tax rate and the degree of tax sheltering given to multinationals. They find that an increase in income shifting allows the government of the small country to increase its tax rate. The final objective of their analysis is to evaluate the effects that the presence of tax havens has on global welfare. The same question is also asked by Slemrod and Wilson (2006), with different conclusions being reached in the two analyses. None of these papers, however, endogenizes the decision of firms to invest in a multinational organizational form.

The remainder of this paper is organized as follows. Section 2 describes the basic model. Section 3 analyzes tax rate competition in the third stage of the game. Section 4 describes the choice of organizational form by firms. Section 5 analyzes non-cooperative discrimination policies in the first stage. Section 6 turns to the welfare effects of coordinated changes in discrimination policies. Section 7 extends the analysis to allow for size asymmetries between countries and Section 8 concludes.

2. The model

We analyze a model of two countries that compete in capital tax rates and in the tax advantages granted to MNEs, taking account of the firms’ endogenous choice of organizational form.7 We consider a four-stage game with the following sequence of events. In the first stage, governments decide on the degree of tax discrimination between mobile and immobile firms. In the second stage, firm owners decide on whether to invest a lump sum to open up a foreign division and become a mobile, multinational firm, or remain an immobile, domestic firm. In the third stage, governments choose statutory capital tax rates. In the fourth stage, mobile firms decide where to produce and consumption plans are realized. All agents perfectly anticipate future decisions and the model is solved by backward induction. Hence in this section and in the following one we treat the decision of firms to be mobile or immobile as exogenous, and derive the sub-game perfect solution for the non-cooperative choice of tax rates.

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6 Osmundsen et al. (1998) consider a problem that is related to this literature. In their model the government is unable to observe the degree of international mobility of firms and the optimal tax policy is to tax mobile firms more, and immobile firms less, than under perfect information.

7 Throughout our analysis, the terms capital and firms are used interchangeably.
In the benchmark model we assume that there are two identical countries \( i \in \{1, 2\} \), which form a federation.\(^8\) The (representative) resident of each of countries 1 and 2 owns \( e \) units of capital. Let \( k^i_j \) be the investment in country \( i \) of an investor from country \( j \). Then the total amount of capital invested in country \( i \) is \( k_i = k^i_1 + k^i_2 \). The production function \( f \) (\( k_i \)) exhibits the usual properties of a positive but decreasing marginal product of capital, \( f'(k_i) > 0, f''(k_i) < 0 \). Moreover the Inada conditions hold, i.e., \( f'(0) \to \infty \) and \( f'(\infty) \to 0 \). Full employment of the fixed aggregate supply of capital implies

\[
k_1 + k_2 = 2e. \tag{1}
\]

The investment of each individual is divided between \( h_i \) units of immobile capital and \( \kappa_i = k^i_1 + k^i_2 - h_i \) units of internationally mobile capital. Hence \( e = h_i + \kappa_i, i \in \{1, 2\} \), where \( h_i \) and \( \kappa_i \) are predetermined at this stage of the game. Mobile and immobile capitals are perfect substitutes in the production of output. Mobile capital can locate anywhere in the federation costlessly, whereas immobile capital cannot be moved at all. The amount of mobile capital employed in country \( i \) is endogenous, and denoted \( m_i \). The total quantity of capital (mobile and immobile) invested in country \( i \) is thus

\[
k_i = k^i_1 + k^i_2 = h_i + m_i \forall i, j, i \neq j, \quad h_i, m_i \geq 0. \tag{2}
\]

We assume that all capital employed in country \( i \) is taxed at source, i.e., country \( i \) taxes all capital invested locally \((k^i_1 + k^i_2)\), but exempts the foreign investment of domestic residents \((k^i_2)\) from tax. This follows a widespread perception in the literature that worldwide company taxation in practice follows closely the source principle of taxation (e.g. Tanzi, 1995, Ch. 6–7).\(^9\) Nevertheless, as is true for much of the tax competition literature, our treatment simplifies international tax relations by not endogenizing the optimal tax response of the residence country.\(^10\)

Mobile and immobile capital must be taxed at the same statutory rate \( t_i \). However, mobile capital may face a lower effective rate, since it can shelter income. Let \( 1 - \phi_i \) be the share of capital income which can be sheltered from tax so that \( \phi_i \) measures to which extent the two countries enforce taxes on mobile capital.\(^11\) To keep our model as simple as possible we do not incorporate any costs of this tax sheltering, and hence do not model an optimal tax avoidance decision taken by mobile firms.

With tax sheltering the effective tax rate on mobile capital in country \( i \) is

\[
\tau_i = \phi_i t_i, \quad 0 \leq \phi_i \leq 1. \tag{3}
\]

The gross return to capital in country \( i \) is \( f'(k_i) \). Taxes are imposed per unit of capital so that the net return for a unit of mobile capital is \( f'(k_i) - \tau_i \). As we will discuss in more detail in Section 4, the distribution of costs to become a multinational firm is specified such that some firms will always want to choose a multinational structure, even in the absence of any tax advantages. This ensures that, in our model, there will always be some mobile capital employed in each country.

Given the presence of mobile firms, each country must also find it attractive to compete for these firms, rather than switch to a high-tax strategy where it fully expropriates the return to immobile capital while allowing all mobile capital to leave the country. The latter possibility is analyzed extensively in Janeba and Peters (1999), in a model where any tax differential induces all the mobile capital to move to the lower-tax jurisdiction.

\(^8\) The assumption of identical countries will be relaxed in Section 7.

\(^9\) Host countries generally tax the profits of multinational firms that operate within its jurisdiction. Hence the source principle applies directly when the residence country of the investor exempts foreign-earned profits from tax, to avoid international double taxation. This exemption method is employed by the majority of OECD countries. However, several countries – notably the United States, the United Kingdom and Japan – use instead the credit method, which taxes residents on their worldwide income, but grants a credit for taxes paid abroad (see Gresik, 2001, Table 1). Even in this case, however, source taxation of corporate profits often remains effective. A first reason is that the tax credit granted by the residence country is typically limited to the amount of tax that would have been owed domestically. This implies that the source country’s tax rate is relevant, if it exceeds the tax rate in the residence country. Secondly, foreign-earned profits are not taxed in the residence country until they are repatriated. This offers firms an incentive to defer the repatriation of profits whenever the tax rate in the residence country exceeds that in the source country.

\(^10\) See Gresik (2001) for a survey of the literature on this issue and Davies and Gresik (2003) for a recent analysis which shows that tax competition between the host and the home countries of a multinational is affected by the mode of financing the subsidiary’s operations.

\(^11\) One example of this sort of sheltering is thin capitalization, whereby the firm borrows money from an affiliate in a tax haven located outside the federation. Here \( 1 - \phi_i \) would indicate the fraction of its capital costs which can be deducted in country \( i \). See Mintz and Smart (2004).
In the present model, which features decreasing marginal productivities of capital, it can be ruled out that countries find it optimal to let all the mobile capital locate elsewhere, if the number of mobile firms is not too low, relative to the marginal costs of public funds. Assume that this condition holds and invoking the Inada conditions, tax competition will equalize the net return to mobile capital between countries

\[ r = f'(k_i) - \tau_i = f'(k_j) - \tau_j \quad \forall \ i, j, i \neq j, \tag{4} \]

where \( r \) is the endogenous net return to mobile capital in the federation. Together with the capital market clearing condition (1), this determines the allocation of capital as a function of the effective tax rates \( \tau_i \) in each country. The response of the capital tax base to a change in each country’s effective tax rate is determined by implicitly differentiating (4). This yields the conventional result that the capital tax base in each country is falling in its own tax rate, but rising in the tax rate of the other country, \( \partial k_i/\partial \tau_i < 0 \) and \( \partial k_i/\partial \tau_j > 0, \ i \neq j. \)

Immobile capital faces the full statutory tax rate. Hence, while mobile and immobile capital receive the same gross return, immobile capital bears a higher tax burden and receives a lower net return:

\[ r_i^h = f'(k_i) - t_i = r - \frac{1}{\phi_i} \tau_i \quad \forall i. \tag{5} \]

In the following, it proves convenient to define a measure for the degree of tax discrimination in favour of mobile capital. This measure is

\[ \rho_i = \frac{1 - \phi_i}{\phi_i}, \quad \infty > \rho_i \geq 0. \tag{6} \]

If taxes on mobile capital are fully enforced (\( \phi_i = 1 \)) there is no discrimination and \( \rho_i = 0 \). In contrast, in the absence of any enforcement of taxes on mobile capital (\( \phi_i \rightarrow 0 \)), the tax preference for MNEs becomes arbitrarily large and \( \rho_i \rightarrow \infty \). From the definition of \( \rho_i \) and (5) the tax advantage of a unit of mobile capital over a unit of immobile capital is given by \( t_i - \tau_i = \rho_i \tau_i \).

Even though capital stocks are fixed, the net return to immobile capital cannot be negative. Since \( k_i = e \) in any symmetric equilibrium, we assume an exogenous ceiling for the statutory tax rate equal to \( \tilde{\tau} = f'(e) \). This ceiling will in turn constrain the (lower) effective tax rate on mobile capital, if the discrimination parameter \( \rho_i \) is sufficiently large. From (3) and (6) the maximum effective tax rate \( \tau^M \) is

\[ \tau^M = \frac{\tilde{\tau}}{1 + \rho_i} = \frac{f'(e)}{1 + \rho_i} \quad \forall \ i. \tag{7} \]

There is a representative individual in each jurisdiction, who owns the region’s capital endowment and receives residual labour income \( f(k_i) - f'(.)k_i \), which remains untaxed. Using (4) and (5), private consumption of the representative individual is

\[ x_i = f(k_i) - f'(.)k_i + er - \rho_i \tau_i h_i \quad \forall \ i, \tag{8} \]

whereas the total tax revenue collected by the source-based capital tax is

\[ z_i = \tau_i (k_i + \rho_i h_i) \quad \forall \ i. \tag{9} \]

The government maximizes the utility of the representative agent, given by

\[ u_i = x_i + (1 + \varepsilon)z_i = f(k_i) + (e - k_i)r + \varepsilon \tau_i (k_i + \rho_i h_i) \quad \forall \ i, \tag{10} \]

where (4), (8) and (9) have been used in the second step. The utility function (10) specifies that each dollar of tax revenue is worth \( 1 + \varepsilon \) dollars of private income for the representative agent. This would apply, for example, if the public and private goods were perfect substitutes, with the marginal valuation of the public good (in terms of the numéraire private good) exceeding its cost. However, it also applies with a variable marginal rate of substitution

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12 This is shown in Appendix 1. All appendices to this paper can be found on our homepages at http://dept.econ.yorku.ca/~sam and www.vwl.uni-muenchen.de/ls_haufler.
This result, proved by Bayindir-Upmann and Ziad (2005), implies that differentiating (11), which holds for arbitrary levels of \( \tau \), assume a symmetric policy outcome in this earlier stage of the game. However, the comparative static results in this section are derived by implicitly differentiating (11), which disappears in a symmetric equilibrium where \( \rho = 0 \). To see this, assume that such a pair of tax rates exists and denote them by \( \tau_I = \tau_2 = \tau_M \). In this case immobile firms would not produce so that \( \tau_I = 0 \). Since the tax rates \( \tau_M \) are already fixed at this stage, it does not matter whether the statutory tax rate or the effective tax rate is considered as choice variable: Eq. (3) shows the relation between \( t_I \) and \( \tau_i \) for any given level of \( \phi_i \). In the following it will prove more convenient to treat the effective tax rates \( \tau_i \) as strategic variables.

Differentiating (10) with respect to \( \tau_i \) determines each country’s optimal effective tax

\[
e(k_i + \rho_i h_i) + (1 + \epsilon)\tau_i \frac{\partial k_i}{\partial \tau_i} + (e - k_i) \frac{\partial r}{\partial \tau_i} = 0 \quad \forall \quad i = 1, 2.
\]

(11)

We assume that each country’s maximand (10) is a quasi-concave function of its own effective tax rate14 as long as \( h_i < k_i \), so that the solution to (11) defines country \( i \)'s best response to the tax rate chosen by country \( j \). Given the symmetry of our benchmark model it is natural to focus on a symmetric equilibrium in which \( \tau_1 = \tau_2 \).15

The best response function implicitly defined by (11) shows how tax preferences to multinationals can alter the incentives to set taxes. The first term measures the marginal benefit of raising \( \tau_i \). The effective tax rate is applied to the tax base \( k_i \), but immobile capital \( h_i \) carries the additional tax burden \( \rho_i \tau_i \). The second term describes the marginal loss from an increase in \( \tau_i \), due to a reduced capital tax base. Finally, the last term represents an intertemporal terms of trade effect, which disappears in a symmetric equilibrium where \( k_i = e \).

The effective tax pair \( \tau_1 = \tau_2 = \tau' \) will be a symmetric interior Nash equilibrium if \( \tau_i = \tau' \) is a best response of country \( i \) to \( \tau_j = \tau' \). Eq. (11) implies that there is at most one symmetric Nash equilibrium tax rate, given by\n
\[
\tau' = \frac{e}{1 + \epsilon} (\epsilon + \rho h) \left( -2f''(e) \right).
\]

(12)

Eq. (12) shows that the equilibrium tax rate \( \tau' \) is rising in the excess burden parameter \( \epsilon \), and it is positive for any positive value of \( \epsilon \). Recall, however, that there is an upper bound on \( \tau \), given by (7), which will bind for sufficiently high levels of \( \rho \). Therefore, there will be an interior symmetric Nash equilibrium at \( \tau_1 = \tau_2 = \tau' \) if and only if \( \tau' < \tau_M \). Otherwise, there will be a corner solution with \( \tau_1 = \tau_2 = \tau_M \).17

In the following we will refer to the interior Nash equilibrium with \( \tau_1 = \tau_2 = \tau' \) as Regime I, and to the corner Nash equilibrium with \( \tau_1 = \tau_2 = \tau_M \) as Regime II. If incentives to compete in tax rates were extremely low, the Nash equilibrium would be in Regime II for any value of \( \rho \). This does not seem a realistic possibility. To ensure that an

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13 This interpretation is frequently used in the public finance literature; see e.g. Keen and Lahiri (1998). It presupposes that the bulk of each country’s revenue is raised by taxes other than the one considered here. This is supported by the empirical observation that corporate income tax revenue has accounted for less than 10% of total tax receipts (including social security contributions) in the OECD average during the last decades (OECD, 2005).

14 This will be the case if the production function is quadratic. However, as is well-known in the tax competition literature, it is difficult to find weaker restrictions on the primitives of the model which ensure that this assumption holds.

15 A symmetric equilibrium in tax rates will arise only when both countries have chosen the same degree of tax preference \( \rho \). Implicitly we thus assume a symmetric policy outcome in this earlier stage of the game. However, the comparative static results in this section are derived by implicitly differentiating (11), which holds for arbitrary levels of \( \rho \).

16 Without any further assumptions, it can be shown that the second-order conditions for optimality are satisfied in both countries when \( \tau_1 = \tau_2 = \tau' \). This result, proved by Bayindir-Upmann and Ziad (2005), implies that \( \tau_1 = \tau_2 = \tau' \) must be a second-order locally consistent equilibrium.

17 Note that there cannot be an interior Nash equilibrium with tax rates that exceed \( \tau_M \). To see this, assume that such a pair of tax rates exists and denote them by \( \tau'_1 > \tau'_2 > \tau_M \). In this case immobile firms would not produce so that \( h_i = 0 \). Since the tax rates \( \tau_M \) are derived from the best response function (11), it can then be inferred from (12) that \( \tau'_1 < \tau'_2 \) for all positive levels of \( \rho \). But this leads to a contradiction since \( \tau' < \tau_M \). Intuitively, the existence of immobile capital moderates tax competition and allows each country to set a higher effective tax rate than if all capital were mobile internationally. Therefore, tax competition does not allow governments to raise effective tax rates beyond \( \tau_M \).
interior Nash equilibrium exists for some levels of ρi, it must be true that τi<τM when ρ=0. From the definition of τM in (7) and (12) this condition is

\[ \frac{e}{1+e} \frac{-f''(e)}{f'(e)} \leq \frac{1}{2}. \]  

(13)

Condition (13) implies that neither the excess burden of the tax system nor the elasticity of the marginal product of capital \(-f''(e)/f'(e)\) are too large. In what follows we assume that this condition is indeed met.\(^{18}\) Equilibrium to this tax-setting stage can then be summarized by

**Proposition 1.** There exists a unique symmetric Nash equilibrium to the tax-setting sub-game, in which

\[ \tau^*_1 = \tau^*_2 = \min \left\{ \tau^l = \frac{e}{1+e} \left[ -2f''(e) \right] (e + \rho h), \quad \tau^M = \frac{f'(e)}{(1+e)} \right\}. \]

Either there is an interior Nash equilibrium with \(\tau^* = \tau^l\) (Regime I), or a corner Nash equilibrium with \(\tau^* = \tau^M\) (Regime II).

In the interior Nash equilibrium of Regime I, implicit differentiation of (11) implies that best response functions are upward-sloping and have a slope less than 1 in the neighbourhood of the equilibrium. In the symmetric equilibrium, the slope is

\[ \frac{\partial \tau^l_1}{\partial \tau^l_j} = \frac{1+2e}{2+4e} < 1. \]  

(14)

Our main interest lies in the response of \(\tau^l_i\) to a change in the discrimination parameter \(\rho_i\). Holding constant the number of immobile firms \(h_i\), Eq. (12) implies that

\[ \frac{\partial \tau^l_i}{\partial \rho_i} = \frac{e}{1+e} \left[ -2f''(e) \right] h > 0 \quad \forall \quad i. \]  

(15)

Eq. (15) holds a central result for our analysis. As long as some immobile firms exist in each country \((h>0)\), increasing the tax preferences for mobile firms will lead to a higher effective tax rate on these firms. This implies that the statutory tax rate \(t_i\) must rise by so much that it overcompensates for the effect of the narrower tax base.

Intuitively, the problem faced by the two countries in this stage of the game is that they are legally constrained to levy the same statutory tax rate \(t_i\) on both mobile and immobile capital. Each country would like to increase the effective tax rate on immobile capital, but this tax rise will simultaneously drive mobile capital to the other country. The larger is \(\rho_i\), the higher is the extra gain in tax revenue from immobile firms for any given level of \(t_i\) and the more attractive is it for each country to raise the effective rate of capital taxation. Therefore, increases in \(\rho_i\) shift up each country’s best response function, implying higher equilibrium tax rates in Regime I.

In Regime II both countries impose the maximum effective tax \(\tau^M = \bar{\tau} / (1+\rho_i)\), given the pre-determined choice of \(\rho_i\). Hence there is no interaction between the effective tax rates in the two countries \((\partial \tau^M_i / \partial \tau_j = 0)\). Furthermore, the relationship between \(\rho_i\) and \(\tau_i\) is negative in this regime, as a higher discrimination parameter reinforces the exogenous constraint on the effective tax rate:

\[ \frac{\partial \tau^M_i}{\partial \rho_i} = \frac{-\tau^M_i}{1+\rho_i} = \frac{-\bar{\tau}}{(1+\rho_i)^2} < 0. \]  

(16)

These comparative static results are summarized in:

\(^{18}\) A similar condition is needed to ensure that the equilibrium in the standard Wilson–Zodrow–Mieszkowski model does not involve tax rates greater than 100%. For example, Assumption 3 in Bayindir-Upmann and Ziad (2005) generalizes this condition to a variable cost of public funds, and an arbitrary number of identical countries.
**Proposition 2.** In an interior (corner) Nash equilibrium, the effective tax rate on mobile capital is rising (falling) in the degree of tax discrimination.

### 4. Second stage: Firms’ organizational form

In the tax-setting stage of the game, the distribution of firms between internationally mobile and immobile types is exogenous. We now endogenize the decision of firms to choose their organizational form. This decision is driven by two conflicting considerations. On the one hand mobile capital faces a lower effective tax rate and thus receives a higher net return, as analyzed above. On the other hand, it is well-known from the literature on foreign direct investment that becoming “mobile” involves choosing a multinational organizational structure, which may be costly (see Horstmann and Markusen, 1992; Markusen, 2002).

In our setting we assume that there are fixed costs associated with setting up a division in the other country. These costs, denoted $c$, are firm-specific and are distributed continuously in the interval $(c_l, c_u)$ with density function $g(c)$. Owners of capital compare these firm-specific fixed costs with the tax advantages of mobility. From (5) and (6), the latter are given by $\rho_i \tau_i$. Hence there is a critical level of fixed costs $c^*$, for which

$$\rho_i \tau_i - c^* = 0.$$  \hspace{1cm} (17)

All firms with $c \leq c^*$ choose to become mobile multinational firms ($m_i$), whereas firms with $c > c^*$ prefer to stay immobile ($i$) and operate only in the residence country of the capital owner. We assume that $c_l < 0$ and $c_u > \bar{c}$. The first of these assumptions incorporates the fact that extensively discussed in the trade literature – that there are also non-tax reasons for choosing a multinational structure. The second assumption postulates that the costs of setting up a subsidiary in the other country are sufficiently high for some firms to exceed the maximum possible tax advantage. Together these assumptions imply that there will always be some mobile and some immobile firms, for any set of tax policies chosen by the two governments.\footnote{An alternative assumption that ensures a positive number of mobile firms in equilibrium would have been to introduce convex costs to the government of preventing international tax shifting. In this case, it is too costly for each government to prevent profit shifting completely (i.e. to set $p_i = 0$), giving firms with positive, yet small, fixed costs an incentive to choose the mobile type.}

The continued presence of mobile firms, even when there are no tax preferences, is crucial for some of the results below. Elimination of all tax preferences would be a very attractive policy for governments, if this resulted in the complete elimination of multinationals. Then countries would have no incentive to cut taxes below their statutory maximum rates in the subsequent stage: the corporate income tax would be a lump-sum tax on domestic capital. But if some mobile firms remain, even in the absence of tax preferences, then countries will want to attract these firms. In fact, with tax preferences absent, tax rate competition in the third stage will be very similar to the standard model where all capital is interregionally mobile, as a cut in effective tax rates will cause no extra revenue from domestic firms.

In general equilibrium the number of immobile firms in each country is determined by the tax preferences and the tax rates chosen by both countries. However, from the arbitrage condition (4), the net return to a mobile firm is always equal to $r_i$, independent of where it locates. Hence to determine the effect of an increase in $\rho_i$ on the number of immobile firms in country $i$, it is sufficient to look at the tax advantage to becoming multinational, which from (5) equals $\rho_i \tau_i$. Holding tax rates constant, an increase in $\rho_i$ directly increases the benefit to a multinational form. But holding $\rho_i$ constant, the induced change in $\tau_i$ will also affect the benefits of being mobile, and capital owners anticipate this additional (indirect) effect. In Regime I, the direct and the indirect effect work in the same direction, whereas in Regime II they work in opposite directions. Substituting the equilibrium tax rate in Regime II shows that the tax advantage $\rho_i \tau_i$ equals $\bar{t} \rho_i/(1 + \rho_i)$, which is an increasing function of $\rho_i$. Hence an increase in $\rho_i$ unambiguously reduces the number of immobile domestic firms in both regimes:

$$h_i = e \left[ 1 - \int_{c_l}^{\rho_i \tau_i} g(c) dc \right]; \hspace{1cm} \frac{dh_i}{d\rho_i} = \frac{\partial h_i}{\partial \rho_i} + \frac{\partial h_i}{\partial \tau_i} \frac{d\tau_i}{d\rho_i} < 0.$$  \hspace{1cm} (18)
5. First stage: Discrimination policies

We now set up each government’s problem of choosing the optimal non-cooperative discrimination policy \( \rho_i \). In this initial stage of the game, the private consumption term in the utility function (10) must account for the aggregate costs that firms pay in equilibrium in order to become multinationals. These costs are treated as a pure waste of resources in the present model because, at the margin, tax savings are the reason for choosing a multinational structure. The government objective is then

\[
u_i = f(k_i) + (e - k_i)r + \varepsilon \tau_i(k_i + \rho_i h_i) - \int_{c^*} c \, g(c) \, dc. \tag{19}\]

We differentiate with respect to \( \rho_i \) and employ symmetry and the arbitrage condition (17) for the last mobile firm. Expressing capital stocks as \( k_i, \tau_i, (\rho_i), \tau_j [\tau_i (\rho_i)] \) to indicate that \( \rho_i \) shifts country \( i \)'s reaction function in the third stage along country \( j \)'s reaction function gives

\[
\frac{\partial u_i}{\partial \rho_i} = \left[ e(k_i + \rho_i h_i) + (1 + \varepsilon) \tau_i \frac{d \tau_i}{\partial \rho_i} + (1 + \varepsilon) \tau_i \frac{\partial k_i}{\partial \rho_i} + \frac{\partial \varepsilon \tau_i}{\partial \rho_i} \right] d h_i + (1 + \varepsilon) \rho_i \frac{d h_i}{d \rho_i} = 0. \tag{20}\]

Eq. (20) is valid for both regimes discussed above, but we restrict attention in this section to Regime I.\(^{20}\) The first term in Eq. (20) is zero in this regime, since countries choose tax rates optimally in the third stage [see Eq. (11)]. The second term describes the effect that the choice of \( \rho_i \) has on the intensity of tax competition in the third stage. We will show below that this effect must be positive in Regime I. Finally, the third term incorporates the ability to tax immobile firms more heavily when \( \rho_i \) rises, and the negative effect that this has on the number of immobile firms.

Note next that when deciding upon the level of \( \rho_i \) in the first stage of the game, each government will take account of both the direct effect and the indirect effect (via the induced change in \( h_i \)) that this will have on the optimal level of \( \tau_i \) in the third stage. Differentiating (12) and allowing for a variable level of \( h_i \) gives\(^{21}\)

\[
\frac{d \tau_i}{d \rho_i} = \frac{\partial \tau_i}{\partial h_i} \frac{d h_i}{d \rho_i} = \frac{\varepsilon}{1 + \varepsilon} \left( -2 f'' \right) h(1 - \mu_i). \tag{21}\]

Here we have defined

\[
\mu_i = - \frac{d h_i}{d \rho_i} > 0 \tag{22}\]

as the absolute value of the elasticity with which the number of immobile firms responds to tax preferences. Note that this is a total elasticity, taking account of the direct and indirect effects in Eq. (18). If \( \mu_i < 1 \), then \( d \tau_i / d \rho_i < 0 \).

Eq. (4) implies that \( d k_i / d \tau_i = -1/[2 f'' (e)] \) when \( \tau_1 = \tau_2 \). Using this fact, along with (21) and (14), Eq. (20) reduces to (in Regime I)

\[
\frac{\partial u_i}{\partial \rho_i} = \tau_i h_i \left[ \frac{1 + 2 \varepsilon}{3 + 4 \varepsilon} \varepsilon (1 - \mu_i) + \varepsilon - (1 + \varepsilon) \mu_i \right]. \tag{23}\]

It is easily checked that (23) can equal zero only if \( \mu_i < 1 \). But this implies that \( d \tau_i / d \rho_i \) in (21) must be positive at any Nash equilibrium in Regime I. Hence the optimal level of \( \rho_i \) trades off the advantage of being able to set higher taxes on both mobile and immobile firms in the third stage, against the fact that some firms will choose a multinational organizational form in response to these tax preferences.

We first evaluate (23) at \( \rho_1 = \rho_2 = 0 \). In this case definition (22) implies that \( \mu_i = 0 \) so that (23) must be strictly positive. This indicates that some tax discrimination between mobile and immobile firms will always be introduced by optimizing governments. Intuitively, a small tax advantage for mobile firms allows governments to raise the effective

\(^{20}\) Outcomes that are not within Regime I are analyzed in Appendix 2 (see footnote 12).

\(^{21}\) In contrast, Eq. (15) has included only the direct effect of \( \rho_i \) on \( \tau_i \).
tax rate and hence increase tax revenues in the third stage, whereas the induced reduction in \( h_i \) causes no first-order revenue losses when the initial level of tax discrimination is zero.

To analyze the conditions under which an interior Nash equilibrium in Regime I exists in the third stage, we denote by \( \hat{\rho} \) the level of tax preferences that forms the boundary between the two regimes: that is \( \rho_1 = \rho_2 = \hat{\rho} \) leads to a third-stage outcome in which \( \tau' = \tau^M \). If the elasticity \( \mu_i \) with which firms respond to tax preferences, evaluated at \( \rho_1 = \rho_2 = \hat{\rho} \), is sufficiently high so that \( \partial u_i/\partial \rho_i^d < 0 \), then there must be some \( 0 < \rho < \hat{\rho} \) for which \( \partial u_i/\partial \rho_i^d = 0 \). The condition for (23) to be negative at \( \rho = \hat{\rho} \) is

\[
\mu_i > \mu^c = 1 - \frac{3 + 4\epsilon}{3 + 8\epsilon + 6\epsilon^2}.
\]  

(24)

If instead \( \mu_i \) is below this critical value, then each country will find it optimal to choose a high degree of tax discrimination \( \rho_i \geq \hat{\rho} \) in the first stage, and tax immobile firms at the maximum rate \( \tau^M \) in the third stage (see Appendix 2). This gives:

**Proposition 3.** If the elasticity with which firms respond to tax preferences is sufficiently high so that condition (24) holds at \( \rho_1 = \rho_2 = \hat{\rho} \), then non-cooperative choice of tax discrimination policies leads to a symmetric Nash equilibrium with effective tax rates in the third stage in the interior of Regime I.

Note that the assumption that countries can commit to a long-term discrimination policy is critical for the results derived here. To see this assume instead that countries cannot commit and choose tax preferences and tax rates simultaneously and non-cooperatively after firms have decided on their organizational structure. Choosing \( \rho_i \) and \( t_i \) simultaneously effectively decouples the taxation of mobile and immobile firms. Each country would thus tax immobile firms at the highest rate possible (\( \tilde{t}_i \)), and compete for mobile firms as in the standard tax competition model, using the effective tax rate \( \tau_i = \phi_i \tilde{t}_i \) [see Eq. (3)].

### 6. Coordinating discrimination policies

We now determine whether the non-cooperative choice of discrimination policies is efficient from a global welfare perspective. Suppose then that countries could coordinate the tax discrimination parameter \( \rho \) in the first stage, knowing that they will still set effective tax rates non-cooperatively in the third stage. This setting is at the core of current policy debates in both the EU and the OECD, where an international coordination of tax discrimination policies is actively pursued, but countries remain free to set corporate tax rates autonomously.

Starting from a symmetric, non-cooperative equilibrium in either Regime I or Regime II, the joint welfare effects of a marginal, coordinated increase in \( \rho \) can be determined solely by evaluating the spillover effects that a small increase in country \( i \)'s discrimination policy \( \rho_i \) has on welfare in country \( j \) (\( j \neq i \)). The (first-order) effect on country \( i \)'s own welfare must be zero from the optimality of the initial equilibrium, and the simultaneous increase in \( \rho_j \) has identical effects due to the symmetry of the model. Hence, we differentiate \( u_j \) in Eq. (19) with respect to \( \rho_i \) and note that country \( j \)'s tax rate is affected only via the induced change in \( \tau_j \). This gives

\[
\frac{\partial u_j}{\partial \rho_i} = \left[ \epsilon(k_j + \rho_j h_j) + (1 + \epsilon)\tau_j \frac{\partial k_j}{\partial \tau_j} \frac{\partial \tau_j}{\partial \rho_i} \right] + (1 + \epsilon)\tau_j \left[ \frac{\partial k_j}{\partial \tau_j} \frac{\partial \tau_j}{\partial \rho_i} + \rho_j \frac{\partial h_j}{\partial \rho_i} \right] \quad \forall i \neq j.
\]

The first of these terms is now zero in both regimes: in Regime I, the term in the squared bracket is zero from (11), whereas \( \partial \tau_j/\partial \tau_j = 0 \) holds in Regime II. Moreover, in Regime II we also have \( \partial h_j/\partial \rho_i = 0 \), as a change in country \( i \)'s discrimination parameter has neither a direct nor an indirect effect (because there is no induced change in \( \tau_j \)) on firms’ choices in country \( j \). Therefore, the effects on country \( j \)'s welfare in the two regimes are

\[
\left. \frac{\partial u_j}{\partial \rho_i} \right|^{(a)} = (1 + \epsilon)\tau_j \left[ \frac{\partial k_j}{\partial \tau_j} \frac{\partial \tau_j}{\partial \rho_i} \right] \quad \forall i \neq j,
\]

(25a)
In Regime II the spillover effect can be readily signed from \( \partial k_j / \partial \tau_i > 0 \) and (16). An increase in \( \rho_i \) will induce a reduction in country \( i \)'s effective tax rate in this regime, thus harming country \( j \) in the third stage of the game. In Regime I, the corresponding first effect is positive, as \( \partial \tau_i / \partial \rho_i > 0 \) must hold in this regime [cf. (21)], and the rise in \( \tau_i \) allows country \( j \) to also raise its tax in the third stage [from (14)]. However, anticipating the tax increase in the third stage, some additional firms in country \( j \) will choose a multinational form (\( \partial h_j \partial \rho_i < 0 \)) so that the second term in (25a) is negative. Nonetheless it can be shown that the first effect in the bracket must dominate in Regime I, and a small increase in country \( i \)'s discrimination parameter raises welfare in country \( j \). The proof requires a detailed calculation of comparative static effects and is relegated to Appendix 3. We can then state:

**Proposition 4.** If the elasticity with which firms change their organizational form is sufficiently high (low), so that an interior (corner) equilibrium results in the tax-setting stage, then a small coordinated increase (reduction) in the tax preferences given to mobile firms must be jointly welfare increasing.

Proposition 4 shows that the implications for welfare-improving changes in coordination policies are exactly opposed in the two regimes. In Regime I, a higher level of \( \rho_i \) will lead to less aggressive tax competition (that is, a higher effective tax rate) by country \( i \) in the third stage of the game, thus relaxing the constraint for country \( j \)'s choice of capital tax rate. In this regime, non-cooperative discrimination policies thus lead to a Nash equilibrium with too few tax advantages granted to internationally mobile firms. In Regime II, in contrast, a coordinated increase in the discrimination parameters aggravates the exogenous constraint on statutory tax rates. This reduces the effective taxation of mobile firms in the third stage of the game, lowering welfare in both countries. In this case the non-cooperative Nash equilibrium in Regime II thus features too many tax advantages granted to multinational firms.

The two scenarios in Proposition 4 incorporate both benchmark cases from previous work on corporate tax discrimination. Janeba and Peters (1999) distinguish exogenously between a tax base that is costlessly mobile internationally and an immobile domestic tax base in each country. This setting corresponds to our model in the special case where the elasticity with which firms adjust their organizational form is zero. In line with the results of Janeba and Peters, this case is associated in our analysis with maximum taxation of the immobile factor (Regime II) and excessive tax preferences granted to MNEs. In contrast, Keen (2001) assumes that both tax bases are internationally mobile to some degree. In this setting, coordinated restrictions on tax preferences are globally welfare-reducing, as they will make tax competition more aggressive. While the set-up of our model is different, its implications are similar to Keen’s when an interior Nash equilibrium in taxes occurs in the third stage (Regime I).

There is, however, an important difference. In the analyzes of Janeba and Peters (1999) and Keen (2001), the trade-off for tax policy arises at the tax-setting stage: the constraint to impose equal tax rates on both bases increases the equilibrium tax on the mobile base, but simultaneously lowers the tax rate on the less mobile base. In the present model, in contrast, an increase in the tax preferences granted to mobile firms increases, in a Regime I equilibrium, the effective tax rate levied on the immobile and on the mobile base. However, the mix between the mobile and the immobile tax base changes in our analysis, whereas this has been held fixed in previous work.

7. Differences in country size

In this section we relax the assumption that the two competing countries are identical in all respects. A well-established model is that of two countries which differ in size, but have identical preferences and per-capita endowments (see Bucovetsky, 1991; Wilson, 1991; Kanbur and Keen, 1993). In this model the capital market clearing condition (1) changes to \( s_1 k_1 + s_2 k_2 = e \), where \( s_1 \) and \( s_2 \) are the shares of each country in the world population (with \( s_1 + s_2 = 1 \)) and all variables are expressed in per-capita form.

---

22 These results for small coordinated changes in \( \rho \) suggest that the optimal coordinated discrimination policy is to set \( \rho = \hat{\rho} \) thus maximizing the effective tax rate that countries will non-cooperatively set in the third stage. This argument neglects the role of firms’ fixed costs, however. Incorporating these, it is shown in Appendix 4 that the optimal coordinated level of tax preferences cannot lie in the interior of Regime II, but it may be either at \( \hat{\rho} \) or in the interior of Regime I.
To obtain some analytical results for this asymmetric model, it is necessary to work with simple functional forms for the production function and for the distribution of the costs of establishing a foreign division. Hence the analysis in this section assumes a quadratic production function \( f(k_i) = ak_i - (b/2)k_i^2 \), \( i \in \{1, 2\} \). Moreover, we assume that the fixed costs \( c \) are uniformly distributed over some interval \((0, A)\), i.e. \( g(c) = \beta > 0 \) where \( 0 \leq c \leq A \). We ignore negative levels of \( c \) but assume instead that there is a positive fraction of firms \( \alpha \) that chooses a multinational form, even in the absence of any tax preferences. Finally, the restriction \( \alpha + \beta \ell < 1 \) ensures that there will always be some immobile firms in each country in equilibrium. Together these assumptions imply that the (per-capita) number of immobile firms is given by \( h_i = e [1 - \alpha - \beta \rho \tau_i] \forall i \).

With these specifications it is possible to obtain closed-form solutions for each country’s choice of effective tax rate and for the equilibrium number of immobile firms, both as functions of the exogenous parameters and of the tax preferences chosen in the first stage of the game. These solutions are derived in Appendix 5. Still, these expressions are so complex that they permit only to derive local results, starting from an initial equilibrium in which both countries have no tax preferences \((\rho_1 = \rho_2 = 0)\). These results can be summarized as follows:

**Proposition 5.** If countries differ only in population size, the following holds when tax preferences are zero in the initial equilibrium \((\rho_1 = \rho_2 = 0)\):

1. The larger country levies the higher effective tax rate.
2. A small increase in each country’s tax preferences increases the effective tax rate in both countries in the subsequent tax-setting equilibrium.
3. Each country gains from a small increase in its own tax preferences.
4. A small increase in the tax preferences of either country benefits the other country.

Part (i) of the proposition is well-known from the literature on asymmetric tax competition when all capital is mobile internationally (Bucovetsky, 1991; Wilson, 1991). Parts (ii) and (iii) confirm that the local results at \( \rho_1 = 0 \) incorporated in Propositions 2 and 3 above carry cover to the case of asymmetric countries. Finally, part (iv) shows that a zero level of tax preferences in either country is unambiguously ‘too low’ from a global welfare perspective (cf. Proposition 4), even when countries differ in size.

To gain more insights into the interaction between country size, tax preferences and effective tax rates, and to determine more generally the welfare implications of coordinated changes in tax preferences, we have to rely on simulations. The results are presented in Table 1. All simulations focus on Regime I equilibria, since the interesting strategic interactions arise in this regime.

Table 1 shows a consistent pattern of results for various changes in the exogenous parameters. The large country (country 1) sets the higher effective tax rate in all the Nash equilibria computed, and at the same time also chooses fewer tax preferences. This reciprocal relationship between \( \tau_i \) and \( \rho_i \) can be explained by the fact that the tax incentives for firms to choose a multinational structure are given by the product \( \rho_i \tau_i \). The higher level of \( \tau_i \) chosen by the large country then implies that the marginal costs of raising \( \rho_i \) (in terms of revenue lost due to additional firms choosing a multinational structure) are larger for this country. A similar reasoning underlies the findings that a higher excess burden of taxation \((\epsilon)\) or a lower elasticity of the mobile capital tax base (a large curvature parameter \( b \) in the production function) increase effective tax rates, but simultaneously reduce tax preferences in both countries. In contrast, a larger tax elasticity of the choice of organizational form (an increase in \( \beta \)) raises the costs of granting a given

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<tr>
<th>Exogenous parameters</th>
<th>Endogenous parameters</th>
<th>Objective functions</th>
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<tr>
<td>(6) 0.9</td>
<td>0.1</td>
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*Note: Parameter values that are held constant in all simulations: \( e = 1, \alpha = 0.1, \beta = 0.10 \).*

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level of tax preferences \( \rho_i \tau_i \). This change reduces not only the equilibrium levels of tax preferences, but also effective tax rates. Finally, in all simulations that we have carried out a small increase in tax preferences of either country, starting from the non-cooperative equilibrium values, raises the welfare of the other country. Hence Proposition 4 is not overturned by the introduction of size asymmetries between countries, at least for the specific example analyzed here.

8. Conclusions

This paper has analyzed a sequential game between two symmetric countries when firms can invest in a multinational structure that confers tax savings and governments are able to commit to long-run tax discrimination policies. The fundamental trade-off for governments in this setting is that granting tax breaks to MNEs softens tax rate competition, but a preferential tax policy also provides incentives for firms to choose a multinational structure with the sole purpose of benefitting from tax breaks. The non-cooperative equilibrium in tax discrimination strategies and corporate tax rates can be in one of two regimes. If the firms’ choice of organizational structure is rather insensitive to tax preferences, then countries will choose a high degree of tax discrimination and maximum taxation of immobile firms. If, however, the firms’ organizational structure responds elastically to tax preferences, then countries will choose moderate tax preferences for mobile firms and levy tax rates that do not confiscate the return to immobile capital.

These results offer one possible reason why tax breaks for multinational firms are limited in practice, despite the high mobility of this tax base. In setting their discrimination policy, governments take into account the incentives given to firms to invest in a multinational structure, in order to reduce tax payments in subsequent periods. Moreover, extending our model to account for countries of different size, our simulation results indicate that small countries tend to grant more tax preferences than their larger neighbours while at the same time levying lower effective tax rates. This result is consistent with the observation that the vast majority of all reported cases of discriminatory tax regimes occurs in small countries. The explanation for this phenomenon given by our model is that substantial tax preferences reinforce the effects of low effective tax rates in the international competition for mobile capital, whereas the domestic revenue costs caused by tax preferences are mitigated when the overall tax level is low.

Our analysis can be applied to the recent policy moves in both the European Union and the OECD, which aim at abolishing preferential tax regimes in favour of multinational firms, but leave national governments full autonomy over the choice of capital tax rates. The EU’s Code of Conduct and the OECD’s guidelines against ‘harmful tax competition’ address practices in which individual countries try to ring-fence their domestic tax bases by tailoring tax breaks to foreign-based firms without granting domestic firms (even domestic multinationals) the same benefits. Hence countries need not fear that domestic firms respond to tax preferences by changing their organizational form.

In this setting the costs of granting generous tax preferences are thus small, and the non-cooperative equilibrium may well be characterized by excessive tax preferences for multinational firms. Hence, according to our model, a coordinated reduction in these tax preferences is indeed likely to raise tax revenue and welfare in each country. However, our analysis has also shown that results may be very different in other policy settings when the firms’ choice of organizational form responds elastically to tax preferences. Coordinated efforts at reducing tax discrimination then have the potential to render tax rate competition more aggressive, and hence be welfare-reducing.

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