WORKING PAPER SERIES

Even Small Trade Costs Restore Efficiency in Tax Competition

Johannes Becker/Marco Runkel

Working Paper No. 23/2010

OTTO VON GUERICKE
UNIVERSITÄT
MAGDEBURG

FACULTY OF ECONOMICS
AND MANAGEMENT

Impressum (§ 5 TMG)

Herausgeber:
Otto-von-Guericke-Universität Magdeburg
Fakultät für Wirtschaftswissenschaft
Die Dekanin

Verantwortlich für diese Ausgabe:
Marco Runkel
Otto-von-Guericke-Universität Magdeburg
Fakultät für Wirtschaftswissenschaft
Postfach 4120
39016 Magdeburg
Germany

http://www.ww.uni-magdeburg.de/fwwdeka/femm/

Bezug über den Herausgeber
ISSN 1615-4274

Even Small Trade Costs Restore Efficiency in Tax Competition[1]

by

Johannes Becker* and Marco Runkel‡

This version:
14th October 2010

Abstract

We introduce transport cost of trade in products into the classical Zodrow and Mieszkowski (1986) model of capital tax competition. It turns out that even small levels of transport cost lead to a complete breakdown of the seminal result, the underprovision of public goods. Instead, there is a symmetric equilibrium with efficient public goods provision in all jurisdictions.

JEL Codes: H25, F23

Keywords: Tax Competition, Public Goods Provision, Trade

---

[1]We thank Ron Davies, Clemens Fuest, Eckhard Janeba and Kai Konrad for helpful comments. The usual disclaimer applies.

*Institute of Public Economics I, University of Mnster, Wilmergasse 6-8, 48143 Mnster, Germany. E-Mail: johannes.becker@wiwi.uni-muenster.de.

‡Faculty of Economics and Management, University of Magdeburg, P.O. Box 4120, 39016 Magdeburg, Germany. E-Mail: marco.runkel@ovgu.de.

1 Introduction

Almost twenty-five years ago, the seminal contributions by Zodrow and Mieszkowski (1986) and Wilson (1986) set the starting point for a vast and still growing theoretical literature on capital tax competition.[1] In this line of literature, tax competition is mainly interpreted as tax competition for mobile capital. Accordingly, the models focus almost entirely on factor markets for (mobile) capital and (immobile) labor or land. In the background, a perfectly competitive product market without any friction closes the model.[2] However, one might argue that whereas perfect mobility of (financial) capital is a plausible assumption, zero cost of trading products between countries is not, except for some special cases.

In this short paper, we introduce transport cost of trade in products into the Zodrow and Mieszkowski (1986) model and derive the tax competition equilibrium.[3] It turns out that the existence of transport cost leads to a complete breakdown of the main result, i.e. the underprovision of public goods. Instead, a symmetric equilibrium emerges in which all countries choose an efficient level of public goods provision. The rationale of this insight is that transport cost in the product sector imply that small differences in prices across countries do not give rise to international arbitrage. Since the balance of payments requires that trade in goods is accompanied by capital flows, imperfect arbitrage on the product market translates into a certain "stickiness" of capital. This allows governments to marginally adjust their capital tax rates until the efficient solution is reached. It is important to note that even small levels of transport cost suffice to switch from inefficiently low levels of public goods provision to efficiency.[4]

The remainder of the paper is organized as follows. Section 2 presents the basic model assumptions. In Section 3 we characterize the market equilibrium for given capital tax rates. Section 4 then turns to the equilibrium of the tax competition game between the countries. Section 5 briefly discusses the results and concludes.

[1] Literally hundreds of papers have since then explored the robustness of the results to various changes in the modelling approach and a great variety of extensions, many of which are surveyed in Wilson and Wildasin (2004) and Fuest et al. (2005).

[2] Zodrow and Mieszkowski (1986) do not mention the product market explicitly, whereas Wilson (1986) assumes the existence of two private consumption goods, a local one and a national one, the latter of which is costlessly tradable across regions.

[3] We focus on the basic framework introduced by Zodrow and Mieszkowski (1986), but our results concern the Wilson (1986) model as well. See footnote 14 for how our contribution relates to the analysis in Wilson (1987).

[4] Our argument is thus an application of the Diamond (1971) paradox. See Konrad (2010) for another application of this paradox to tax competition. He considers a model with firm mobility where firms face search costs, which arise because getting information on the true effective corporate tax rate is costly. This leads to a small, though decisive reduction in firm mobility and allows for an efficient tax competition equilibrium.

2 Setup

We consider the Zodrow and Mieszkowski (1986) framework in the version presented by Hoyt (1991),[5] and augment it by a transport sector. If transport costs are assumed to be zero, the model boils down to the original one.

There are $n \geq 2$ countries. As country indices we use $i, j \in \{1, \ldots, n\}$. Each country hosts a large number of perfectly competitive firms with mass of unity. The representative firm in country i uses k_i units of capital in order to produce a good according to the production function $F(k_i)$, which satisfies $F' > 0 > F''$ and the Inada condition $\lim_{k_i \to 0} F'(k_i) = \infty$.[6] Capital is rented at the world capital market at an interest rate of $r > 0$. Denoting the price of the good produced in country i by p_i and the (source-based) capital tax rate set by country i by $t_i > 0$, the after-tax profits of the firm located in country i are

$$\pi_i = p_i F(k_i) - (r + t_i) k_i. \tag{1}$$

The first-order condition of profit maximization reads

$$p_i F'(k_i) - t_i = r. \tag{2}$$

This condition implies that the after-tax marginal return to capital, $p_i F(k_i) - t_i$, equals the interest rate r and, thus, is equalized across countries.

Each country is populated by a large number of households which is, again, normalized to unity. The representative household in country i derives utility from private consumption c_i and publicly provided goods g_i according to the utility function $u_i = U(c_i, g_i)$ with $U_c, U_g > 0 > U_{cc}, U_{gg}$. The household is endowed with savings of $\bar{k}$ which are invested at the world capital market. The household's income is given by interest income $r\bar{k}$ and after-tax firm profits π_i. This income is used to purchase c_{ii} units of the consumption good from firms in country i and c_{ij} units of the consumption good from firms in country $j \neq i$. If purchased from firms in country i, the consumption good has a price of p_i. If purchased in country $j \neq i$, i.e. abroad, the price is p_j and a transport cost $\tau \geq 0$ per unit of the good applies. The budget constraint of country i's household is

$$r\bar{k} + \pi_i = p_i c_{ii} + \sum_{j \neq i}^{n} (p_j + \tau) c_{ij}. \tag{3}$$

[5] While Hyot (1991) considers the general case with an arbitrary number of countries, Zodrow and Mieszkowski (1986) focus on the case of infinitesimally small countries which is obtained as special case of the Hyot (1991) model if the number of countries converges to infinity.

[6] We can replace the Inada condition by the weaker condition $F(0) = 0$. This would leave our results completely unchanged, but comes at the cost of much more complicated proofs.

Total consumption of the household in country i equals the sum of consumption from all countries, i.e. $c_i = \sum_{j=1}^{n} c_{ij}$, where the units produced in different countries are perfect substitutes in consumption.

Each government has only one tax instrument, the unit tax on capital. Governments purchase private consumption goods and transform them into the publicly provided good on a one-to-one basis. The government in country i purchases g_{ii} units in its own country and g_{ij} units in country $j \neq i$. Its budget constraint reads

$$t_i k_i = p_i g_{ii} + \sum_{j \neq i}^{n} (p_j + \tau) g_{ij}. \tag{4}$$

Total public consumption in country i amounts to $g_i = \sum_{j=1}^{n} g_{ij}$.

Transport services are provided by a competitive sector which is exempt from corporate taxation and has a linear production function. The only input is capital. Shipping of one unit of the consumption good requires $\theta \geq 0$ units of capital including the original case of $\theta = 0$. Profits of the transport sector are given by

$$\pi^{\tau} = (\tau - \theta r) \sum_{i=1}^{n} \sum_{j \neq i}^{n} (c_{ij} + g_{ij}). \tag{5}$$

Perfect competition reduces these profits to zero from which follows

$$\tau = \theta r. \tag{6}$$

Zero profits and tax exemption imply that we neither need an assumption on to whom the transport firms belong nor on where they are located.[7]

Finally, the equilibrium condition for the world capital market reads

$$\sum_{i=1}^{n} \left(k_i + \theta \sum_{j \neq i}^{n} (c_{ij} + g_{ij}) \right) = n\bar{k}. \tag{7}$$

It equates the world capital demand of the production firms and the transport sector to the world capital supply of the households.

[7]Assuming that the transport sector is taxed actually does not change the main insights. However, such an assumption adds a number of complexities arising from the endogeneity of equilibrium transport costs and the necessity of assuming the location and ownership of transport firms.

3 Market Equilibrium

In this section we analyze the equilibrium of private markets (capital, transport and product markets), taken as given the capital tax rates of the countries. As a benchmark, we first briefly consider the case without transport cost, in order to replicate the original result, and then turn to the case of positive transport cost.

Zero transport cost. Assume $\theta = 0$ and, thus, $\tau = 0$. According to the standard arbitrage argument, the price of the consumption good has then to be the same in all countries. Otherwise, all consumers purchase the good solely in the country with the lowest price, implying that demand in all other countries is zero. However, the Inada condition and (2) render supply in all countries positive and, thus, prevent such a market equilibrium. Normalizing the common price to unity we obtain[8]

$$p_i = 1 \quad \text{for all } i. \tag{8}$$

Equations (2), (7) and (8) determine the capital allocation $\{k_i\}_{i=1}^n$, the product prices $\{p_i\}_{i=1}^n$ and the interest rate r as functions of the tax rates $\{t_i\}_{i=1}^n$. Totally differentiating and following Zodrow and Mieszkowski (1986) in focusing on a symmetric situation with $t_i = t$ for all i, we obtain the comparative static results

$$\frac{\partial p_j}{\partial t_i} = 0, \qquad \frac{\partial r}{\partial t_i} = -\frac{1}{n} < 0, \tag{9}$$

$$\frac{\partial k_i}{\partial t_i} = -(n-1)\frac{\partial k_j}{\partial t_i} = \frac{n-1}{nF''} < 0, \qquad j \neq i. \tag{10}$$

These results show that, in the absence of transport cost, an increase in one country's capital tax rate drives out capital and, thus, increases the capital supply for all other countries. The resulting decline in the world interest rate increases capital demand and restores a new equilibrium. The reason is that capital is perfectly mobile, so changes in the capital tax rates immediately translate into changes in the user cost of capital and thereby induce capital movements. The relative prices of the consumption goods remain unchanged due to perfect arbitrage on the product market.

Positive transport cost. Assume $\theta > 0$ and, thus, $\tau > 0$. Let $p_\ell := \min\{p_i\}_{i=1}^n$ and $p_u := \max\{p_i\}_{i=1}^n$ denote the upper and lower bound of the price range of the consumption good. Then, there are at most three types of countries: countries

[8] The equilibrium condition for the common product market is $\sum_{i=1}^n \sum_{j=1}^n (c_{ij} + g_{ij}) = \sum_{i=1}^n F(k_i)$. With the help of (1), (3) and (4) it is straightforward to show that this condition is always satisfied as identity, which reflects Walras' law in case of zero transport cost. Hence, we can follow Zodrow and Mieszkowski (1986) and ignore this equilibrium condition.

with a price p_ℓ, countries with a price in the interval $]p_\ell, p_u[$ and countries with a price p_u. The countries in the first and the last group are denoted as type ℓ and type u countries, respectively. It can be ruled out that $p_u - p_\ell > \tau$, as this would imply that there is at least one type u country with $p_u > p_\ell + \tau$, so the household and the government of this country purchase the consumption good only abroad and there is no demand for the good produced in this country. Again, such a situation cannot be a market equilibrium because the Inada condition and (2) render supply in type u countries strictly positive. Hence, the arbitrage mechanism works whenever $p_u - p_\ell > \tau$ and reduces the price ranges to $p_u - p_\ell \leq \tau$.

In equilibrium we have either $p_u - p_\ell < \tau$ or $p_u - p_\ell = \tau$. Under $p_u - p_\ell < \tau$, households and governments in each country purchase the consumption good solely at home and there is no international trade in consumption goods. In contrast, if $p_u - p_\ell = \tau$, households and governments in type u countries are indifferent between purchasing the good at home and purchasing it in type ℓ countries. In this case the consumption good may therefore be traded between countries. This, however, depends on the the tax rate differential between t_u and t_ℓ as the following Lemma states.

Lemma *Assuming positive transport cost* ($\tau = \theta r > 0$) *and a tax rate differential satisfying* $t_u - t_\ell \leq \tau(r + t_\ell)/p_\ell > 0$, *the resulting market equilibrium implies* $p_u - p_\ell < \tau$ *and no trade in the consumption good.*

Proof: The proof is by contradiction. Let the number of type ℓ and type u countries be denoted by n_ℓ and n_u, respectively. If $p_u - p_\ell = \tau$, the household and government in a type u country equally divide their consumption over their own country and all n_ℓ type ℓ countries.[9] From (3) and (4), in each type u country we obtain $c_{uu} = c_{u\ell} = [p_u F(k_u) + r(\bar{k} - k_u) - t_u k_u]/[p_u(1 + n_\ell)] > 0$ and $g_{uu} = g_{u\ell} = t_u k_u/[p_u(1 + n_\ell)] > 0$. The household and government in a type ℓ country purchase the good solely at home, so $c_{\ell\ell} = [p_\ell F(k_\ell) + r(\bar{k} - k_\ell) - t_\ell k_\ell]/p_\ell > 0$ and $g_{\ell\ell} = t_\ell k_\ell/p_\ell > 0$. The product market equilibrium condition in a type u country is $c_{uu} + g_{uu} = F(k_u)$. Inserting c_{uu} and g_{uu} and employing $c_{uu} = c_{u\ell}$ and $g_{uu} = g_{u\ell}$ yields $r(\bar{k} - k_u) = p_u n_\ell (c_{u\ell} + g_{u\ell}) > 0$ and, thus, $k_u < \bar{k}$. The condition for the product market equilibrium in a type ℓ country reads $c_{\ell\ell} + g_{\ell\ell} + n_u(c_{u\ell} + g_{u\ell}) = F(k_\ell)$. Inserting now yields $r\left(\bar{k} - k_\ell\right) = -p_\ell n_u (c_{u\ell} + g_{u\ell}) < 0$ and, thus, $k_\ell > \bar{k}$. From $F'' < 0$ and (2) follows that $k_u < \bar{k} < k_\ell$ is possible only if $F'(k_u) > F'(k_\ell)$ or $(r + t_u)/p_u > (r + t_\ell)/p_\ell$. The assumption $p_u = p_\ell + \tau$ then yields the contradiction $F'(k_u) \leq F'(k_\ell)$ if $t_u - t_\ell \leq \tau(r + t_\ell)/p_\ell$. ■

The intuition behind the Lemma is the following. With $p_u = p_\ell + \tau$, there are

[9]The results remain completely unchanged if we assume an unequal division of purchases.

countries at the upper bound of the price range (type u) which purchase the good not only at home but also in countries at the lower bound of the price range (type ℓ). The balance of payments then forces the high-price countries to export capital to the low-price countries. Hence, the marginal return to capital, $p_i F'(k_i)$, is higher in high-price countries than in low-price countries. If tax rates in the two types of countries are equal, the after-tax marginal return to capital, $p_i F'(k_i) - t$, is not equalized across countries, thereby violating (2) and preventing a market equilibrium. This argument remains true in the presence of positive, but not too large capital tax rates differentials, $t_u - t_\ell \leq \tau(r + t_\ell)/p_\ell > 0$. Note that, in the absence of trade costs ($\tau = 0$), an equilibrium without trade only occurs if $t_u = t_\ell$, which is consistent with the Zodrow and Mieszkowski (1986) analysis.

In the next section, we follow Zodrow and Mieszkowski (1986) and focus on the symmetric tax competition equilibrium with $t_i = t$. Since this implies $t_u - t_\ell = 0 < \tau(r + t_\ell)/p_\ell$, we can refer to the market equilibrium with $p_u - p_\ell < \tau$ and without trade. Under this condition, each household and each government purchases the consumption good solely at home, that is $c_{ii}, g_{ii} > 0$ and $c_{ij} = g_{ij} = 0$ for all i, j and $j \neq i$. Then, the product market in country i is in equilibrium if

$$c_{ii} + g_{ii} = F(k_i), \tag{11}$$

where (1), (3), (4) and $c_{ij} = g_{ij} = 0$ for $j \neq i$ yield

$$c_{ii} = F(k_i) + \frac{r(\bar{k} - k_i) - t_i k_i}{p_i}, \qquad g_{ii} = \frac{t_i k_i}{p_i}. \tag{12}$$

Inserting (12) into (11) gives n equations which together with (2) for all i and (7) with $c_{ij} = g_{ij} = 0$ for $j \neq i$ determine the equilibrium capital allocation $\{k_i\}_{i=1}^n$, prices $\{p_i\}_{i=1}^n$ and interest rate r as functions of the tax rates $\{t_i\}_{i=1}^n$.[10] Choosing the price in country 1 as numeraire, i.e. $p_1 = 1$, and totally differentiating yields

$$\frac{\partial p_i}{\partial t_1} = -\frac{\partial p_i}{\partial t_i} = -\frac{1}{F'}, \quad \frac{\partial p_i}{\partial t_j} = 0, \quad \frac{\partial r}{\partial t_1} = -1, \quad \frac{\partial r}{\partial t_i} = 0, \quad i, j \neq 1, \quad i \neq j, \tag{13}$$

$$\frac{\partial k_j}{\partial t_i} = 0. \tag{14}$$

These comparative static results are diametral different from those in the absence of transport cost, compare (13) and (14) with (9) and (10). In particular, tax rate changes now do not affect the capital allocation, but alter the product prices. The intuition is that in the presence of positive transport cost the whole production

[10]Equations (11) and (12) imply that equation (7) is satisfied as identity. This is Walras' law in the presence of strictly positive transport cost.

in a country is solely consumed by the household and government of this country. There is no trade in goods and, thus, the balance of payments requires that there is also no trade in capital, independent of the capital tax rates.[11] Hence, the introduction of (even small) transport costs makes capital sticky and tax rate changes translate into price changes that maintain the market equilibrium.

4 Tax Competition

We now turn to the governments' choice of tax rates. Regardless of whether we have zero or positive transport cost, utility in country i can be written as

$$u_i = U\left[F(k_i) + \frac{r(\bar{k} - k_i) - t_i k_i}{p_i}, \frac{t_i k_i}{p_i}\right]. \tag{15}$$

The government of country i maximizes its residents' utility with respect to the tax rate t_i, taking as given the tax rates of the other countries $j \neq i$. The equilibrium of this Nash tax competition game is determined by the first-order condition

$$\frac{\mathrm{d}u_i}{\mathrm{d}t_i} = \frac{\partial u_i}{\partial t_i} + \frac{\partial u_i}{\partial r}\frac{\partial r}{\partial t_i} + \frac{\partial u_i}{\partial p_i}\frac{\partial p_i}{\partial t_i} + \frac{\partial u_i}{\partial k_i}\frac{\partial k_i}{\partial t_i} = 0, \tag{16}$$

with

$$\frac{\partial u_i}{\partial t_i} = -(U_c - U_g)\frac{k_i}{p_i}, \qquad \frac{\partial u_i}{\partial r} = U_c\frac{\bar{k} - k_i}{p_i}, \tag{17}$$

$$\frac{\partial u_i}{\partial p_i} = -U_c\frac{r(\bar{k} - k_i) - t_i k_i}{p_i^2} - U_g\frac{t_i k_i}{p_i^2}, \qquad \frac{\partial u_i}{\partial k_i} = U_g\frac{t_i}{p_i}, \tag{18}$$

where in $\partial u_i/\partial k_i$ we have used the first-order condition (2).

Let us start by briefly replicating the result of Zodrow and Mieszkowski (1986). According to (8) and (9), without transport cost we have $p_i = 1$ and $\partial p_i/\partial t_i = 0$ for all i. Moreover, Zodrow and Mieszkowski (1986) focus on a symmetric tax competition equilibrium with $t_i = t$ for all i. Equations (2), (7) and $p_i = 1$ then imply $k_i = \bar{k}$ in equilibrium. Inserting into (16)–(18) and rearranging yields

$$\frac{U_g}{U_c} = \frac{1}{1 - \varepsilon} > 1, \tag{19}$$

where $\varepsilon := -(\partial k_i/\partial t_i)t_i/k_i > 0$ denotes the capital demand elasticity in country i with respect to the tax rate in country i. In the absence of transport cost, this elasticity is strictly positive according to (10). Hence, equation (19) states that in the tax competition equilibrium the marginal rate of substitution between public

[11] Formally, equations (13) and (14) imply $k_i = \bar{k}$ independent of t_i.

and private consumption, U_g/U_c, equals the marginal cost of public funds, $1/(1-\varepsilon)$, and is thus larger than 1 which reflects the marginal rate of transformation between public and private consumption. This is the classical underprovision of public goods result obtained by the previous tax competition literature.

If we introduce (even small but) strictly positive transport cost, equations (11), (12) and (14) imply $k_i = \bar{k}$ and $\partial k_i/\partial t_i = 0$ for all i. Inserting this together with (13) into (16)–(18) and rearranging yields

$$\frac{U_g}{U_c} = 1. \tag{20}$$

This condition implies symmetry with $t_i = t$ and $p_i = 1$ for all i.[12] It states that the marginal rate of substitution equals the marginal rate of transformation between public and private consumption. Hence, we have proven the following

Proposition *In the absence of transport cost* ($\tau = \theta r = 0$)*, the symmetric tax competition equilibrium is characterized by equation* (19) *and, thus, inefficient underprovision of public goods. In contrast, in the presence of transport cost* ($\tau = \theta r > 0$) *there is a symmetric tax competition equilibrium with efficient public good provision characterized by equation* (20).

Taking into account transport cost therefore restores efficiency in capital tax competition between countries. Whereas capital is perfectly mobile if transport costs are absent, capital becomes sticky in the presence of transport cost, at least in in a certain parameter range. Then, the use of capital taxes translates into consumer price adjustments and does not lead to capital movements. Under these circumstances, the individual government is able to increase the capital tax rate and, thus, public consumption until the efficient levels are attained.

5 Discussion and Conclusion

Our analysis shows that introducing even small transport cost to the product sector of the classical Zodrow and Mieszkowski (1986) model leads to a complete breakdown of the main result. The equilibrium switches from underprovision of public goods to efficiency. The reason is that even small imperfections on the trade side of the model translate into imperfect mobility of capital. In other words, transport cost in the product sector makes capital sticky. This allows governments

[12] In a more elaborated way, equation (20) can be be written as $U_g[F(\bar{k})-t_1\bar{k}, t_1\bar{k}] = U_c[F(\bar{k})-t_1\bar{k}, t_1\bar{k}]$ for country 1 and $U_g[F(\bar{k}) - t_i\bar{k}/p_i, t_i\bar{k}/p_i] = U_c[F(\bar{k}) - t_i\bar{k}/p_i, t_i\bar{k}/p_i]$ for country $i \neq 1$. This implies $t_1 = t_i/p_i$. Inserting into $F'(\bar{k}) - t_1 = r = p_iF'(\bar{k}) - t_i$ yields $p_i = p_1 = 1$ and $t_i = t_1$ for $i \neq 1$. Hence, in the presence of transport cost symmetry is a result rather than an assumption as in the Zodrow and Mieszkowski (1986) framework.

to costlessly increase their tax rate until the efficient solution is reached.

We are, of course, not the first ones to consider product market imperfections in the context of capital tax competition. It seems, though, that most contributors in the field being dissatisfied with the assumption of perfect product markets build their work on a different model class inspired by Black and Hoyt (1988) and, more recently, Melitz (2003).[13] In these models, countries compete for imperfectly competitive firms and account for consumer price changes. Accounting for imperfect competition and firms comes at the price of giving up the focus on (financial) capital markets, though, and in many cases on general equilibrium effects.

What are the implications of our findings? A general lesson might be that product markets matter for the analysis of capital tax competition.[14] Imperfections and distortions in this part of the economy may have severe repercussions on factor markets and, thus, on optimal capital tax policy. We certainly do not want to claim that, due to positive transport cost, there is no tax competition at all and the whole debate of the last twenty-five years was a chimaera. However, it seems that taking a closer look at the trade side of capital tax competition is worthwhile. While perfect capital mobility is a plausible assumption, zero transport cost for products is not. To sustain the classical result of inefficient public goods provision in the presence of transport cost, the model will have to be modified. A potential modification is the assumption of product heterogeneity, as in Melitz (2003) but by sticking to the assumption of a common financial capital market. We explore this approach in Becker and Runkel (2010).

References

[1] Becker, J. and Runkel, M. (2010). Capital Tax Competition and Trade, mimeo.

[2] Black, D.A. and Hoyt, W.H. (1989). Bidding for Firms, American Economic Review 79(5): 1249-1256.

[3] Davies, R., Eckel, C. (2010). Tax Competition for Heterogeneous Firms with Endogenous Entry. American Economic Journal: Economic Policy.

[4] Diamond, P. (1971). A Model of Price Adjustment, Journal of Economic Theory 3(2): 156-168.

[13]See Davies and Eckel (2010), Haufler and Stähler (2009) and the literature cited therein.

[14]This has also been the starting point of the analysis in Wilson (1987). He assumes a model with two goods and two factors. In equilibrium, countries specialize on the production of a single good which leads to a "wasteful diversity" in tax rate setting and public goods provision. In contrast to this study, our model sticks to the classical assumption of a product market with just one homogeneous good.

[5] Fuest, C., B. Huber and J. Mintz (2005). Capital Mobility and Tax Competition - A Survey, Foundations and Trends in Microeconomics 1(1): 1-62.

[6] Haufler, A. and Stähler, F. (2009). Tax Competition in a Simple Model with Heterogeneous Firms: How Larger Markets Reduce Profit Taxes, CESifo Working Paper No. 2867.

[7] Hoyt, W.H. (1991). Property Taxation, Nash Equilibrium, and Market Power. Journal of Urban Economics 30(1): 123-131.

[8] Konrad, K.A. (2010). Search Costs and Corporate Income Tax Competition, mimeo.

[9] Melitz, M. J. (2003). The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity, Econometrica 71(6): 1695-1725.

[10] Wilson, J. D. (1986). A Theory of Interregional Tax Competition, Journal of Urban Economics 19(2): 296–315.

[11] Wilson, J. D. (1987). Trade, Capital Mobility, and Tax Competition, Journal of Political Economy 95(4): 835-56.

[12] Wilson, J. D. and Wildasin, D.E. (2004). Capital Tax Competition: Bane or Boon?, Journal of Public Economics 88(6): 1065-91.

[13] Zodrow, G. R. and Mieszkowski, P. (1986). Pigou, Tiebout, Property Taxation, and the Underprovision of Local Public Goods, Journal of Urban Economics 19(3): 356–370.

Otto von Guericke University Magdeburg
Faculty of Economics and Management
P.O. Box 4120 | 39016 Magdeburg | Germany

Tel.: +49 (0) 3 91 / 67-1 85 84
Fax: +49 (0) 3 91 / 67-1 21 20

www.ww.uni-magdeburg.de

ISSN 1615-4274