Call for Tax Co-ordination but Complain about Excessive Taxation?[1]

Silke Gottschalk and Wolfgang Peters[2]

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[2]Department of Economics, European University Viadrina, P.O. Box 1786, D-15207 Frankfurt (Oder), Germany; e-mail: silke.gottschalk@nwn.de and Peters@euv-frankfurt-o.de (corresponding author).

Abstract

Contemporaneous complaints state that intensifying tax competition damages a government's ability to raise taxes and that taxes are too high. Our paper explains this puzzle within a model of voting on political representatives and subsequent negotiations about tax rates. To improve the own payoff at the expense of the other country voters elect politicians who implement inefficiently high tax rates. This is due to the facts that electorates are unable to co-ordinate their voting decision and do not face the effective cost for higher tax rates since less tax base leaks away when tax rates increase in either country.

1 Motivation

In the past decades the economic interdependency and integration of countries have rapidly grown. As a consequence national policies become important even beyond a country's borders. On the one hand, a stronger competitiveness of markets is seen to be efficiency enhancing, on the other hand, contesting independent governments engage in a rather wasteful competition for scarce resources.[1] From the governments' point of view this statement is perfectly correct. Whatever a politician in power pursues as main objective, international competition among different countries causes some kind of prisoners' dilemma.[2] In the EU/OECD governments usually consider tax competition as damaging their ability to raise taxes. Hence, we do not wonder that there is a political pressure to engage in bargaining between the national rivals in order to avoid the negative consequences of a non-cooperative behavior which originates in political competition.

In today's world the political process either yields economic and political integration like in the EU or NAFTA, or international agreements contain measures for voluntary self-restraints like GATT/WTO or the EU/OECD negotiations about how to avoid harmful tax practices.[3] Both are characterized by a policy co-ordination of governments in order to reduce the negative consequences of tax competition.

However, what seems to be a good strategy for politicians need not yield an advantage for the electorate. Not without reason complaints about excessive taxation are quite common. According to the viewpoint of e.g. Brennan and Buchanan (1980) the public sector in most countries has grown too large due to imperfections in the political system. As they understand tax competition, it does not yield any kind of underprovision. On the contrary, it seems to be an appropriate measure for taming the Leviathan. In this sense, any kind of policy co-ordination among governments would strengthen the power of the Leviathan which consequently yields an overshooting of policy measures like a provision of public goods or an income

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[1] Avi-Yonah (2000) pointed at an increased mobility of tax bases between countries which, in turn, resulted in an international tax competition of sovereign countries who aim to attract these resources by lowering the tax liability. As a consequence, decreasing tax revenues impede the provision of public goods or, more general, enforce the fiscal crisis of the welfare state. According to Tanzi (1996) taxation (and thereby tax competition) is the policy area where this conflict becomes particularly strong. Thus, the scope for redistribution through either taxation or public expenditures shrinks.

[2] Wilson (1999) gives in his survey an intuitive approach to tax competition models. As he pointed out the majority of tax competition models predicts inefficiently low tax rates and an decreasing scope for redistribution.

[3] For a practical overview on tax heavens and harmful tax preferentials and appropriate measures to overcome the negative consequences see OECD (1998). A theoretical analysis can be found in Keen (2001), Janeba and Smart (2003), or Haupt and Peters (2005).

redistribution among citizens.

In the present paper, however, we will show that political co-ordination will yield an inefficiently high extent of redistribution even if politicians do not behave as extreme as a Leviathan, i.e. when redistribution is simply a matter of political majorities.[4]

Since the typical median income falls short of the average, the political process in a democracy will lead to a redistribution of income, at least to some extent.[5] In case of a redistributive tax-transfer scheme the support for a more redistributive tax is inversely related to an individual's personal income.[6]

To analyze how the political process in a representative democracy and the subsequent bargaining yield inefficiently high tax rates we model a two-stage game. At the first stage the domestic and foreign electorate vote for political representatives who, in turn, subsequently negotiate on tax rates at the second stage.

As with models is often the case our model exaggerates too in some sense. In reality, politicians do not directly negotiate on tax rates because countries are not willing to give up their tax sovereignty. Nevertheless, one can observe political processes on which the mechanism of our model can certainly be applied. Take for instance negotiations within the EU on binding minimum tax rates with respect to the VAT and interest taxation. Another example are EU negotiations over the application of the residence principle in personal income taxation to avoid excessive tax competition. We also observe efforts of the EU which intend to avoid harmful tax preferentials that origin in the application of the source principle in corporate taxation. Applying formula apportionment instead is considered a promising measure to overcome the negative consequences of the source principle. All those negotiations are actually nothing else but a co-ordination of taxation rules. This co-ordination, however, restricts national tax sovereignty in so far as it reduces a country's scope

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[4] A contrasting paper by Persson and Tabellini (1992) focuses on the political integration within the EU without changing the non-cooperative behavior of politicians in the direction of more coordination.

[5] Redistributive taxation which is subject to majority voting exhibits an intermediate view between two rather extreme benchmark approaches: The government as welfare maximizer and the Leviathan who maximizes tax revenues.

[6] Considering the growing importance of interjurisdictional competition there are several approaches analyzing the scope for redistribution in an international context. However, they often concentrate on labor mobility as in Wildasin (1991) and Hindricks (2001), or migration and the political economy of tax heavens as in Hansen and Kessler (2001), while capital can somehow better escape from taxation than labor income. Different motives for redistribution are given in Pauly (1973), Roberts (1977) or Varian (1980) who analyzed how voting on tax schedules can establish redistributive taxation. An empirical investigation by Corneo and Grüner (2002) indicates that conventional economic motives are, among others, a driving force for redistribution.

for setting tax rates. Thus, although formally national tax sovereignty remains untouched, national tax rates are implicitly fixed through a co-ordination of taxation rules.

The remainder of the paper is structured as follows. As usual, the two-stage game is solved by backward induction. Consequently, after describing the model in section 2 we will determine the outcome of tax co-ordination (section 3.1) and then have a closer look on voting for a political representative (section 3.2). Section 4 then provides the results and its economic intuition which is followed by some concluding remarks.

2   The Model

Consider a model with two countries i and j of the same size. Each country's residents distribute their economic activities over both countries. A one-dimensional comprehensive tax reflects the tax system with all its direct and indirect taxes. This comprehensive tax links the relative income of an individual to his or her overall tax liability. Domestic and foreign share of personal income are subject to different tax legislations and therefore different tax rates.

The aggregate tax bases reflecting economic behavior in country i and j respectively are given by

$$
\begin{aligned}
B^i &= 1 - \alpha \left(t^i - t^j \right) - \beta t^i \\
B^j &= 1 - \alpha \left(t^j - t^i \right) - \beta t^j,
\end{aligned}
\tag{1}
$$

where t^i (t^j) are the domestic (foreign) tax rates and α and β are constant parameters characterizing different impacts on the tax bases. $\alpha > 0$ measures the impact of international tax differentials on the tax base. $\beta > 0$ reflects the distortionary effect of taxation. The absolute value of a tax rate has a stronger impact on the tax base than the international difference in tax rates, $0 < \alpha < 1 < \beta$. Furthermore, the aggregate tax base of both countries together does not depend on α since at an aggregate level the decision where to carry out the economic activities does not matter. It is thereby only affected by the distortionary effect of taxation, $B^i + B^j = 2 - \beta \left(t^i + t^j \right)$. Thus, international mobility of economic activities stands for a shift of an essential part of a country's tax base abroad according to the differences in the national tax policies.

In each country all citizens decide on the amount and the place of their economic activity. The decision where to become economically active depends on the differences in tax rates as individuals want to avoid taxation. At a disaggregate level

the tax base of a citizen in country i reflects the domestic as well as the foreign share of economic activity or income respectively. While $1 - (\alpha + \beta)t^i$ corresponds to domestic income, the share αt^i represents exactly that part of income realized in the foreign country j and αt^j turns out to be the inflow of foreign income in country i. If the home country increases its tax rate the domestic activity of its residents is reduced through two channels: the usual tax distortion measured by β, and a shift of economic activity to the foreign country, denoted by α.

Tax revenues in each country are redistributed as per capita transfers that favor residents only. In both countries total income is asymmetrically distributed and the majority of citizens favors a certain extent of redistribution. However, individuals differ with respect to their individual preferences for redistribution θ. For voters this parameter coincides with the individual share of the tax base. These shares determine the income distribution, which in each country is skewed to the right, i.e. the median income falls short of the average.[7]

Each individual wants to maximize her overall income. Thus the payoff of a θ^i-type citizen is given by net income plus transfers $P^i = \theta^i I^i + T^i$, or equivalently

$$P^i = \text{income-taxes} \underbrace{\theta^i \left[(1 - (\alpha + \beta)\, t^i)(1 - t^i) + \alpha t^i (1 - t^j) \right]}_{} + \text{transfers} \underbrace{t^i \left[1 - (\alpha + \beta)\, t^i + \alpha t^j \right]}_{}. \tag{2}$$

A rise in the neighboring country's tax rate induces at least a part of the foreign tax base to flee the higher taxation and thereby enlarges the domestic tax base. Consequently, transfers in the home country increase. The additional transfers exceed the higher foreign tax burden for all below average income types. Thus, taxation abroad exhibits the property of a positive fiscal externality, at least for all below average income earners, and especially the median voter.

However, financing lump-sum transfers is not cost free since we deal with distortionary taxation. Aside from paying an average tax liability an individual with an income just below the average additionally bears an excess burden caused by an increase in the national tax rate. But transfers do not exceed the average, or personal tax, and consequently redistributive taxation does not yield a monetary gain. Although all individuals with a relative income below the average favor lump-sum redistribution, only voters with an income level which does not exceed a certain threshold level will recommend a redistribution through distortionary taxation. This limiting income is characterized by equality of the received transfers to the sum of the personal tax liability and the loss due to the excess burden[8]. Hence, voters

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[7]Income θ is distributed within a closed interval $[0, \overline{\theta}]$ with mean $E[\theta] = 1$ and a median θ^m below average.

[8]All income earners below the threshold level, $\theta < 1/(1 + \beta)$, prefer a positive tax rate inde-

favor no taxation over redistributive taxation if their relative income exceeds the threshold level, $\theta \in (1/(1+\beta); 1)$.

Assumptions:

i) The median incomes are symmetric, $\theta^{im} = \theta^{jm} = \theta^m$ and $\theta^m < \frac{1}{1+\beta}$, the income distribution is sufficiently skewed to the right such that a majority favors redistribution through distortionary taxation.[9]

ii) $\beta > 1 > \alpha$; both conditions together are sufficient for the net income I^i in country i being a decreasing function of its own domestic tax rate t^i. The condition $\beta > \alpha$ reflects that the absolute value of a tax rate has a stronger impact on the tax base than tax differentials.

The former assumption is for convenience only, the latter guarantees that even if taxpayers shift their activities to the low-tax country as a matter of tax avoidance, individuals' total net-income is negatively affected by taxation in either country. Although the consequences of these assumptions are in accordance with practice, they are rather technical.

After introducing those prerequisites we will now analyze the two-stage game of voting and bargaining in a representative democracy.

3 Policy process in a representative democracy

In what follows, we analyze how the political process yields a progressive tax system with a redistribution from the top to the bottom. In a representative democracy this process is reflected by a two-stage game. At the first stage the electorate in each country vote for a political representative characterized by her individual preferences for redistribution $\left(\theta^{ip}, \theta^{jp}\right)$. The politicians to be elected as well as their voters have preferences which characterize their favored extent of redistribution. However, politicians are not completely alike their voters. Besides their personal net income politicians exhibit a second motive for redistribution. According to Niskanen (1971) this is attracting as large a budget as possible. The politician's preferences for redistribution θ^{ip} also reflect this second motive: $\theta^{ip} =: r^i/(1 + \gamma^i)$, where r^i represents a politician's relative income position (i.e. her individual share of the tax base) and γ^i her attitude for attracting a high budget.[10] This 'construction' of

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pendent of their opponent's choice: $\partial P^i / \partial t^i \big|_{t^i=0} = 1 - \theta^i(1+\beta) + (1-\theta^i)\alpha t^j > 0 \ \forall \ t^j \geq 0.$ This threshold level falls sufficiently short of the average so that the lump-sum transfers outweigh the losses due to the excess burden.

[9]If both medians earn an income below the threshold level, they favor a positive tax rate, and so does the politician they vote for.

[10]The 'budget attitudes' γ^i are distributed continuosly among politicians so that voters have a continuos choice.

the politicians' redistributive preferences reflects the fact that politicians' incomes usually exceed the average, so an additional motive is necessary to guarantee for redistributive politics. The politicians' only goal is to maximize the own payoff, they do not pursue the goal of being elected as an end in itself.[11] Every voter will always vote for exactly that politician whose political goal best of all matches her personal interest since voters have complete information about the politicians' payoff functions. At the second stage the elected politicians have the option to engage either in tax competition or tax co-ordination. Since tax competition is a race to the bottom the two politicians decide to negotiate on tax rates t^i and t^j which are less harmful or, to be more precise, are efficient from their perspective. The purpose of this cooperation is to avoid the harmful consequences of tax competition.[12]

3.1 Tax co-ordination

As usual the game is solved by backward induction and, consequently, we will first determine the outcome of the second stage. In the context of international taxation governments can negotiate about two aspects: First, the tax rates which implement an extent of redistribution favored by the two politicians in power and, second, side payments from one country to the other which are to compensate a region for an overshooting effort to reduce the negative consequences of tax competition.

If we allow for side payments, the calculation of the bargaining solution becomes rather simple. To be precise, we apply Nash bargaining in combination with outside option principle, cf. Muthoo (1999). It is evident that if each politician's outside option does not exceed the equal share she receives from the joint payoff, the outside option has no impact on the partition between both negotiators. Otherwise, they are guaranteed at least their outside option. However, in that case their payoff never exceeds the outside option. As long as we deal with nearly symmetric politicians, the latter will never be the case. Thus, we directly concentrate on non-binding outside options. Since politicians payoff is expressed in monetary terms, these expressions can be aggregated. The politicians in power determine the efficient tax rates. Afterwards, the total payoff under cooperation is split equally between the governments. Typically, this second step requires some transfers. As our model deals with symmetric countries, the overall equilibrium at the first stage will exhibit a voting equilibrium where the electorate in the two regions decide for politicians

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[11] As in Besley and Coate (1997) the politician who wins the election always implements her preferred policy. Promising something different is not credible as voters and politicians have complete information.

[12] In a companion paper Gottschalk and Peters (2003) show the consequences of harmful tax competition on the scope for redistribution.

of the same color. Hence, in equilibrium there are no active transfers between the regions. However, they play a decisive role for the voters when making up their mind on whom to vote for.

In a first step politicians agree to maximize their joint payoff

$$P^i + P^j = \theta^{ip} I^i + T^i + \theta^{jp} I^j + T^j \rightarrow t^i, t^j \max \qquad (3)$$

with respect to the regions' taxes. The necessary first-order conditions[13] are also sufficient for a maximum since under our assumptions the sum of politicians' payoff is strictly concave in the two tax rates[14]

$$\theta^{ip} I^i_{t^i} + T^i_{t^i} + \theta^{jp} I^j_{t^i} + T^j_{t^i} = 0$$

$$\theta^{ip} I^i_{t^j} + T^i_{t^j} + \theta^{jp} I^j_{t^j} + T^j_{t^j} = 0. \qquad (4)$$

Solving both necessary conditions for the optimal tax rates, we obtain[15]

$$t^i = \frac{\alpha[2 - \theta^{ip} - \theta^{jp}][1 - \theta^{jp}(1+\beta)] + 2(\alpha+\beta)(1-\theta^{jp})[1-\theta^{ip}(1+\beta)]}{\det}. \qquad (5)$$

The comparative statics of the negotiated tax rates in politicians' preferences for redistribution may have either sign. However, if we restrict the analysis to parameters according to our general assumption, the tax rates are decreasing in θ^{ip}; the tax liability increases when politician's preferences for redistribution become even stronger, i.e. θ^{ip} decreases:[16]

$$\frac{\partial t^i}{\partial \theta^{ip}} = \frac{1}{\det}\left[2\left(\alpha+\beta\right)\left(1-\theta^{jp}\right)I^i_{t^i} + \alpha\left(2-\theta^{ip}-\theta^{jp}\right)I^i_{t^j}\right] < 0 \text{ and}$$

$$\frac{\partial t^j}{\partial \theta^{ip}} = \frac{1}{\det}\left[2\left(\alpha+\beta\right)\left(1-\theta^{ip}\right)I^i_{t^j} + \alpha\left(2-\theta^{ip}-\theta^{jp}\right)I^i_{t^i}\right] < 0. \qquad (6)$$

If voters choose a more left-wing politician the negotiated tax rates rise in either country.

In a second step side payments have to be determined. These payments are to ensure that although the two countries agree on different tax rates and tax revenues the payoff including the intergovernmental side payments are identical across

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[13]Throughout the whole paper subscripts indicate a derivative of the respective function with respect to the variable indicated in the subscript.

[14]While the second derivatives with respect to t^i or t^j are always negative for all politicians of a type to the left of the average, to show that the determinate is positive needs some additional arguments. However, for $\beta \geq 1 \geq \alpha$ maximizing the joint payoff yields an interior optimum. For details see appendix 6.1.

[15]According to the second-order condition of bargaining det $= 4(\alpha+\beta)^2(1-\theta^{ip})(1-\theta^{jp}) - \alpha^2(2-\theta^{ip}-\theta^{jp})^2 > 0$ holds, i.e. there is a unique maximum.

[16]Further details are presented in the appendix 6.2.

countries. Therefore, the difference in countries' payoffs has to be split such that finally all countries receive an equal share of the maximized joint payoff. In our two-country model side payments are given by

$$S^i = \frac{1}{2}\left(\theta^{jp}I^j + T^j - \theta^{ip}I^i - T^i\right) = \frac{P^j - P^i}{2}. \tag{7}$$

3.2   Voting for political representatives

In a representative democracy each voter decides about which politician to vote for. As pointed out before the preferred tax policy depends on the preferences for redistribution.[17] Since in a representative democracy the electorate do not directly vote for a tax policy we have to consider the impact of the choice for a political representative on the subsequent process of tax co-ordination.

At the first stage the electorate in each country votes for a political representative. Taking the outcome of bargaining into account the voter decides on the politician by maximizing her objective function or overall payoff, which is given by the sum of her net income, transfers and the side payments,

$$Z^i = \theta^i I^i + T^i + S^i = \left(\theta^i - \theta^{ip}\right)I^i + \frac{P^i + P^j}{2}. \tag{8}$$

Since this payoff Z^i of any voter fulfills the single-crossing property[18] in the politician's character θ^{jp} or θ^{ip} we can apply the median-voter theorem,[19] i.e. the casting vote is with the median. Thus, the maximization problem to be solved reads

$$Z^{im} = \theta^m I^i + T^i + S^i = \left(\theta^m - \theta^{ip}\right)I^i + \frac{P^i + P^j}{2}$$

$$\text{s.t.} \qquad t^i = t^i\left(\theta^{ip}, \theta^{jp}\right), t^j = t^j\left(\theta^{ip}, \theta^{jp}\right) \rightarrow \theta^{ip}\max. \tag{9}$$

Since the electorate in both the countries is unable to co-ordinate their decisions, they vote simultaneously for their political representatives. Because the total payoff for voters of country i can be improved at the expense of her neighbor, there is

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[17]To be precise, voting at the first stage combines two voting models: the citizen-candidate model and the median voter theorem. The former just refers to the fact that in principle every citizen could be elected as politician. As voters rank candidates according to their preferences for redistribution the voting decision reduces to a pairwise election, since voters always choose between a candidate with stronger and one with weaker preferences for redistribution. In a pairwise election, however, the casting vote is with the median.

[18]For details see appendix 6.3.

[19]On the sufficiency of the single-crossing property for application of the median voter theorem see Gans and Smart (1996).

an incentive to vote strategically. The cooperation problem is 'simply' shifted from the huge anonymous mass of voters to the governments or, respectively, to the elected politicians. However, although politicians co-ordinate their decisions across borders, strategic behavior of the non-cooperative electorate causes an inefficiency like in every kind of prisoners' dilemma. In our case the median voter has an incentive to delegate the political decision to a representative who then, in turn, implements tax rates which are efficient from her own point of view. These tax rates are not efficient in the eyes of the median, though. In other words, elections yield a distortionary effect through a difference between voter's and politician's preferences for redistribution.

The median has a twofold incentive to vote for someone different: a decrease in θ^{ip} has a positive impact on the first term in the overall payoff in equation (9). However, voting for a representative with stronger preferences for redistribution yields higher negotiated tax rates and, therefore, a lower net income I^i. Thus, the optimal choice is characterized by countervailing these opposing effects.

In more detail, the first-order condition to the maximization problem above can be transformed by using the properties of the negotiations (equation (4))

$$\left(\theta^m - \theta^{ip}\right)\left[I_{t^i}^i t_{\theta^{ip}}^i + I_{t^j}^i t_{\theta^{ip}}^j\right] = 0.5 I^i. \tag{10}$$

By means of this equation, we can show whether the median voter uses her ballot for a politician who is more to the right or more to the left than she is herself.

Individuals favor a positive net income I^i. Obviously, this requires that the two terms on the LHS of (10) necessarily exhibit the same sign

$$\text{sign } \left\{\theta^m - \theta^{ip}\right\} = \text{sign } \left\{I_{t^i}^i t_{\theta^{ip}}^i + I_{t^j}^i t_{\theta^{ip}}^j\right\} > 0. \tag{11}$$

Since all four terms on the right hand side are negative, the sign of equation (11) is unambiguously positive and median voter's type θ^m is more to the right than the politician elected θ^{ip}, i.e. $\theta^m > \theta^{ip}$ holds. Thus, the median voter chooses a politician with stronger preferences for redistribution than her own. The reason is quite simple: by voting for such a more left-wing politician she can improve her overall payoff Z^{im} through higher transfers and side payments at the expense of the neighboring citizens.

4 Results

In the case of symmetry ($\theta^{im} = \theta^{jm} = \theta^m$) the median voters in both the countries choose politicians with identical preferences for redistribution, $\theta^{ip} = \theta^{jp} = \theta^p$. Nash bargaining on the tax rates then yields

$$t^* = \frac{1 - \theta^p\,(1 + \beta)}{2\beta\,(1 - \theta^p)} \tag{12}$$

in either country. The tax rate is positive for all preferences for redistribution that do not exceed $1/(1+\beta)$. However, until now we did not answer the question whether tax co-ordination is successful such that this tax rate indicates an efficient level of redistribution.

To answer this question we need a benchmark level which is given by the tax rate the median voters would agree on. Substituting θ^p by θ^m in equation (12) yields the 2nd-best tax rate t^{**} from the median voters' point of view

$$t^{**} = \frac{1 - \theta^m\,(1 + \beta)}{2\beta\,(1 - \theta^m)}. \tag{13}$$

From analyzing the first stage of the game, we know that the median voter will always vote for a politician with stronger preferences for redistribution, i.e. $\theta^m > \theta^p$. This indicates

Theorem 1 *Overshooting taxation*
In a representative democracy the equilibrium tax rates are too high in case of negotiating governments.

Proof: By subtracting (13) from (12) one can easily see that $t^* - t^{**} > 0$ holds since $\theta^m > \theta^p$. ■

Thus, voting for a more left-wing politician who will then bargain over tax rates with her foreign counterpart yields an inefficiently high tax rate compared to the 2nd-best tax rate. Consequently, there is too high an extent of redistribution.

Recalling that we deal with a full information game one might wonder why voting favors a politician with stronger preferences for redistribution in view of the result mentioned in the theorem. After all, the electorate have been able to anticipate the outcome of bargaining. The voting decision is plausible yet. If the electorate in both the countries could coordinate their voting behavior the median politicians would win the elections and - at the second stage - agree on the second best tax rate t^{**}. However, there is no realistic way to coordinate voting behavior. Non-cooperative voting, on the contrary, offers the possibility to use one's ballot strategically: Assume the foreign country's voters choose the median politician. In this case the best answer of the home country's electorate is to vote for a politician with stronger preferences for redistribution than the median (i.e. $\theta^{ip} < \theta^m$) because then the home country receives higher side payments compared to the 'median solution'. The home country'ss voters now face a higher tax rate, though. Nevertheless, voting for

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a more left-wing politician is profitable for the home country since the effect on received transfers outweighs the effect on the locals' tax liability. Of course, in our full information game voters in either country have the incentive to vote strategically for a more left-wing politician. Thus, tax rates rise in both the countries.

5   Concluding remarks

In the era of an intensifying competition among countries or governments the call for political co-ordination - especially in the field of taxation - becomes louder and louder, since co-ordination is seen as an effective measure to avoid the harmful consequences of non-cooperative behavior. Nevertheless, political co-ordination might well yield quite unpleasant results.

The present paper analyzed the outcome of non-cooperative voting on political representatives and the subsequent bargaining on tax rates by the elected politicians. Our analysis shows that the tax rate the politicians agree on is inefficiently high compared to the 2nd-best, i.e. the tax rate the median voters would agree on.

Implementing the median voter's preferred tax policy would require a co-ordination in the voting behavior by the two electorates. However, bargaining among all voters seems to be not realistic and, consequently, the 2nd-best policy t^{**} can only serve as a benchmark level. Moreover, our result is a 'strategic delegation' result as in Besley and Coate (2003), Chari, Jones and Marimon (1997) or Persson and Tabellini (1992) among others. In their models redistribution is a matter of financing public goods. Local voters do not face the correct price for the goods delivered since part of the cost is borne by the other jurisdictions. This results in an inefficiently high provision of public goods. In our model a similar mechanism applies: voters elect politicians with 'too strong' preferences for redistribution. Consequently, tax rates rise in either country through the bargaining mechanism. Thus voters in both the countries face lower effective cost of the higher tax rates as less tax base leaks away.

Nonetheless, voting for a more or less Leviathan-like type of politician is quite surprising in a full information game. In a model of Besley and Smart (2002) that features politicians of unknown type (Leviathans or benevolents) the Leviathanian politicians are elected only 'accidentally'. In our model, on the contrary, voters elect Leviathan-type politicians on purpose to improve their overall payoff at the expense of the neighboring country - although they were able to anticipate the outcome of the bargaining process. After all, the voters' selfishness has to be paid dearly by accepting inefficiently high tax rates and they have to -loosely speaking- face the music.

6 Appendix

6.1 Concavity of the bargaining problem

The maximization problem (3) is concave if the ordered principle minors of the Hessian matrix to (3) alternate in their sign:

$$
H = \begin{pmatrix} -2(\alpha + \beta)(1 - \theta^{ip}) & \alpha(2 - \theta^{ip} - \theta^{jp}) \\ \\ \alpha(2 - \theta^{ip} - \theta^{jp}) & -2(\alpha + \beta)(1 - \theta^{jp}) \end{pmatrix}.
$$

As the terms on the major diagonal are unambiguously negative, the determinate

$$
\det = 4(\alpha + \beta)^2(1 - \theta^{ip})(1 - \theta^{jp}) - \alpha^2(2 - \theta^{ip} - \theta^{jp})^2
$$

needs to be positive.

The determinate can be decomposed in three parts ($\det = A + B^i + B^j$)

$$
A = 2(1 - \theta^{ip})(1 - \theta^{jp})\left[(\alpha + \beta)^2 - \alpha^2\right] > 0
$$

$$
B^i = (1 - \theta^{ip})\left[(\alpha + \beta)^2(1 - \theta^{jp}) - \alpha^2(1 - \theta^{ip})\right]
$$

$$
B^j = (1 - \theta^{jp})\left[(\alpha + \beta)^2(1 - \theta^{ip}) - \alpha^2(1 - \theta^{jp})\right],
$$

which are each positive. While A is obviously positive, we have to show the sign of the other terms. As all θ's are below the threshold level, $1 - \theta \in [\frac{\beta}{1+\beta}; 1]$. Hence, we have

$$
(\alpha + \beta)^2(1 - \theta^{jp}) > (\alpha + \beta)^2\frac{\beta}{1 + \beta} > \alpha^2 > \alpha^2(1 - \theta^{ip}),
$$

which proves our conjecture. Note that the middle part in the above inequality follows from $\alpha < 1 < \beta$.

6.2 Comparative statics and $t^{\max} < 0.5$

Let us first show the solution to the FOC of the bargaining problem (3)

$$
\left[1 - 2(\alpha + \beta)t^i + \alpha t^j\right](1 - \theta^{ip}) + \beta\theta^{ip} + \alpha t^j(1 - \theta^{jp}) = 0 \ \forall \ i \neq j.
$$

Equation (5) in the paper is the solution to the equation above.

If $I_{t^i}^i$ and $I_{t^j}^i$ are both negative, the comparative statics of the tax rates in θ^{ip} are unambiguously negative. Thus, the highest possible tax rate $t^{\max}$ will be obtained

in the Leviathan case for θ^{ip} and θ^{jp} being zero. However, even the highest tax does not exceed 50%; see equation (5) for $\theta^{ip} = \theta^{jp} = 0$.

As $I^i_{t^j} = -\alpha t^i < 0$ and $I^i_{t^i} = -(1-\alpha) - (\alpha+\beta)(1-2t^i) - \alpha t^j < 0$ for $\alpha < 1 < \beta$ and $t^{\max} < 0.5$, the prerequisites of the proof above are true.

6.3 Single-crossing property

According to Mirrlees (1976) and Seade (1982) indifference curves that fulfil the agent monotonicity property intersect only once, i.e. exhibit the single crossing property. To show this rewrite the indifference curve (equation (8), $Z^i = \theta^i I^i + T^i + S^i$) as

$$Z^i = G + \theta^i I^i \left(\theta^{ip} \right)$$
$$\text{s.t. } G = T^i + S^i.$$

The agent monotonicity property then requires the MRS between G and θ^{ip} to be monotone in θ^i, i.e. $\frac{dG}{d\theta^{ip}} < 0$. Since Z^i is an implicit function of G and θ^{ip} the MRS reads

$$MRS = \frac{dG}{d\theta^{ip}} = -\frac{Z^i_{\theta^{ip}}}{Z^i_G} = -\theta^i I^i_{\theta^{ip}}.$$

As $I^i_{\theta^{ip}} > 0$ and $\theta^i \geq 0$, $\frac{dG}{d\theta^{ip}} \leq 0$ holds and $\frac{dG}{d\theta^{ip}}$ is monotone. Therefore, the MRS exhibits agent monotonicity what implies the single-crossing property to be fulfilled.

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