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Federalism, weak institutions and the competition for foreign direct investment

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Abstract This paper shows that vertical fiscal inefficiencies impede federally organized countries in successfully attracting foreign direct investment. Such countries, particularly if characterized by weak institutions, are disadvantaged in the process of bidding for firms and in their ability to commit to a low overall tax burden. The interaction of these problems deteriorates their competitive position *vis-à-vis* unitary states in the competition for foreign direct investment. These theoretical considerations are in line with recent empirical evidence that suggests that the number of government layers of host countries has significant and sizeable negative effects on the amount of foreign direct investment inflows.

Keywords Foreign direct investment · Hold-up problem · Federalism · Vertical tax competition · Bidding for firms · Tax base cooccupation

JEL Classification F34 · F42 · H11 · H71 · H77

1 Introduction

The risk of ex-post opportunism of host governments (e.g., cold expropriation by confiscatory taxation, tightened regulatory policies, extortion, or nationalization) is considered to be one of the quintessential obstacles to foreign direct investment (FDI). It

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is also considered to be a key factor in explaining international capital flows, or the lack of such flows, in particular to developing and transition countries. A foreign investor who identifies a profitable investment opportunity in a country will irreversibly have to install some capital in this country and wait for the returns to accrue. Prior to the investment the country's government may be willing to promise the investor to keep the returns. However, confiscation is optimal from the perspective of the government and may occur once the investment has been made. Investors who anticipate this will under-invest or not invest at all. This is the hold-up problem in FDI and many of its aspects have been extensively studied.[1]

Standard and popular policy recommendations regard federalism and decentralization as adequate instruments for overcoming the hold-up threat to capital investment in general, and FDI in particular (see, for instance, Weingast 1995, and Qian and Weingast 1997). In its recent World Development Report 2005, which focuses on measures to foster investment, the World Bank highlights decentralization of policy-decision making as conducive to attracting FDI. For, as it is argued, decentralization "permits a degree of institutional competition between centers of authority that can ... reduce the risk that governments will expropriate wealth" (World Bank 2004, p. 53). Such recommendations are rooted in the view that interjurisdictional competition could be a welcome supplement to inadequate constitutional constraints and imperfect political institutions (see Brennan and Buchanan 1977, 1980). If capital is mobile between regions, competition between the regions within a federation exerts competitive pressure on each region to provide good governance. Following Kehoe (1989), this basic argument has frequently been used in the tax competition literature.[2]

However, this reasoning rests on the assumption that investment stays mobile between regions and so that investors can react to ex-post opportunism. For many types of FDI, and particularly so (by definition) for the type of investment for which there is a hold-up problem, capital installed is immobile once the investment is made and cannot simply relocate in response to the actual taxes chosen once the investment is made. Hence, for ex-post immobile capital investment, splitting up a country into many smaller and fiscally autonomous regions does not unfold the beneficial horizontal competition between the regions of a federation.

The contribution of the present analysis is to take the ex-post immobility of investment seriously and combine it with the vertical dimension of federal countries. If investment is sunk once it is made, it can be targeted as a source of revenue by the local and/or federal government. *Vertical* externalities between different governmental layers and tax choices that follow irreversible investment choices then come into

[1] Contributions include, among others, Eaton and Gersovitz (1983, 1984), Erbenová and Vagstad (1999), Doyle and van Wijnbergen (1994), Janeba (2000), Hubert and Ikonnikova (2004), Konrad and Lommerud (2001), Schnitzer (1999, 2002), Svejnar and Smith (1984), and Thomas and Worrall (1994).

[2] Related work that makes this assumption is Andersson and Konrad (2003). This also applies to Grazzini and Petretto (2007) who consider the competition for mobile capital between a federal and a centralized country. Haufler and Wooton (2003) consider competition for FDI between one unitary jurisdiction and two jurisdictions that belong to the same federation and ask whether a coordinated tax increase can benefit or harm them, given the role of the third competitor. None of these approaches, however, addresses the hold-up problem since the choice of the location of the tax base occurs when the taxes are chosen.

play. The commonality of the tax base—coupled with the recognition that both levels of government are active players—gives rise to vertical interdependencies. Such interdependencies are not a theoretical curiosum, but they arise in practice and can be either explicit, in the sense that there is explicit recognition that the different levels of government can tax the same tax base, or implicit, arising when—perhaps as result of constitutional restrictions—the distinct levels have formally different tax bases that are interdependent.[3] Moreover, in the development and transition context with insufficient rule of law, the various government actors at different levels of a federal structure may follow their de facto powers to tax instead of the legal powers granted to them by the constitution. Such explicit, implicit, or de facto overlap results in overtaxation and disadvantages federal countries relative to unitary ones.

This paper considers the implications of this vertical aspect of federalism for the relationship between the subsidy package a country can credibly offer to a foreign investor and the country's fiscal architecture. The argument that we put forward is the following. It is well documented that countries resort to a large variety of policy measures to attract FDI. These measures include fiscal incentives such as tax holidays, reductions in social security contributions, tax deductions, accelerated depreciation allowances, import and/or export duty reductions. They also include financial incentives such as offering land, existing building structures, or entire state-owned enterprises at below market value, direct subsidies, subsidized loans, government credit, equity participation, or large scale procurement contracts. These measures can compensate an investor for the potential future confiscation of a major share in his capital or its returns.[4] Once firms have accepted such offers and brought in irreversible investment, confiscatory taxation may take place. At this point, the fiscal architecture is the key to the degree of confiscatory taxation that will take place. A unitary government will choose some tax that is optimal ex-post and confiscate some of the capital or its returns. This is not true, however, for the federal country. This is because, as noted earlier, in a fiscal federation the vertical tax competition between the levels of government will give rise to the vertical fiscal externality and as a consequence to an inefficient level of ex-post taxation.[5] Such uncoordinated confiscatory taxation in the federal economy leads to an overall tax burden for the investor that is higher than in a unitary country. The consequence of this inefficiency in ex-post taxation of the federal economy is that the region that bids for the investment receives lower tax revenue than the unitary government and, hence, has a lower willingness to bid for FDI. One,

[3] On this, see Boadway et al. (1998), and Keen and Kotsogiannis (2002, 2003).

[4] For empirical evidence, see, e.g., Oman (2000, p. 80). In the industrial organization literature, up-front payments, which essentially transfer ownership rights in the investment returns to the party that can behave opportunistically ex post, solve the problem if only one party can behave opportunistically (see, e.g., Tirole 1988, p. 26). As is also known from the literature, this will typically not be first-best in the two-sided moral hazard case we implicitly consider here. There are several contributions suggesting that the process of bidding for firms is an important phenomenon, including Black and Hoyt (1989), and Besley and Seabright (1999), even though they do not address the bids as an instrument for overcoming the hold-up problem. Fumagalli (2003) provides a short overview and a welfare analysis that takes into account competition effects with domestic firms.

[5] This effect has been studied, by among others, Wrede (1997, 2000), and Keen and Kotsogiannis (2002, 2003). For an early survey on vertical tax competition see Keen (1998).

of course, may argue that the lower willingness to bid for the investment disappears if all levels of government in the federal economy can bid for the investment since they all have a share of tax revenues. This is not necessarily the case since each level of government would prefer that the other level government paid the subsidy that is needed to attract the FDI. This results in a coordination problem which adds to the overtaxation problem, and the two problems reinforce each other.

These results are well in line with recent empirical evidence on such detrimental effects of federal structures on countries' ability to attract FDI. Kessing et al. (2007) find a significant negative effect of the number of government layers of host countries on the amount of inward FDI these countries receive.[6]

The contribution that is perhaps most closely related to ours is Berkowitz and Li (2000). They attribute the difference in economic performance and development between China and Russia to the differences in fiscal architecture of those countries. China implemented a tax regime in which a commonality of the tax base between the local or regional government and the federal government was limited or ruled out by construction. For Russia they document a strong commonality of the tax base on which many agencies legally or illegally draw. They attribute the weaker growth performance of Russia to this common-pool problem.[7] Instead, our focus is on FDI and the disadvantages regions in a federation have in attracting FDI compared to a unitary government. This reveals the interaction between the common pool problem in taxation and the free-rider problem in the bidding for FDI.

The paper is organized as follows. In Sect. 2, we present the model and develop the theoretical arguments in a rigorous form. Section 3 discusses a number of extensions that underline the robustness of our results. Section 4 discusses the results and concludes.

2 The theoretical framework

We consider a federal country F, a unitary country S, and an investor, somewhere in the rest of the world, who has no predisposition about host-countries F and S and, consequently, invests in the country that offers the best returns on her investment. The unitary government is denoted by the subscript S. In the federal country, there are two levels of government: a central level denoted by the subscript C, and a regional one, denoted by the subscript R. At the regional level there may be several mutually exclusive regions with corresponding regional governments. However, for analytical clarity, we study first the situation in which there is only a single region in the federal country. In Sect. 3, we extend the framework to allow for more than one region in the federal country and show that the results of our analysis remain largely unchanged.

[6] This negative aspect of decentralization is also present when one considers the alternative motives of FDI; see Herger et al. (2007).

[7] For this commonality see also Frye and Shleifer (1997), Shleifer and Treisman (1999), Shleifer and Vishny (1993), Treisman (1999), and Berkowitz et al. (1998). Zhuravskaya (2000) also discusses the differences between the federal institutions of China and Russia but focuses on the resulting incentives for local governments to pursue business-friendly policies.

2.1 Timing

We analyze a game with 5 stages. In stage 1, nature chooses the profitability of the investment for the federal and unitary country denoted by $b_F(t)$ and $b_S(t)$, respectively. This profitability is (but need not be) country specific. Also, in a given country, the profitability depends on the tax burden of that country. These profitabilities of investment are common knowledge. In stage 2, the two governments R and S compete for the investment by making simultaneous bids, m_R and m_S, respectively, to the investor. As discussed in the introductory section, these bids need not be strictly interpreted as cash offers. Instead, they can be seen as the package of financial incentives offered to the investor. In stage 3, the investor makes her investment choice. She accepts at most one of the respective payment offers and invests exactly one unit of capital in R, or S, or does not invest at all. This specification excludes considerations of counterveiling threats to attenuate the hold-up problem as studied by Janeba (2000). Once it is made, investment is fully immobile. In stage 4, taxation takes place. In the federal country both levels of government levy source-based taxes on investment. Denoting the source-based tax rate of the central (higher level) government by t_C and that of the regional (lower level) government by t_R, then the consolidated source-based tax rate in F is

$$t_F = t_C + t_R. \tag{1}$$

In the unitary country S there is only one government and this government levies a source-based tax on investment if the investment takes place there, and this tax rate is denoted by t_S. The governments are revenue-maximizing Leviathans. We discuss this assumption and implications of alternative specifications in Sect. 3.

In stage 5, the gross return to investment accrues. Their size will depend on the country in which investment occurs and on the consolidated tax rate that applies in this country, as described by functions $b_F(t_F)$ and $b_S(t_S)$. Notice that the case of equal profitability of the two locations is a special case of this general formulation. Also, the return is a decreasing function of the overall tax burden in a country which is measured by t_S and t_F, that is

$$b_j(0) > 0, \qquad b_j'(t_j) < 0 \quad \text{and} \quad b_j''(t_j) \leq 0 \quad \text{for } j = F, S.^{8} \tag{2}$$

The derivative of a function of one variable is indicated by a prime. The assumptions in (2) express that some firm decisions can be made after the capital is invested and the consolidated tax rate is chosen, such that a high tax rate will generally cause distortions and reduce the taxable activity. Such ex-post choices may concern variable inputs such as managerial effort or labor input, but also the direct and indirect compliance cost that is caused by taxation.[9]

[8] This is a standard assumption in tax competition models, see Wilson (1999).

[9] A simple microeconomic underpinning of (2) is the cost of tax compliance that is an increasing and convex function of the consolidated tax rate. If the genuine net return from investing the capital $k = 1$ in country j is $r - 1 > 0$ (with the price of capital being 1) and tax compliance cost is $c(t)$ with $c(0) = 0$, $c'(t) > 0$ and $c''(t) \geq 0$, then the tax base becomes $b_j(t) = (r - 1) - c(t)$ which has the properties given in (2).

2.2 The taxation equilibrium

Consider stage 4. Investment is sunk when the government(s) choose their tax rates. If the investment took place in region S, the government S maximizes

$$T_S = t_S\, b_S(t_S), \tag{3}$$

by a choice of t_S with the first order condition being

$$b_S(t_S) + b'_S(t_S)t_S = 0. \tag{4}$$

Equation (4) implicitly defines the optimal tax for region S, denoted by t_S^*, which, upon following (2), is unique. For later use, tax revenues are

$$T_S^* = t_S^*\, b_S\big(t_S^*\big), \tag{5}$$

and are strictly concave in t_S^*. With revenues T_S^* going to the government of region S, the net return to the investor from investing in S is

$$\pi_S^* = \big(1 - t_S^*\big) b_S\big(t_S^*\big) - 1. \tag{6}$$

Consider next the case in which investment takes place in region R, the region that belongs to the federal country. In this case, the tax base is cooccupied by both levels of government, and hence, following from (1), the profitability of the investment depends on the consolidated tax t_F, that is, $b_F(t_F)$. The strategic interaction between the central and regional governments can take different forms. In the present context, it is natural to conceive of these two governments as having Nash conjectures. We discuss another alternative specification of strategic behavior in Sect. 3.

Taking as given the tax rate set by the regional government R, the central government chooses t_C to maximize its revenues $T_C = t_C b_F(t_F)$, with the first order condition being

$$b_F(t_F) + t_C b'_F(t_F) = 0. \tag{7}$$

Similarly, the regional government maximizes its revenues $T_R = t_R b_F(t_F)$, with the resulting first order condition being

$$b_F(t_F) + t_R b'_F(t_F) = 0. \tag{8}$$

The Nash equilibrium tax rates are characterized by a simultaneous solution of (7) and (8). In this economy each level of government ignores the damaging effect that raising its tax has on the other by making, recalling (2), the tax base to contract. This mutually damaging vertical tax competition leads to the equilibrium level of taxes being higher than the two government levels would set if they acted cooperatively. To see this denote the equilibrium revenues for the central, regional, and consolidated tax revenues respectively by

$$T_C^* = t_C^* b_F\big(t_F^*\big), \qquad T_R^* = t_R^* b_F\big(t_F^*\big) \quad \text{and} \quad T_F^* = t_F^* b_F\big(t_F^*\big). \tag{9}$$

From (1) and (9), it then follows that equilibrium tax revenue is split evenly between central and regional governments, that is, $T_R^* = T_C^* = \frac{1}{2}T_F^*$. Making use now of the envelope theorem in (9), one arrives at

$$\frac{\mathrm{d}T_C^*}{\mathrm{d}t_R^*} = t_C^* b_F'(t_F^*) \leq 0, \quad \text{and} \quad \frac{\mathrm{d}T_R^*}{\mathrm{d}t_C^*} = t_R^* b_F'(t_F^*) \leq 0, \tag{10}$$

with the inequalities following from (2). Clearly, then each level of government would gain (strictly not lose) if the other level reduces its tax rate.

With consolidated revenues T_F^* going to the governments of the federal country, the net return to the investor from investing there is

$$\pi_F^* = (1 - t_F^*) b_F(t_F^*) - 1. \tag{11}$$

We turn now to the stages where the bidding for firms takes place.

2.3 Incentives for firms

Bidding for firms' FDI is an auction. The type of auction is most easily and realistically depicted by a first-price sealed bid auction. In such an auction each government R and S can make a payment offer to the firm which, upon observing both offers, can choose the offer that is seemingly more attractive, taking into consideration the payments offered up-front and the equilibrium taxation behavior in the later stages of the game (where the commitment problem sets in, such that tax promises are not time consistent).[10] However, other types of auctions yield similar results and we discuss this below. More specifically, let m_S and m_R be the upfront payments that S and R make. Government C also has a positive willingness to pay for the firm to make the investment in R, and we will discuss a possible role for government C further below. Hence, in the bidding stage, S and R make bids and the firm decides which bid is more attractive. Note that the firm needs not choose the location which makes the higher bid, as the firm considers its overall surplus from investing in one or the other location, and the two locations differ in the future tax burden, and potentially also in the genuine profitability of the investment. We make the following observation:

Lemma 1 *Let m_S and m_R be the upfront payments that S and R make. Then it is optimal for the investor to invest in S if $m_S + (1 - t_S^*)b_S(t_S^*) - 1 \geq \max\{0, m_R + (1 - t_F^*)b_F(t_F^*) - 1\}$, and it is optimal to invest in R if $m_R + (1 - t_F^*)b_F(t_F^*) - 1 \geq \max\{0, m_S + (1 - t_S^*)b_S(t_S^*) - 1\}$.*

Proof Suppose the governments S and R simultaneously and independently offer the investor payments m_S and m_R, respectively. Anticipating the equilibrium path in the continuation equilibrium from investing in S or R, respectively, the investor has a payoff equal to $\pi_S^* + m_S$ if she invests in S and $\pi_F^* + m_R$ if she invests in R.

[10] For instance, the Bernheim–Winston auction approach which Besley and Seabright (1999) employ when studying bidding for firms reduces to a standard first-price sealed-bid auction in the absence of the externalities between bidders which they consider.

Accordingly, she will invest in S, R, or not at all, depending on which of $\pi_S^* + m_S$, $\pi_F^* + m_R$, and 0 is largest. Country S will obtain the investment if

$$\left(m_S - T_S^*\right) + b_S\left(t_S^*\right) > \max\left\{0, \left(m_R - T_F^*\right) + b_F\left(t_F^*\right)\right\} \tag{12}$$

and R obtains the investment if

$$\left(m_R - T_F^*\right) + b_F\left(t_F^*\right) > \max\left\{0, \left(m_S - T_S^*\right) + b_S\left(t_S^*\right)\right\} \tag{13}$$

holds. □

Note that the bidding process may lead to three possible outcomes. First, the firm does not invest at all. In this case, all players have a payoff that is equal to zero. Second, the firm invests in S. In this case, the payoff of R is zero, the payoff of the firm is $m_S + (1 - t_S^*)b_S(t_S^*) - 1$ and the payoff of S is $t_S^* b_S(t_S^*) - m_S$. The joint surplus of all three players that interact in this stage is $b_S(t_S^*) - 1$. Third, the firm invests in R. In this case, the payoff of S is zero, the payoff of the firm is $m_R + (1 - t_F^*)b_F(t_F^*) - 1$, and the payoff of R is $t_R^* b_F(t_F^*) - m_R$. The joint surplus of all three players that interact in this stage is $(1 - t_C^*)b_F(t_F^*) - 1$. Note that the payoff of C differs in the three cases as well but can be disregarded at this stage as C does not take part in the bidding. Note that bidding for the investment is a nontrivial problem only if both locations provide positive joint surplus for the firm and the winning jurisdiction. This is the case if

$$b_S\left(t_S^*\right) - 1 > 0 \quad \text{and} \quad \left(1 - t_C^*\right)b_F\left(t_F^*\right) - 1 > 0. \tag{14}$$

We assume that these "participation constraints" hold in what follows. We also assume that a firm that, for given bids, is indifferent whether to invest in F or in S will invest in the country in which this participation constraint has more "slack," i.e., being indifferent, a firm invests in S (in F) if $b_S(t_S^*) > (<)(1 - t_C^*)b_F(t_F^*)$.[11] With this in mind, we arrive at the following proposition.

Proposition 1 *The following bids constitute an equilibrium of the first-price sealed bid auction*: *If the joint surplus of the firm and S from investment in S is higher than the joint surplus of the firm and R from investing in R, then R makes a bid equal to the tax revenue T_R^* that R obtains if R attracts the FDI. The government in S makes a bid that is just sufficient for the firm to make it attractive to invest in F. This bid is equal to $(1 - t_C^*)\, b_F(t_F^*) - (1 - t_S^*)b_S(t_S^*)$. If instead, $b_S(t_S^*) - 1 < (1 - t_C^*)b_F(t_F^*) - 1$ then R and S switch roles*: *S bids T_S^* and R bids $b_S(t_S^*) - (1 - t_F^*)\, b_F(t_F^*)$.*

Proof Note that $\pi_S^* + m_S^* > 0$ and $\pi_F^* + m_R^* > 0$ for (m_S^*, m_R^*) as in (15) if $(1 - t_C^*)b_F(t_F^*) - 1 > 0$ and $\pi_S^* + m_S^* > 0$ and $\pi_F^* + m_R^* > 0$ for (m_S^*, m_R^*) as in (16) if $b_S(t_S^*) - 1 > 0$. Hence, at the equilibrium bid levels, given (14), the investor would prefer to choose any of the bids rather than not to invest. We, therefore, disregard the

[11] The behavior of players who are just indifferent is simply a tie-breaking rule that avoids problems of players optimizing on open sets, but is not essential for the results. An alternative way to handle this problem is to allow bids on a finite grid and let the mesh of this grid become infinite.

option not to invest when showing that the two pairs of bids are mutually optimal replies to each other in what follows.

(i) To show that

$$\left(m_S^*, m_R^*\right) = \left(\left(1 - t_C^*\right) b_F\left(t_F^*\right) - \left(1 - t_S^*\right) b_S\left(t_S^*\right), T_R^*\right) \tag{15}$$

are mutually optimal replies, let $m_R = T_R^*$ and consider the optimal bid by government S. The (reduced form) payoff of S that makes use of the equilibrium values in the taxation subgames is $t_S^* b_S(t_S^*) - m_S^*$ if S wins the investment, and zero otherwise. Hence, S optimally makes the smallest bid that makes S win if this bid does not exceed $t_S^* b_S(t_S^*)$ and any nonwinning bid otherwise. The smallest bid that makes S win[12] if $m_R = T_R^*$ is the smallest m_S for which $(m_S - T_S^*) + b_S(t_S^*) \geq (m_R^* - T_F^*) + b_F(t_F^*)$ holds, which is m_S^* in (15). This smallest bid yields positive payoff to S if $b_S(t_S^*) > (1 - t_C^*)\, b_F(t_F^*)$, which can be confirmed by inserting m_S^* from (15) into $t_S^* b_S(t_S^*) - m_S^*$. Given this bid, m_S^* by S, any bid by R that makes R win will exceed T_R^* and will not be optimal for R. Hence, R is indifferent between all bids by which R does not win, and between these bids, R can equally well choose $m_R^* = T_R^*$. This makes (m_S^*, m_R^*) as in (15) optimal replies to each other.

(ii) Similarly, for

$$\left(m_S^*, m_R^*\right) = \left(T_S^*, b_S\left(t_S^*\right) - \left(1 - t_F^*\right) b_F\left(t_F^*\right)\right), \tag{16}$$

suppose that S chooses $m_S^* = T_S^*$ and consider R's optimal reply. R's (reduced form) payoff equals zero if R does not attract the investment and $t_R^* b_F(t_F^*) - m_R$ otherwise. Hence, R's optimal bid is the smallest bid that makes R win if this bid does not exceed $t_R^* b_F(t_F^*)$, and any non-winning bid otherwise. The smallest m_R that makes R win for $m_S^* = T_S^*$ is the smallest value m_R for which $m_R - T_F^* + b_F(t_F^*) \geq m_S^* + b_S(t_S^*)$ hold, and this value is m_R^* as in (16). This smallest winning bid yields positive payoff to R if $(1 - t_R^*) b_F(t_F^*) > b_S(t_S^*)$, which can be confirmed by inserting m_R^* from (16) into $t_R^* b_F(t_F^*) - m_R^*$. Given this bid m_R^* by R, any bid that makes S win will exceed T_S^* and will be inferior to any bid that makes S not win, all of which lead to zero payoff to S. Hence, S is indifferent between all bids by which S does not win, and from these bids, S can equally well choose $m_S = T_S^*$. This makes (m_S^*, m_R^*) as in (16) optimal replies to each other. □

The region that is part of the federation is disadvantaged in the process of attracting firms, and F will attract the investment only if investment is genuinely sufficiently more profitable there than in S. If both locations are genuinely equally profitable investment locations the unitary country will always receive the investment. The intuition for the two cases in Proposition 1 that determine which location will receive the investment is as follows. For revenue maximizing governments, the maximum a government is willing to bid for the investment are the additional tax revenues. Thus, the maximum payoff for the firm, whether the firm invests in F or in S, is given by the

[12] Note that this requires an endogenous tie-breaking rule. This rule is defined as follows. If (12) holds with equality, S wins if $b_S(t_S^*) > (1 - t_R^*) b_F(t_F^*)$ and if (13) holds with equality, R wins if $b_S(t_S^*) < b_F(t_F^*) - t_R^* b_F(t_F^*)$.

after tax profits plus the tax revenues that accrue to the bidding entity. But as noted earlier, in the federal country F the consolidated tax rate on profits is set inefficiently high ex post, implying that the tax burden is higher and the consolidated tax revenue is lower than if the country was a unitary one. This implies that the net return to the investor from investing in the federal country will be lower relative to returns from the investment taken place in the unitary one. But revenues, and so the amount that can be used to bid for the investment, are also lower in the federal economy as a consequence of inefficiently set taxes and the fact that the government in R receives only a share of consolidated tax revenues. To summarize, the disadvantages of F arise because of two reasons: (i) Overtaxation (a consolidated tax rate to the right of the Laffer curve peak) in the federation reduces the gross returns of the investment more strongly than in the unitary country. This reduces what can be shared between the government and the investor if investment takes place in F by more than if the investment takes place in S. (ii) The regional government receives only a share in the consolidated tax revenue in the federation. This reduces the regional government's incentive in the bidding.

For illustration, consider a simple parametric example. Let the tax base in both countries be a linear function of the tax rate(s) and given by $b_F(t_F) = (1 - t_F)B_F$ and $b_S(t_S) = (1 - t_S)B_S$, in the range $t_I \in [0, 1]$ for $I \in \{F, S\}$, where B_S and B_F are strictly positive parameters. Following (4), (7), and (8), one obtains $t_S^* = 1/2$, $t_R^* = t_C^* = 1/3$ and so $t_F^* = 2/3$. These equilibrium rates imply equilibrium revenues $T_S^* = B_S/4, T_C^* = T_R^* = B_F/9$, and $T_F^* = 2B_F/9$. Region S wins the bid if $B_S > \frac{4}{9}B_F$, with the equilibrium winning bid being $m_S^* = -\frac{1}{4}B_S + \frac{2}{9}B_F$. Apparently, S wins even for a broad range of possible investment projects that are much more efficiently located in F. Being a unitary region is a substantial advantage. Consider the reasons for this outcome. First, $t_F = 2/3$ and $t_S = 1/2$ reduce the gross returns from investment in the respective region to $B_F/3$ and $B_S/2$, respectively. Hence, compared to the maximum returns B_F and B_S that accrued under zero taxes, what can be allocated between the investor the government(s) shrinks in F more strongly than in S. Moreover, government S could profitably use up to the whole tax revenue $T_S = B_S/4$ to make bids to attract the investor, whereas government R would at most want to spend $T_R = B_R/9$ to attract the investment.

One may argue that the second disadvantage of country F in attracting FDI could be overcome if both levels of governments C and R could make a joint bid and their bids are simply added up. Such possibility, however, introduces other obstacles in the federal country. To see this, consider joint bidding. Let R's and C's joint maximum willingness to pay, $\bar{m}_R$ and $\bar{m}_C$, for attracting the investment exceed what is needed to overbid the maximum willingness $\bar{m}_S$ to pay by S (i.e., formally, let, $\bar{m}_R + \bar{m}_C + (1 - t_F^*)b_F(t_F^*) > (1 - t_S^*)b_S(t_S^*) + t_S^* b_S(t_S^*)$), but let each single willingness to pay be too small for outbidding S. Denote m the smallest joint bid that outbids $\bar{m}_S$. Then $m < \bar{m}_R + \bar{m}_C$. Accordingly, there is a continuum of combinations (m_R, m_C) for which $m_R \leq \bar{m}_R$ and $m_C \leq \bar{m}_C$ and $m_R + m_C = m$, each of which constitutes an optimal joint reply to $m_S = \bar{m}_S$ and makes F win the investment. This generates a distributional conflict between R and C and causes a coordination problem. The joint bidding of R and C provides a public good to the two governments in F, and this public good provision need not yield an efficient outcome. In particular,

there is an equilibrium in which both governments R and C bid zero.[13] In the context of joint bidding, it is also worth noticing that even if R and C overcome this coordination problem the maximum bid made by both governments jointly would not exceed $T_F^* = t_F^* b_F(t_F^*)$, and this tax revenue is lower than the maximum possible tax revenue in F, due to overtaxation as discussed in (i). Accordingly, even if the coordination problem is successfully overcome, inefficient taxation remains as a problem deteriorating F as a location for investment. We further discuss this in Sect. 3.2. While we acknowledge the possibility of joint bidding, and the difficulties arising from this, in what follows we assume that, as a consequence of vertical decentralization, only the regional government can take part in the bidding process.

Whether the bidding for firms follows the rules of a sealed-bid first-price auction or another type of auction is an empirical matter and, given the asymmetry of bidders, the equilibrium bids and payoffs of players can depend on the type of auction if incomplete information is taken into consideration. However, in the limited framework here with perfect information any auction, that has the governments of R and S as the only bidders and the investor as seller and has an outcome that maximizes the joint surplus of these three players, has the same investment outcome as the first-price sealed bid auction in Proposition 1. To see this, let (14) be fulfilled. Then (12) can be written as

$$b_S\left(t_S^*\right) - 1 > \left(1 - t_C^*\right) b_F\left(t_F^*\right) - 1. \tag{17}$$

The left-hand side in (17) is the total surplus of all three players which are active at the bidding stage: the tax revenue $t_S^* b_S(t_S^*)$ of S, the net value of the investment after taxes $(1 - t_S^*) b_S(t_S^*) - 1$ and a zero payoff of the regional government R. The right-hand side is the total surplus if the investment takes place in R. It consists of the investor's after-tax return, $(1 - t_F^*)\, b_F(t_F^*) - 1$, and the tax revenue $t_R^*\, b_F(t_F^*)$ of the regional government that result if the investor locates the project in region R, and a zero payoff of the unitary government in this case. Accordingly, if inequality (17) holds, the sum of the rents of S, R and the investor is maximal if investment takes place in S. The inequality (17) is equivalent with the sum of the rents of S, R and the investor in the equilibrium of the respective continuation game being higher if investment takes place in S than if it takes place in R. Most of the standard single unit auction designs have the property that under complete information, they have an equilibrium in which the sum of payoffs of all bidders and of the seller is maximized. Accordingly, the result in Proposition 1 is not generated by a particular choice of auction design.[14]

[13] The structure of the joint bidding problem essentially becomes a problem of provision of a discrete public good, as analyzed in Bagnoli and Lipman (1989).

[14] Note that any reasonable auction design needs to adjust for the fact that the seller is not indifferent about which buyer receives the object here.

3 Extensions and robustness

3.1 Multiple regions in the federal country

Consider now the case where the federal country F consists of two geographically non-overlapping regions $i \in \{1, 2\}$ with one regional government for each region. Let $b_{F_i}(t)$ be the genuine profitability of the investment project in region i. For simplicity, we assume symmetry among regions inside the federal country, i.e., $b_{F_1}(t) = b_{F_2}(t) \equiv b_F(t)$. If the investor places the investment in region i inside country F, the government of region i can decide on the regional tax t_{R_i}, and the federal government in F chooses a tax with tax rate t_C. Accordingly, the combined (consolidated) tax rate in region i of the federal country is $t_F = t_C + t_{R_i}$. If the investor places the investment in the centralized country S, then the government chooses t_S just as in Sect. 2. Solving backwards, at the taxation stage, in each region in F, the consolidated tax burden will be the same as in the case with $n = 1$ as discussed in Sect. 2. Intuitively, once the investor has invested irreversibly in some region i, the incentives for the regional and federal governments to resort to confiscatory taxation do not depend on whether more than one other regions exist in the same country.

As the tax revenues for given investment choices do not depend on the number of regions, the incentives to bid for the investment are also very similar to the ones studied in Sect. 2. Whether the investment will occur in one of the regions of the federal country F or in the unitary country S, will again depend on the conditions determined in Proposition 1. This shows that the federal country is disadvantaged and will attract the investment only if it is genuinely sufficiently more profitable than the unitary country. Note that the number of bidders is now 3, but 2 of these bidders have the same valuation. If (14) holds, if $b_S(t_S^*) \geq (1 - t_C^*)\, b_F(t_F^*)$, the investor locates the investment in country S, and the equilibrium bids as in Proposition 1 are also equilibrium bids in this generalized case with several regions. If $b_S(t_S^*) < (1 - t_C^*)\, b_F(t_F^*)$, then one of the regions $i = 1, 2$ will attract the investment. The equilibrium bid will be higher in this case, as the winning region must bid at least the maximum willingness to pay of a neighboring region. Hence, the payoffs are independent of whether there is one or several symmetric regions in F for all governments and for the investor if $b_S(t_S^*) \geq (1 - t_C^*)\, b_F(t_F^*)$ holds. If $b_S(t_S^*) < (1 - t_C^*)\, b_F(t_F^*)$ only the allocation decision and the tax equilibrium are independent of the number of regions.

A related problem can be studied if two regional governments R_1 and R_2 that both belong to the same federation compete for the foreign direct investor, but without competition from another country. In this case, too, tax competition between the levels of government reduces the attractiveness of the federal country as a host for FDI. To see this, consider again the linear example. Let the tax base that accrues from attracting the FDI investment in R_i be $(1 - t_F)B_{R_i}$ with $t_F = t_C + t_{R_i}$, with $B_{R_i} \equiv B$ for $i = 1, 2$. Once investment took place in one of the two regions, say i, the central government and the government in region 1 are the only ones that can tax this investment. The incentives for choosing taxes t_F and t_{R_1} are the same as in Sect. 2. Region 2 cannot interact in this problem, and its existence does therefore not matter for the choices of these taxes. This reveals that the federation suffers from the problem of over-taxation, but—due to symmetry—there is no distortion between the

two regional governments regarding the investment decision. As both regions face the problem that they can collect only half the equilibrium tax revenues, their willingness to bid for the FDI is lower.[15] The nice aspect of this outcome is that vertical tax competition reduces the competition for attracting FDI for regions that belong to federations. Due to the overtaxation incentives and to the sharing of total tax revenue with the central government, regions of federations have reduced incentives for bidding for FDI. This shifts rents from the foreign investors to the government(s) of the federation(s). The free-rider problem in the bidding for investment shields some of the governments' rents from attracting FDI investment. However, this only holds if no other country enters the competition to attract the investment. As shown, adding a unitary country S to R_1 and R_2 as a further competitor for foreign direct investment, both regions will be disadvantaged in the competition for FDI, compared to S.

3.2 Coordination

Tax competition between the central and regional governments results in taxes being inefficiently high and also results in a disadvantage in the competition for FDI. Can this problem be overcome if the two levels of government cooperate? Coordination can take three forms; coordination on taxes and bidding, coordination on bidding, but not on taxes, and coordination on taxes, but not on bidding. With the first type of coordination the strategic difference between a federal government and the unitary government disappears, and so does the federal structure in F. If the governments in the federal country cooperate with respect to bidding for investment, or with respect to tax rates, the disadvantage of region R reduces but does not completely disappear.[16]

Suppose the two governments in F choose their tax rates cooperatively once the investor has chosen to invest in region R. They will coordinate on $\hat{t}_F = -b_F(\hat{t}_F)/b'_F(\hat{t}_F)$. The tax rate $\hat{t}_F$ will be chosen according to the same rule as the tax rate in the unitary country S. However, the local government in region R will receive only some share $\rho < 1$ of the revenue, and is willing to make bids only according to this share. This will still lead to a disadvantage of the local government in region R. Consider the outcome in the linear case, for $\rho = 1/2$. $\hat{t}_F = 1/2$ will result, and assuming symmetry, $\hat{t}_R = 1/4$. Accordingly, $B_S \geq \frac{1}{2}B_F$ is sufficient for region S to attract the investment in the equilibrium. Tax cooperation reduces the parameter range in which the investment choice is inefficient but does not eliminate it.

[15] For the parametric example of Sect. 3.2, the equilibrium taxes are $t^*_{R_1} = t^*_C = 1/3$ if the investor made the investment in R_1. Analogously, $t^*_{R_2} = t^*_C = 1/3$ if the investor made the investment in R_2. The resulting tax revenue is zero in the region that does not attract the investment, and tax revenues are $T^*_{R_i} = T^*_C = B/9$ for the government of the region that attracts the investment and for the central government, summing up to the total tax revenue in the federation equal to $T^*_F = 2B/9$. Thus, each regional government is willing to spend at most $m_{Ri} = B/9$.

[16] Note that coordination is typically not plausible in countries with weak political institutions. It is more likely to occur if a country possesses a politically stable federal system with commitment power at the different federal levels. However, even in this case, coordination will typically not work as perfect as complete centralization of all decisions and actions in a unitary state.

Suppose, alternatively, that the local and central governments in country F cannot agree on a cooperative choice of the aggregate tax rate but choose their tax rates t_R and t_C as in the noncooperative equilibrium in Sect. 2. They may, however, coordinate and make a bid $m_F = m_C + m_R$ for attracting the investment. Given the vertical tax competition, they will still overtax the investor if they attract the investment. This leads to lower total tax revenue and also reduces the gross benefits of the investor compared to taxing at the peak of the Laffer curve. This results in a disadvantage in the bidding. Again there will be a range in which the investment is allocated inefficiently between the regions. Consider the outcome in the linear example of Sect. 2.3. The two governments that have jurisdiction in R will at most bid $m_{R+C} = T_R^* + T_C^* = \frac{2}{9}B_R$. The government in region S will at most bid $m_S = T_S^* = \frac{1}{4}B_S$. Accordingly, as $(1-t_S^*)b_S(t_S^*) = \frac{1}{4}B_S$ and $(1-t_F^*)b_F(t_F^*) = \frac{1}{9}B_R$ for this parametric example, S will attract the investment if $\frac{1}{4}B_S + \frac{1}{4}B_S > \frac{1}{9}B_R + \frac{2}{9}B_R$, or, $B_S > \frac{2}{3}B_R$.

3.3 Timing within the federation

The possible asymmetry between the federal and the regional governments leads to the consideration of the possibility that the federal government may act as a Stackelberg leader relative to the regional government R or vice versa. In both cases, this will lead to a consolidated tax in the equilibrium that is to the right of the Laffer curve. As shown in the Appendix, for any possible timing, the share of this tax revenue that government R obtains is smaller than the tax revenue that accrues under a unitary regime, and the investment returns are smaller than under a unitary regime. In particular, this result does not hinge upon the precise strategic relationship of taxes. Hence, the disadvantages for government R remain qualitatively the same.

3.4 Benevolent governments

So far the governments were assumed to be revenue-maximizing Leviathans. Naturally, one may ask to what extent the above results depend on the governments' preferences. We now explore this. Suppose, to take the other extreme, that the governments in F and S are purely benevolent in the sense that they maximize welfare that depends on the tax revenue collected and spent on public goods for their respective citizens. Suppose further that preferences for the public goods in the two countries are not dissimilar. In this case, too, the government S, in the taxation game, continues to maximize revenues as the producer rent of the foreign direct investor is not a variable in this government's objective function. The governments in the federal economy F behaves in the taxation game as before, too, and so—with the two governments C and R behaving in an uncoordinated manner—the level of consolidated taxation in the federal economy will be inefficiently high and the level of public good provision inefficiently low. Thus, the effects identified in the analysis above will hold here too.

The question that now arises is how likely it is that the benevolent governments at the regional and federal level, realizing the inefficient outcome of overtaxing in equilibrium the investor, coordinate their tax and bid behavior so to replicate the outcome of the unitary country. Though perhaps feasible, such coordination is hard

to rationalize, other than by the intervention of some outside agency that oversees the tax policy of both levels of government or, in the lack of such agency, by the use of intergovernmental transfers that potentially eliminate the inefficiencies from the tax setting and bidding behavior of the governments.[17] Moving away from these possibilities, it is difficult to envisage policies with which the different governments in federal countries cooperate and coordinate on mimicking the unitary country's policy, since the interests of the two levels of government will not be completely aligned. Similar arguments apply, if benevolent governments are interested in other potential benefits of the investment such as new jobs in situations of unemployment or productivity-enhancing spillovers from the investment. In summary, even if the government acts benevolently on the behalf of its citizens, the vertical inefficiencies will most likely arise and disadvantage the federal country in the competition for FDI.

3.5 Dynamic interaction

The above analysis may be criticized on the grounds that the investor and the host country government(s) do not interact repeatedly. This is understandable given that following the seminal contributions by Eaton and Gersovitz (1983) and Thomas and Worrall (1994), it is commonly argued that the most important factor to overcome the hold-up problem is repeated interaction between the investor and the host country government(s). However, in a recent paper, Kessing et al. (2006) consider such dynamic interactions between foreign investors and host country governments that can potentially sustain repeated investment. For such collusion between the host country governments and the investor to be viable, the rewards from future investments must compensate the host country governments for not resorting to confiscatory taxation in the present. As Kessing et al. (2006) show, with more levels of governments, each government layer has increased incentives not to collude but to resort to confiscatory taxation. The reason is that each government will typically benefit more than proportionally from choosing high taxes today, but the punishment will be born by all governments in the future, so the individual future punishment tends to be lower with more levels of government. Thus, vertical federal structures also tend to make collusion between host country government(s) and the foreign investor *less* sustainable. This dynamic argument is different from the argument made here, where we want to highlight the interaction between the ex-post overtaxation and the ex-ante incentives to attract FDI to the country. However, while Kessing et al. (2006) do not consider strategic interaction between potential host countries and do not allow for bidding for firms, it is evident that the results they derive in their simple dynamic framework would extend to a broader setting with competition between regions for attracting FDI.

4 Discussion and conclusion

Federalism has typically been regarded as an important instrument to improve the investment climate, particularly for overcoming the hold-up problem. Our analysis

[17] For the potential role of such transfers in a context of benevolent policymaking with vertical fiscal externalities, see Boadway and Keen (1996).

points to some more problematic aspects of federalism regarding its effects on the attractiveness of countries for foreign investors. The horizontal effects of federalism, i.e., the potentially beneficial competition effect between alternative locations within a single country cannot fully unfold, since the hold-up problem is rooted in the ex-post immobility of the invested capital. After investment has taken place in region R_i, the existence of region R_j where the investor could have alternatively invested, is of little use to her, because she is now tied to region R_i. The vertical dimension of federalism, however, reveals two sources of inefficiency that reduce the competitiveness of a federation, compared to a unitary government: the multiplicity of government level leads to a common-pool problem that results in overtaxation ex-post and to a free-rider problem with underbidding ex ante. These two effects interact and compound which disadvantages federal countries *vis-à-vis* unitary countries in the competition for FDI.

The analytical findings are robust to a large variation in the assumptions regarding the objectives, the constraints and the sequence of actions in the federal country. Moreover, our theoretical perspective can be directly related to the findings of the empirical analysis of Kessing et al. (2007). They add decentralization or federalism variables to an otherwise standard empirical "capital-knowledge" model of the determinants of FDI flows. Their estimates suggest that such variables actually affect these flows substantially. More specifically, in line with the theoretical perspective we develop here, they find that the number of government layers has a significant negative impact on the amount of incoming FDI flows.

We have highlighted the relevance of our analysis for developing and transition countries, where the hold-up problem is most important. However, most of the arguments can be transferred to developed countries and may be equally valid there. While direct expropriation is less likely there, other vertical externalities regarding taxes or regulatory overlap may reduce the profitability of investments in these countries as well. Similarly, the free-riding incentives in the process of bidding for firms may be just as relevant in the developed world. In fact, the results of Kessing et al. (2007) suggest that the negative impact of an increase in the number of government layers on FDI can also be found in developed economies.

Our results have direct normative implications for policy measures to improve the investment climate for foreign investors. Ceteris paribus, the number of government layers a foreign investor has to deal with should be as low as possible. Centralized decision-making regarding all decisions that affect investors is preferable to decentralized decision-making at several levels of government. If several levels are involved, coordination between the levels is important to increase the chances for attracting FDI.

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Appendix

This Appendix shows that the Stackelberg equilibrium brings the economy to the right side of the Laffer curve. The analysis here tackles the case in which the central government is the Stackelberg leader (the analysis where the regional government is the Stackelberg leader, being similar, is omitted). The regional government, for any given t_C, sets t_R to maximize tax revenue that is given by $T_R = t_R b_F(t_F)$. The first and second order conditions are given by

$$b_F(t_F) + t_R b'_F(t_F) = 0, \tag{18}$$

and

$$2b'_F(t_F) + t_R b''_F(t_F) < 0, \tag{19}$$

respectively.

Equation (18) implicitly defines R's reaction function $t_R(t_C)$ with

$$\frac{\mathrm{d}t_R(t_C)}{\mathrm{d}t_C} = -\frac{b'_F(t_F) + t_R b''_F(t_F)}{2b'_F(t_F) + t_R b''_F(t_F)}, \tag{20}$$

and thus, for later use,

$$1 + \frac{\mathrm{d}t_R(t_C)}{\mathrm{d}t_C} = \frac{b'_F(t_F)}{2b'_F(t_F) + t_R b''_F(t_F)} > 0, \tag{21}$$

where the inequality sign in (21) follows from (19) and the fact that $b'_F(t_F) < 0$. Equation (21) shows that an increase in the central government's tax t_C increases the consolidated tax t_F.

The central government chooses t_C that maximizes $T_C = t_C b_F(t_F)$ subject to $t_R = t_R(t_C)$. This maximization gives the necessary condition

$$b_F(t_F) + t_C b'_F(t_F)\left(1 + \frac{\mathrm{d}t_R(t_C)}{\mathrm{d}t_C}\right) = 0. \tag{22}$$

Equations (18) and (22) implicitly define the Stackelberg equilibrium, with equilibrium tax values denoted by $\hat{t}_F = \hat{t}_C + \hat{t}_R$. Notice that, in such an equilibrium, the central and regional governments tax revenues are given by, respectively,

$$\hat{T}_C = \hat{t}_C b_F\left(\hat{t}_F\right), \tag{23}$$

$$\hat{T}_R = \hat{t}_R b_F\left(\hat{t}_F\right), \tag{24}$$

and so consolidated revenues are

$$\hat{T}_F = \hat{t}_F b_F\left(\hat{t}_F\right). \tag{25}$$

Notice that

$$\frac{\mathrm{d}\hat{T}_F}{\mathrm{d}t_F} = b_F\left(\hat{t}_F\right) + \hat{t}_F b'_F\left(\hat{t}_F\right), \tag{26}$$

which upon using (18) and (22), becomes

$$\frac{\mathrm{d}\hat{T}_F}{\mathrm{d}t_F} = -\frac{b_F(\hat{t}_F)}{1 + \frac{\mathrm{d}t_R(\hat{t}_C)}{\mathrm{d}t_C}} < 0, \tag{27}$$

and so a reduction in the consolidated tax t_F strictly increases consolidated revenues at $t_F = \hat{t}_F$. It is so the case that even if the central government has a first-mover advantage, *vis-à-vis* the regional government, the federal economy will find itself on the right side of the (consolidated) Laffer curve. Notice also that, following from (21), this result does not depend on the precise strategic relationship of taxes.

References

Andersson, F., & Konrad, K. A. (2003). Human capital investment and globalization in extortionary states. *Journal of Public Economics*, *87*, 1539–1555.

Bagnoli, M., & Lipman, B. L. (1989). Provision of public goods—fully implementing the core through private contributions. *Review of Economic Studies*, *56*(4), 583–601.

Berkowitz, D., & Li, W. (2000). Tax rights in transition economics: a tragedy of the commons. *Journal of Public Economics*, *76*, 369–397.

Berkowitz, D., de Melo, M., & Ofer, G. (1998). *Survey of the business environment in six Volga cities*. Unpublished Survey, conducted for the National Science Foundation and the World Bank.

Besley, T., & Seabright, P. (1999). The effects and policy implications of state aids to industry: an economic analysis. *Economic Policy*, *28*, 13–42.

Black, D., & Hoyt, W. (1989). Bidding for firms. *American Economic Review*, *79*, 1249–1256.

Boadway, R., & Keen, M. (1996). Efficiency and the optimal direction of federal-state transfers. *International Tax and Public Finance*, *3*, 137–155.

Boadway, R., Marchand, M., & Vigneault, M. (1998). The consequences of overlapping tax bases for redistribution and public spending in a federation. *Journal of Public Economics*, *68*, 453–478.

Brennan, G., & Buchanan, J. (1977). Towards a tax constitution for Leviathan. *Journal of Public Economics*, *8*, 255–273.

Brennan, G., & Buchanan, J. (1980). *The power to tax: analytical foundations of a fiscal constitution*. Cambridge: Cambridge University Press.

Doyle, C., & van Wijnbergen, S. (1994). Taxation of foreign multinationals: a sequential bargaining approach to tax holidays. *International Tax and Public Finance*, *1*, 211–225.

Eaton, J., & Gersovitz, M. (1983). Country risk: economic aspects. In R. J. Herring (Ed.), *Managing international risk* (pp. 75–108). Cambridge: Cambridge University Press.

Eaton, J., & Gersovitz, M. (1984). The theory of expropriation and deviations from perfect capital mobility. *Economic Journal*, *94*, 16–40.

Erbenová, M., & Vagstad, S. (1999). Investors facing opportunistic governments: is it really good to "know the market" before investing?. *Scandinavian Journal of Economics*, *101*, 459–475.

Frye, T., & Shleifer, A. (1997). The invisible hand and the helping hand. *American Economic Review, Papers and Proceedings*, *87*, 354–358.

Fumagalli, C. (2003). On the welfare effects of competition for foreign direct investment. *European Economic Review*, *47*, 963–983.

Grazzini, L., & Petretto, A. (2007). Tax competition between unitary and federal countries. *Economics of Governance*, *8*, 17–36.

Haufler, A., & Wooton, I. (2003). *Regional tax coordination and foreign direct investment*. Mimeo.

Herger, N., Kotsogiannis, C., & McCorriston, S. (2007). *Decentralization and alternative motives for foreign direct investment*. Mimeo, University of Exeter.

Hubert, F., & Ikonnikova, S. (2004). *Hold-up, multilateral bargaining, and strategic investment: the Eurasian supply chain for natural gas*. Mimeo.

Janeba, E. (2000). Tax competition when governments lack commitment: excess capacity as a countervailing threat. *American Economic Review*, *90*, 1508–1519.

Keen, M. J. (1998). Vertical tax externalities in the theory of fiscal federalism. *International Monetary Fund Staff Papers*, *45*(3), 454–485.
Keen, M. J., & Kotsogiannis, C. (2002). Does federalism lead to excessively high taxes? *American Economic Review*, *92*(1), 363–370.
Keen, M. J., & Kotsogiannis, C. (2003). Leviathan and capital tax competition in federations. *Journal of Public Economic Theory*, *5*(2), 177–199.
Kehoe, P. J. (1989). Policy cooperation among benevolent governments may be undesirable. *Review of Economic Studies*, *56*, 289–296.
Kessing, S. G., Konrad, K. A., & Kotsogiannis, C. (2006). Federal tax autonomy and the limits of cooperation. *Journal of Urban Economics*, *59*(2), 317–329.
Kessing, S. G., Konrad, K. A., & Kotsogiannis, C. (2007). Foreign direct investment and the dark side of decentralisation. *Economic Policy*, *22*(49), 5–70.
Konrad, K. A., & Lommerud, K. E. (2001). Foreign direct investment, intra-firm trade and ownership structure. *European Economic Review*, *45*, 475–494.
Oman, C. (2000). *Policy competition for foreign direct investment: a study of competition among governments to attract FDI*. Paris: Development Center of the Organization for Economic Co-operation and Development.
Qian, Y., & Weingast, B. R. (1997). Federalism as a commitment to preserving market incentives. *Journal of Economic Perspectives*, *11*, 83–92.
Schnitzer, M. (1999). Expropriation and control rights: a dynamic model of foreign direct investment. *International Journal of Industrial Organization*, *17*, 1113–1137.
Schnitzer, M. (2002). Debt v. foreign direct investment: the impact of sovereign risk on the structure of international capital flows. *Economica*, *69*, 41–67.
Shleifer, A., & Treisman, D. (1999). *Without a map: political tactics and economic reform in Russia*. Cambridge: MIT Press.
Shleifer, A., & Vishny, R. W. (1993). Corruption. *Quarterly Journal of Economics*, *108*, 599–617.
Svejnar, J., & Smith, S. C. (1984). The economics of joint ventures in less developed countries. *Quarterly Journal of Economics*, *119*, 149–167.
Thomas, J., & Worrall, T. (1994). Foreign direct investment and the risk of expropriation. *Review of Economic Studies*, *61*, 81–108.
Tirole, J. (1988). *The theory of industrial organization*. Cambridge: MIT Press.
Treisman, D. (1999). Russia's tax crisis: explaining falling revenues in a transitional economy. *Economics and Politics*, *11*, 145–169.
Weingast, B. R. (1995). The economic role of political institutions: market-preserving federalism and economic development. *Journal of Law, Economics and Organization*, *11*(1), 1–31.
Wilson, J. D. (1999). Theories of tax competition. *National Tax Journal*, *52*, 269–304.
World Bank (2004). *A better investment climate for everyone*, World development report 2005. World Bank and Oxford University Press.
Wrede, M. (1997). Tax competition and federalism: the underprovision of local public goods. *FinanzArchiv*, *54*, 494–515.
Wrede, M. (2000). Shared tax sources and public expenditures. *International Tax and Public Finance*, *7*(2), 163–175.
Zhuravskaya, E. V. (2000). Incentives to provide local public goods: fiscal federalism, Russian style. *Journal of Public Economics*, *76*(3), 337–368.