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Working Paper No. 13

**Leviathan and Competition among Jurisdictions:
The Case of Benefit Taxation**

by

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Leviathan and Competition among Jurisdictions: The Case of Benefit Taxation *

Abstract

The paper shows that interjurisdictional competition for mobile factors of production forces the government to raise the efficiency of the public sector and, thus, helps to tame Leviathan governments. However, this result is derived under some restrictive assumptions concerning the kind of tax policy used by the government. In the case of benefit taxes, e.g. user charges, a Leviathan may be tamed by interjurisdictional competition whereas this is not necessarily true in the case of lump-sum taxes.

JEL categories F20, H21, H40, H73

1 Introduction

Most models in public economics are based on the assumption that the government of a jurisdiction has the objective of maximising the welfare of its constituency. Moreover, it is claimed that the public sector uses its budget efficiently. Neither of these assumptions is realistic. Governments and public-sector bureaucrats follow their own goals and they waste resources. To some extent, this behaviour is restricted by the democratic process. Selfish and wasteful governments can be punished by the voter in the elections. However, as Downs [2] has argued, voters are rationally ignorant and are only imperfectly informed what is going on in politics. Thus, governments and public bureaucracies are, at least to some extent, able to improve the well-being of their members at the expense of the well-being of the voters.

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It has been argued in the literature that there is another, perhaps more efficient, way to limit the discretionary power of governments: openness of the economy for mobile factors of production. See Brennan and Buchanan [1], ch. 9.2, but also Drèze [3] and Giersch [6]. The basic argument is the following one. The government is responsible for the provision of the infrastructural and institutional framework in which economic activities take place. If it is inefficient, i.e. if it provides low-quality services but charges high taxes, mobile factors are driven out of the country. This leads to a decline in income and employment of the immobile factors. The voters will be worse off and they will punish the government by electing other parties or candidates. But since the government is interested in being re-elected, it is forced to act and increase the jurisdiction's attractiveness to mobile factors of production. This requires lower taxes and/or better public services. Thus, the part of the budget spent by the public sector for its own well-being must shrink. The Leviathan is tamed.

If this argument is correct, then factor mobility can repair a major deficiency of the system of representative democracy. Not only is the allocation of the private factors of production improved by increased mobility, there is also a productivity gain in the public sector. The resource-wasting Leviathan is turned into a leaner state that satisfies its constituency's needs in a more efficient way.¹ This is an interesting result and it has

¹ There are alternative, less optimistic, notions of the lean state. Hans-Werner Sinn [12] looks at situations where a benevolent state corrects market failures and provides public goods that are not supplied optimally by unregulated competitive markets. If competition is re-introduced, now on the level of jurisdictions, market failures are re-introduced as well. Governments are forced to reduce their public-goods supply to inefficiently low levels. Sinn's [12] examples for such undesirable outcomes of interjurisdictional competition are the public provision of social insurance and product quality standards. In both cases regulation is reduced to sub-optimal levels if jurisdictions compete with another.

important policy implications. None the less, one does not find much about this hypothesis in the literature. Related questions have been addressed by Epple and Zelenitz [5] and by Edwards and Keen [4], but the only papers dealing with the hypothesis itself are those by *Sinn* [12] and *Rauscher* [11]. *Sinn's* [12] analysis is based on a diagrammatical exposition rather than on a formal model. It is shown that the public sector of a jurisdiction is forced to reduce its taxes if other jurisdictions offer better combinations of tax rates and public-sector services. But it is not shown that the other jurisdictions have incentives to do so. Moreover, *Sinn's* paper is rather vague on what the tax base is and on how the taxes collected from the mobile factor of production are used. Thus, this paper presents some good arguments for a taming of Leviathan, but it does not provide a formal proof. *Rauscher* [11] uses a formal model and shows that the argument, though plausible, is not always consistent. If the mobile factor of production is the tax base, it is possible that public-sector efficiency declines when factor mobility is increased. In the present paper, I take a slightly different approach and look at benefit taxes as the instrument. Examples are road pricing schemes, environmental taxes, and all kinds of fees that are paid for public-sector services.

2. The Model

Imagine a world consisting of many small identical jurisdictions.² There are three factors of production. One factor (land or labour) is taken as given and constant and, therefore, it is not modelled explicitly. In each jurisdiction, there is another immobile but variable factor of production, g , which is supplied by the government. It may be thought of as infrastructure or institutional capital. The third factor is private capital, which is mobile across jurisdictions. Each jurisdiction is endowed with a stock k^0 and it

2 This assumption makes the analysis relatively convenient and it allows to separate the effects of tax competition from those of changes in the allocation of the mobile factor of production.

employs k . Ex ante, k^0 and k may differ but ex post they are equal because the jurisdictions are identical and all governments choose the same policies. The production function exhibits constant returns to scale.

An aggregate good is produced. This good can be used for consumption purposes but also as the public-sector input. Thus, each unit of g costs one unit of consumption - if the government does not waste tax revenues. Let the production function have constant returns to scale. Due to the assumption that some factors are constant, the production function can be represented by $f(k,g)$ where $f(.,.)$ exhibits decreasing returns to scale in (k,g) .³ Moreover, let it have the usual properties (positive partial derivatives and negative second derivatives). The sign of the cross derivative, f_{kg} , is indeterminate in the case of decreasing returns to scale. Moreover, the function is strictly concave in (k,g) . Thus, $f_{kk}f_{gg} - f_{kg}^2 > 0$. Subscripts denote partial derivatives.

The tax revenue consists of two components. One of them is a lump-sum tax, t^0 . The other one is a user charge or fee on the public good. Let this fee be t . Then $t^0 + tg$ is the tax revenue. Domestic producers have to pay for the factors they hire from abroad. With r being the remuneration, $r(k - k^0)$ is the income going to foreigners. Ex post, this turns out to be zero, but ex ante it matters. Thus the consumable private income in this economy is

$$y = f(k,g) - t^0 - tg - r(k - k^0). \quad (1)$$

A benevolent government would maximise y or – if capital is mobile and footloose – the income of the immobile factor, $y - rk^0$. Note, however, that both r and k^0 are given and

³ It is known from empirical analyses that the elasticities of output with respect to private and public capital are approximately one third and less than 0.2, respectively. See Gramlich [7] for a survey and Holtz-Eakin [8] for recent estimates. Only if the additional factors of production are taken into account, will the sum of output elasticities add up to one.

For a Leviathan government, y is just one of the arguments of its objective function. It may be interpreted a proxy for political support. The other argument of the Leviathan's objective function is the rent it can appropriate due to voter ignorance. In the model, this rent is $t^0 + tg - g$, i.e. the part of the tax revenue which is not spent to provide public-sector services. Note that this is not a budget surplus but the consumption of the public sector itself. Political support and the government's rent income are the arguments of a quasi-concave utility function:

$$u(t^0 + tg - g, f(k, g) - t^0 - tg - r(k - k^0)). \quad (2)$$

Edwards and Keen [4] use the same type of utility function. It is a drastically reduced form of a complex political process. In particular, I have not modelled the interactions of the government and the bureaucracy explicitly. For a model doing this, see Moene [9]. Moreover, one may think of additional arguments of a Leviathan's utility function, e.g. the size of the budget or the level of public-sector activity. See Niskanen [10] and Moene [9]. This is, however, not done here since I wish to concentrate on the waste of resources in my analysis. For the sake of convenience, the arguments of the functions will be dropped in what follows.

The capital market is assumed to be perfectly competitive and this implies

$$f_k = r. \quad (3)$$

If the capital is immobile, k is given and r is determined in the domestic capital market. If capital is mobile, r is given and k is the endogenous variable.

Government behavior can be modelled in three ways. One possibility is to look at a situation where the government sets a tax rate or user fee and leaves it to the market to decide how much of the g good is demanded by the private sector. Alternatively, one may assume that the government fixes a level of g and auctions user permits such that the market determines the price of a permit, t . The final option is to assume that the government offers a (t, g) package - subject to the constraint that profits do not become

negative. It is known that the taxation and the tradable-permits schemes are equivalent if markets are perfectly competitive. Moreover, one can show that the package approach leads to the same result in the case of constant returns to scale.⁴ Thus it is sufficient to look at one of these cases and I chose the first one, where the government just sets taxes. The relationship between g and t is given by

$$f_g = t. \quad (4)$$

What is the effect of a change in the tax rate on the supply of the public good? In autarky, it follows directly from equation (4):

$$\left(\frac{dg}{dt}\right)^{autarky} = \frac{1}{f_{gg}} < 0 \quad (5)$$

If capital is mobile, it has to be taken into account that the capital stock is determined by equation (4). Total differentiation of equations (3) and (4) then yields

$$\left(\frac{dg}{dt}\right)^{mobility} = \frac{f_{kk}}{f_{kk}f_{gg} - f_{kg}^2} < 0 \quad (6)$$

The results are expected. High fees reduce the demand for public-sector services. Moreover it follows that

$$\left(\frac{dg}{dt}\right)^{mobility} < \left(\frac{dg}{dt}\right)^{autarky} \quad (7)$$

⁴ If the condition of non negative profits is binding, we have $f(k,g) = rk + tg + w$ where w is the income of the immobile factor. The Euler equation, which is a technical condition satisfied for all constant-returns-to scale functions, implies $w = f(k,g) - f_k k - f_g g$. Using this and equation (3), we have that $t = f_g$.

for given levels of k and g . If capital is mobile, tax increases induce a more drastic decline in demand for the government good than if it is not. The direct effect of a tax increase is a reduction in g . This is independent of whether the jurisdiction is autarchic or not. The indirect effect, however, occurs only in the case of capital mobility. The reduction in g leads to a decline in capital productivity; capital leaves the jurisdiction, this reduces the productivity of the government goods and ultimately leads to further reductions in g .⁵

Before the behaviour of a Leviathan is considered, I will briefly discuss the welfare-maximising solution. A benevolent government does not appropriate a rent. Thus, $g = t^0 + tg$ and this implies

$$y = f(k, g) - g - r(k - k^0). \quad (8)$$

The optimum is determined by

$$f_g = 1. \quad (9)$$

This is not a particularly surprising result. An increase in infrastructure by one unit results in a loss of one unit of consumable income. Thus, since the opportunity cost of increasing g equals one, the marginal benefit must equal one as well. This result is independent of whether or not capital is mobile.

3 The Taming of the Leviathan

The Leviathan government maximizes the utility function subject to the factor demands of the private sector (equations (3) and (4)). The first-order conditions are

⁵ This argument is based on the assumption that $f_{kg} > 0$. If $f_{kg} < 0$, the result is the same. The reduction in g leads to an increase capital productivity and, therefore, an increase in the capital stock. This now reduces the marginal productivity of the government good and results in an additional reduction in g .

$$u_1 - u_2 = 0, \quad (10a)$$

$$u_1 \left(g + (t-1) \frac{dg}{dt} \right) - u_2 g = 0 \quad (10b)$$

It is assumed here that the objective function is a strictly concave function of the tax rate and that boundary solutions can be ruled out.⁶ It should be noted that t has an impact on the allocation of capital, too, but all terms containing dk/dt cancel out since $f_k = r$ and $k = k^0$ ex post. If lump-sum taxation is possible, the optimum is characterised by $t=1$. Moreover, it follows from eq. (4) that $f_g = 1$. Again, it does not matter whether or not capital is mobile. The reason is that even a Leviathan government is interested in using efficient tax instruments. The purpose of t is to signal the scarcity of the publicly supplied good to the private sector. The tax revenue needed to finance the government's own consumption is generated by a distortion-free-lump-sum tax.

Matters are different if the benefit tax is (ab)used to generate the Leviathan's rent. There are at least two explanations as to why this inefficient instrument may be chosen. The standard argument in the public-finance literature is that there are binding constraints to lump-sum taxation, e.g. due to equity considerations. The alternative explanation comes from the public-choice literature. There, it is argued an important motive underlying a government's instrument choice is obfuscation: governments wish to disguise the generation of rents through the tax system and, therefore, prefer instruments that are non-transparent to the tax payer. This may be another reason as to

⁶ In this model, strict concavity of the optimisation problem does not follow from the well-behavedness of the utility and production functions. The private sector's first-order conditions are binding restrictions. Thus the government's first-order condition contains second derivatives of the production function and the second-order conditions contain third derivatives. It can be shown that in the case of Cobb-Douglas production and utility functions the second-order conditions are satisfied, nevertheless. A proof is available from the author on request.

why lump-sum taxes are used so rarely in practice. If there is a constraint on lump-sum taxation, equation (10a) is not satisfied. Equation (13b) can be rewritten:

$$\frac{u_2}{u_1} = 1 + \frac{t-1}{g} \frac{dg}{dt}. \quad (11)$$

The tax rate is now larger than one.⁷ Thus, the second term on the right-hand side of eq. (11) is negative. It follows that the marginal rate of substitution, u_2/u_1 , is less than one. If the government raises the tax rate by one unit, the private sector's income is reduced by exactly the tax base. However, the public sector's rent is raised by less than the tax base since the rise in the tax rate reduces the tax base itself. Thus, a one-unit increase in rent-income is accompanied by a more-than-one unit loss of political support.

What happens if we move from autarky to free capital movements? Assume for a moment that not only the capital stock but also the tax rate and the demand for the government good remain unchanged. Due to the stronger impact of t on g (inequality (7)), the left-hand side of equation (11) becomes negative. If the objective function is strictly concave, this indicates that the tax rate exceeds the optimum tax rate. Thus, t must be smaller in the case of capital mobility and interjurisdictional competition than in the autarky situation. But if t is smaller, g must be larger (see eqs. (6) and (7)). Thus,

⁷ To prove this, differentiate the first-order condition for the optimal tax rate t with respect to the lump-sum tax t^0 . This yields

$$\frac{\partial^2 u}{\partial \alpha \partial t^0} = u_{11} \left(g + (t-1) \frac{dg}{dt} \right) + u_{22} g < 0.$$

It follows the smaller t^0 , the larger is t . What has been an optimal user fee for a high level of lump-sum taxes is now a suboptimal user fee. Thus, the lower the lump-sum tax the larger must the user fee be. Since t^0 is lower than its optimum level if the restriction on lump-sum taxation is binding, the benefit tax rate, t , must exceed one.

we conclude that interjurisdictional competition leads to lower tax rates and an improvement in the availability of the government goods. The Leviathan has been tamed. The private sector of the economy is better off.

Proposition

If benefit taxes are used to generate rents for the public sector then factor mobility leads to lower fees and an increase in the use of the government good. If this is done by lump-sum taxes, factor mobility and autarky produce the same results.

The reason for the taming of the Leviathan is that mobility raises the elasticity of demand for public-sector services. Thus, tax increases cause smaller tax-revenue increases in the open than in the closed economy. This implies that for the government in an open economy it is more expensive in terms of lost political support to increase its rent income than in a closed economy. Thus, after a change from autarky to factor mobility, each government reduces the tax rate since this now leads to a larger increase in the tax base than before. However, since the governments in all jurisdictions do this, capital stays where it was and not much happens - except that t is reduced and g is increased.

In contrast to the results established in the traditional tax-competition literature with benevolent governments (Wilson [14] and Zodrow and Mieszkowski [15]), interjurisdictional competition is socially beneficial in my model. In the traditional literature, tax competition ties the hands of a good government: it is forced to provide a less-than-optimal amount of public goods. In my model, tax competition ties the hands of a bad government: it is forced to redistribute resources from its own members to the rest of society.

4 Final Remarks

The central result of this paper is that interjurisdictional competition can be advantageous - not for lazy bureaucrats but for those for whom economic policy is made. A Leviathan which (ab)uses benefit taxes to generate rent income is tamed by factor mobility. However, if other modes of taxation are considered, the result is changed. In the case of distortion-free lump-sum taxes, capital mobility has no effect at all. If the mobile factor is taxed, the result may even be reversed and the public sector may become more inefficient as a consequence of increased openness. See Rauscher [11]. Similar results are obtained if the assumption of identical jurisdictions is dropped. If jurisdictions are different, there will be gains from trade. These gains raise the income of the private sector and, thus, the political support of the government. With additional political support, the government has more discretion and is to be expected to increase its rent income. Thus, the optimistic result derived in this paper is not generalisable to situations where other tax instruments are used and where jurisdictions are not identical.

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