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Institutional quality and capital taxation in development economies

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Institutional Quality and Capital Taxation*

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Abstract

We describe the preferred taxation regime in a small economy with uncertain institutional quality. We obtain that a preferential (unconstrained) taxation regime in which taxes can be matched to the mobility of the tax base may be worse off than a non-preferential (constrained) taxation regime in which taxes are constant across bases with distinct mobility. Since the small economy takes foreign taxes as given, our result is not driven by a downward pressure on revenues caused by unconstrained tax competition. It is instead related to the ability of a non-preferential taxation regime to credibly convey information about the institutional quality of the small economy. We endogenize the choice of taxation regime, and derive the conditions under which each regime emerges as the preferred one.

1 Introduction

There is an extensive literature on the determination of taxes and the preferred tax regime in the presence of strategic competition for the same tax base.[1] In contrast, not much work has focused on the determination of taxes and the preferred tax regime in small economies which do not strategically compete with the rest of the world (say, because they are too small to impact the behavior of other economies) but strategically interact with foreign investors who are uncertain about its institutional quality (i.e., its ability to protect their property rights). This theme is particularly important in developing economies. Indeed, a survey of opinion conducted by the World Bank (Lamech and Saeed, 2003) shows that, when deciding whether to invest in a developing economy,

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[1] Wilson (1986) and Zodrow and Mieszkowski (1986) are seminal references. See also Persson and Tabellini (1992), Janeba (1998, 2000), Keen (2001), Baldwin and Krugman (2004), Wilson and Janeba (2005), Slemrod and Wilson (2009), and Marceau, Mongrain, and Wilson (2010).

foreign investors are particularly concerned about (i) the legal framework defining the rights and obligations of private investors, (ii) the independence of regulatory institutions and processes from arbitrary government interference, and (iii) the degree of perceived judicial independence from government influence.[2]

More precisely, in this paper we develop a model of capital taxation in a small economy that wants to attract investors located in a large economy who are uncertain about the ability of institutions in the small economy to protect their capital. We capture uncertainty by assuming that institutions in the small economy either have high quality or low quality, and by assuming that a positive measure of foreign investors cannot directly observe the underlying institutional quality.[3] We consider two distinct taxation regimes: a preferential (unconstrained) regime, in which taxes can be conditioned on the mobility of the capital, and a non-preferential (constrained) regime in which taxes are constant across bases with distinct mobility.

We first consider a benchmark scenario, with no uncertainty about institutional quality. We show that the unconstrained regime always dominates the constrained regime in terms of tax revenue. Intuitively, there is no actual competition in taxes between the small and the large economy, i.e., when choosing her tax, the government in the large economy does not take into account the behavior of the small economy. As a result, when making her decision, the government of the small economy is only concerned about the relative mobility of capital. Thus, the optimal tax scheme involves high taxation of the domestic capital and low taxation of the foreign capital. This is true irrespective of the quality of the institutions in the small economy.

We then consider the environment with uncertainty about institutional quality. We show that the constrained regime may dominate the unconstrained regime if institutions in the small economy are of high quality. The intuition for this result runs as follows. In the unconstrained (constrained) regime, the elasticity of the foreign tax base[4] with respect to the tax on foreign capital is independent

[2] There are a number of papers that attest the impact of local institutions on foreign direct investment (FDI). See, for example, Schneider and Frey (1985), Jun and Singh (1996), Brunetti, Kisunko and Weder (1997), Buthe and Milner (2008), Seyoun (2011), and An (2011). In turn, the fact that institutions differ greatly across developing countries is made clear by the measurement of governance produced by Kaufmann, Kraay, and Zoido-Lobaton (1999).

[3] The work that is closest to ours is Janeba (2000). Janeba (2000) considers a setting in which the uncertainty of investors comes not from the unobserved quality of the institutions but from the possibility that the governments change taxes after the investment decisions are made (lack of commitment). See also Janeba (2002). Kessing, Konrad, and Kotsogiannis (2009) also look at the role of institutions on tax competition. They relate weak institutions with the inability of the government to offer a common tax structure within a federalist country, and exploit the adverse effect of this weakness on the ability to attract foreign direct investment. In their setting, there is no uncertainty with respect to the quality of institutions.

[4] The foreign tax base is given by the measure of foreign investors who choose to locate their capital in the small economy

of (increases with) institutional quality. This implies that, absent any uncertainty, the optimal tax on foreign capital in the unconstrained (constrained) regime is independent of (decreases with) institutional quality. In the presence of uncertainty though, the choice of taxes also depends on how taxes impact the belief of uninformed agents. In particular, if institutions are good, the government may want to choose taxes which are different from the ones chosen when institutions are bad, just to convey information about the underlying institutional quality. Now, since optimal taxes in the unconstrained regime do not vary with institutional quality, to depart from such taxes in order to signal institutional quality is particularly costly in the unconstrained regime. Indeed, we obtain that, while there exist equilibria in the constrained regime in which taxes on foreign capital vary with institutional quality, such equilibria do not exist in the unconstrained regime. Thus, the constrained regime is superior when incentives to convey information about institutional quality dominate incentives to discriminate between tax bases with different mobility.[5]

The result above implies that the preferred taxation regime in the small economy may depend on its institutional quality. Thus, it is natural to consider which taxation regime arises if the government in the small economy can choose between the constrained and the unconstrained regime. We deal with this issue by allowing the government of the small economy to condition its choice of regime on its institutional quality. We show that there is a unique equilibrium, and in this equilibrium, while low quality institutions always lead to the choice of the unconstrained regime, high quality institutions can lead to the choice of the constrained regime. Hence, our model offers a novel rationale for the choice of a constrained (non-preferential) regime, which is not linked to the strategic competition for a mobile tax base.

The paper is organized as follows. In the next section we present the model. We consider first the case of complete information and then the case of incomplete information. We then endogenize the choice of taxation regime, and we make our final remarks in the last section.

[5] Ours is not the first work to obtain that the constrained (non-preferential) regime may dominate the unconstrained (preferential) regime. Janeba and Peters (1999) obtain this result in an environment where governments actively compete for a mobile tax base. See also Janeba and Smart (2003), Wilson (2005), Konrad (2007), and Marceau, Mongrain and Wilson (2010). As said above, the key difference in our approach is that the non-preferential regime may dominate despite the fact that the governments are not actively competing for the mobile tax base.

2 Model

2.1 Environment

Consider an environment with two countries, Home and Foreign. Home is a small economy inhabited by a measure ω of agents. Foreign is a large economy, inhabited by a continuum of groups of agents distributed over a circle of length one and where, for each group, there is a $[0, 1]$ continuum of agents. Each agent in Home is endowed with one unit of an indivisible and immobile capital. In turn, agents in Foreign come in two types: there exists one group of agents that is endowed with one unit of an indivisible and mobile capital. All remaining agents are endowed with one unit of an indivisible and immobile capital.

Immobile capital can only be invested in the country of origin while mobile capital may be invested abroad. We normalize the revenue (cost) of investing in the country of origin to one (zero). In turn, every agent in Foreign with a mobile capital (henceforth called investor) obtains a revenue v and faces a cost δc if he chooses to invest in Home, where $\delta \in \{\delta_L, \delta_H\}$, with $\delta_L < \delta_H$, and c is a random draw from a uniform distribution in the interval $[0, 1]$. The probability that $\delta = \delta_H$ is equal to θ. The factor δ captures the overall quality of institutions in Home, for instance it captures Home's ability to protect property rights. The constant c is a standard cost of capital reallocation. We capture asymmetries of information with respect to institutions in Home by assuming that a measure $\lambda \in [0, 1]$ of investors do not observe the value of δ.

Capital is taxed by the government in each country, and the objective of each government is to maximize tax revenues. We consider two systems of taxation: a non-preferential (constrained) regime in which the government taxes capital irrespective of its origin and a preferential (unconstrained) regime in which the government taxes capital based on its origin. The sequence of events in the economy is as follows. First, the institutional cost δ is randomly drawn by nature and observed by the Home government. After that, the Foreign government and the Home government choose their taxes. Each agent then observes taxes and decides where to locate his capital.

2.2 Equilibrium under Complete Information

As a benchmark, we initially consider the case where all investors know the realization of $\delta \in \{\delta_L, \delta_H\}$, that is, $\lambda = 0$. First, note that the government in Foreign has a strictly dominant strategy, i.e., tax all available capital irrespective of the realization of δ. In fact, with the exception of a set of measure zero, all capital available in Foreign is immobile. We solve for the remaining

decisions by backward induction, starting with the decisions of investors.[6] An investor chooses to move his capital to Home if and only if

$$(1 - t_f)\, v - (1 - \delta)c > 0,$$

where t_f is the tax of foreign capital in Home. We can rewrite this condition as

$$c < \frac{(1 - t_f)\, v}{1 - \delta} \equiv B_f(\delta, t_f).$$

$B_f(\delta, t_f)$ is the foreign tax base, i.e., the total measure of investors who choose to locate their capital in Home, which depends on the tax chosen by the Home government and the institutional quality. Naturally, the foreign tax base is a decreasing function of the tax t_f and an increasing function of the institutional quality.

We now consider the decision of the Home government. Her choice depends on the regime in place. We consider each case separately, starting with the unconstrained regime.

The Unconstrained (Preferential) Regime Let t_h be the tax of domestic capital in Home. The revenue of the Home government is

$$t_h \omega + B_f(\delta, t_f) t_f v.$$

Clearly, in the unconstrained regime, the Home government fully taxes the domestic capital. In turn, the revenue from taxing foreign capital is given by the foreign tax base times the tax revenue of each unit of capital $t_f v$. Thus, the value of t_f that maximizes revenue is $t_f = \frac{1}{2}$, and the total revenue is

$$r_u(\delta) = \omega + B_f\left(\delta, \frac{1}{2}\right)\frac{v}{2} = \frac{v^2}{4\delta} + \omega.$$

The tax on foreign capital is the same regardless of the institutional quality of the small economy because the elasticity of the foreign tax base with respect to the foreign tax, given by $-\frac{t}{1-t}$, does not depend on institutional quality. In turn, the revenue of the Home government increases with δ due to the positive effect of the institutional quality on the foreign tax base.

The Constrained (Non-Preferential) Regime In the constrained regime, that tax t is the same for both domestic and foreign capital. The revenue of the Home government is

$$t\left[\omega + B_f(\delta, t)\, v\right],$$

[6] Clearly, we only need to deal with the decisions of investors as agents with immobile capital have no choice but to invest in their country of origin.

so the optimal tax is given by

$$t_C(\delta) = \min\left\{\frac{1}{2}\left(1 + \frac{\omega(1-\delta)}{v^2}\right), 1\right\}.$$

In the constrained regime, the Home government imposes a higher tax on foreign capital in order to obtain a higher revenue from the domestic capital. Note that, if the measure of agents in Home is large enough, the Home government chooses to tax all available capital and a measure zero of investors choose to move their capital to Home. In order to avoid this uninteresting scenario, henceforth we assume that

$$A1 : \omega < \frac{v^2}{1-\delta_L}.$$

This implies

$$t_C(\delta) = \frac{1}{2}\left[1 + \frac{\omega(1-\delta)}{v^2}\right],$$

and the revenue of the Home government is

$$r_c(\delta) = t_C(\delta)\left\{\omega + B_f\left[\delta, t_C(\delta)\right] v\right\} = \frac{\delta}{4v^2}\left(\frac{v^2}{1-\delta} + \omega\right)^2.$$

Note that a higher institutional quality leads to a lower tax. To understand this effect, let $\epsilon_{B,t}$ be the elasticity of the total tax base $B = \omega + B_f$ with respect to the tax t. We have

$$\epsilon_{B,t} = -\frac{t}{1 - t + \frac{\omega}{v}(1-\delta)},$$

and the reduction in the total tax base associated with an increase in taxes is more pronounced if the small economy has a higher institutional quality.

It is immediate to observe that, irrespective of the institutional quality $\delta \in \{\delta_L, \delta_H\}$, the revenue in the unconstrained regime is always higher than the revenue in the constrained regime. This is intuitive and captures the idea that the unconstrained regime allows the Home government to discriminate between agents according to the mobility of their capital.

2.3 Equilibrium under Incomplete Information

We now consider the case in which a measure $\lambda > 0$ of investors in Foreign do not observe the realization of $\delta \in \{\delta_L, \delta_H\}$. If we let δ^e denote the belief of an uninformed investor about the realization of δ, then this investor chooses to move his capital to Home if and only if

$$c < \frac{(1 - t_f)\, v}{1 - \delta^e} \equiv B_f(\delta^e, t_f).$$

As in the complete information case, we consider each regime separately, starting with the unconstrained regime.

The Unconstrained (Preferential) Regime In the unconstrained regime, the revenue of the Home government is

$$t_h\omega + \left[\lambda B_f(\delta^e, t_f) + (1-\lambda)\, B_f(\delta, t_f)\right] t_f v.$$

In the presence of incomplete information about the institutional quality, the tax on foreign capital affects not only the direct cost of investing in Home but, for an uninformed investor, it may also affect his belief about the institutional quality. Thus, in principle, there may be equilibria in which the Home government strategically manipulates the foreign tax to reveal (or to hide) information about δ. In Proposition 1 we show that such type of equilibria do not exist in an unconstrained regime.

Proposition 1 *In the unconstrained regime, there is no equilibrium in which the tax on foreign capital varies with the institutional quality* $\delta \in \{\delta_L, \delta_H\}$.

Proof. Consider a candidate equilibrium in which taxes convey information about the institutional quality. If the equilibrium values of t_h and t_f reveal the underlying institutional quality, the choice of the Home government under a low institutional quality must be the same as her choice under perfect information. Thus, $t_h(\delta_L) = 1$ and $t_f(\delta_L) = \frac{1}{2}$. Now, if the choice of the Home government under the high institutional quality is given by $\{t_h, t_f\}$, it must be that

$$\omega + B_f\left(\delta_L, \frac{1}{2}\right)\frac{v}{2} \geq t_h\omega + \left[\lambda B_f(\delta_H, t_f) + (1-\lambda)\, B_f(\delta_L, t_f)\right] t_f v,$$

and

$$t_h\omega + B_f(\delta_H, t_f)\, t_f v \geq \omega + \left[\lambda B_f(\delta_L, \frac{1}{2}) + (1-\lambda)\, B_f(\delta_H, \frac{1}{2})\right]\frac{v}{2}.$$

We can rewrite these inequalities as

$$(1-t_h)\frac{\omega}{v} \geq \left[\lambda B_f(\delta_H, t_f) + (1-\lambda)\, B_f(\delta_L, t_f)\right] t_f - B_f\left(\delta_L, \frac{1}{2}\right)\frac{1}{2}, \tag{1}$$

and

$$(1-t_h)\frac{\omega}{v} \leq B_f(\delta_H, t_f)\, t_f - \left[\lambda B_f(\delta_L, \frac{1}{2}) + (1-\lambda)\, B_f(\delta_H, \frac{1}{2})\right]\frac{1}{2}. \tag{2}$$

A necessary condition for (1) and (2) to be satisfied is that the right hand side of (1) is smaller than the right hand side of (2). After some computation we obtain that this can only be the case if

$$(1-t_f)t_f \geq \frac{1}{4}.$$

Thus, the only value of t_f consistent with this condition is $t_f = \frac{1}{2}$. That is, in any equilibrium where the values of t_h and t_f reveal the institutional quality, it must be that $t_f(\delta_L) = t_f(\delta_H) = \frac{1}{2}$. This concludes our proof. ■

Henceforth, we let

$$E_\mu B_f(t_f) \equiv \mu B_f(\delta_H, t_f) + (1-\mu) B_f(\delta_L, t_f)$$

denote the expected foreign base when the posterior belief that the institutional quality is high is given by μ. Our next result shows that there exists equilibria in the unconstrained regime in which taxes are the same, regardless of the institutional quality.

Proposition 2 *In the unconstrained regime, there exists an equilibrium in which taxes coincide with the ones obtained in the complete information case, i.e.,* $t_h(\delta_L) = t_h(\delta_H) = 1$ *and* $t_f(\delta_L) = t_f(\delta_H) = \frac{1}{2}$.

Proof. Let (t_h, t_f) be the profile of taxes on the equilibrium path, and let $\mu\left(t'_h, t'_f\right)$ be the posterior belief that the institutional quality is high when the profile of taxes is $\left(t'_h, t'_f\right) \neq (t_h, t_f)$. In an equilibrium in which taxes do not reveal information about the institutional quality, it must be that, for all $\left(t'_h, t'_f\right) \in [0,1]^2$,

$$t_h\omega + \left[\lambda E_\theta B_f(t_f) + (1-\lambda) B_f(\delta_L, t_f)\right] t_f v \geq t'_h\omega + \left[\lambda E_\mu B_f(t'_f) + (1-\lambda) B_f(\delta_L, t'_f)\right] t'_f v. \quad (3)$$

This inequality ensures that, under a low institutional quality, the Home government has no incentive to deviate. In turn, it must be that, for all $\left(t'_h, t'_f\right) \in [0,1]^2$,

$$t_h\omega + \left[\lambda E_\theta B_f(t_f) + (1-\lambda) B_f(\delta_H, t_f)\right] t_f v \geq t'_h\omega + \left[\lambda E_\mu B_f(t'_f) + (1-\lambda) B_f(\delta_H, t'_f)\right] t'_f v, \quad (4)$$

so the Home government has no incentive to deviate if the institutional quality is high. Now, since deviations are less likely if investors attach probability one that the underlying institutional quality is low after observing $\left(t'_h, t'_f\right)$, let us impose that $\mu\left(t'_h, t'_f\right) = 0$ for all $\left(t'_h, t'_f\right) \neq (t_h, t_f)$. Consider then the existence of an equilibrium in which $t_h = 1$ and $t_f = \frac{1}{2}$. In this case, (3) can be rewritten as

$$\left(1 - t'_h\right)\frac{\omega}{v} + \left[\lambda E_\theta B_f(\frac{1}{2}) + (1-\lambda) B_f\left(\delta_L, \frac{1}{2}\right)\right]\frac{1}{2} \geq \left[\lambda E_\mu B_f(t'_f) + (1-\lambda) B_f(\delta_L, t'_f)\right] t'_f,$$

and (4) can be rewritten as

$$\left(1 - t'_h\right)\frac{\omega}{v} + \left[\lambda E_\theta B_f(\frac{1}{2}) + (1-\lambda) B_f\left(\delta_H, \frac{1}{2}\right)\right]\frac{1}{2} \geq \left[\lambda E_\mu B_f(t'_f) + (1-\lambda) B_f(\delta_H, t'_f)\right] t'_f.$$

Clearly, since $B_f\left(\delta, \frac{1}{2}\right)\frac{1}{2} \geq B_f\left(\delta, t'_f\right)t'_f$ and $E_\theta B_f(\frac{1}{2})\frac{1}{2} > E_\theta B_f(t)t > E_{\mu=0}B_f(t)t$, the Home government has no incentive to deviate, irrespective of the institutional quality. ■

The equilibrium in Proposition 2 implies the same choice of taxes obtained under complete information. However, since taxes do not convey information about the institutional quality, the overall revenue of the Home government is given by

$$r_u\left(\delta, \theta\right) = \omega + \left[\lambda E_\theta B_f\left(\frac{1}{2}\right) + (1-\lambda)B_f\left(\delta, \frac{1}{2}\right)\right]\frac{v}{2}.$$

which is increasing in the institutional quality. As compared to the revenue under complete information, there is a decrease in revenue when institutions are of high quality and an increase in revenue when institutions are of low quality. Finally, since $t_h = 1$ and $t_f = \frac{1}{2}$, there can be no other equilibrium in the unconstrained regime that achieves a higher revenue.[7]

The Constrained (Non-Preferential) Regime In the constrained regime, the revenue of the Home government is given by

$$t\omega + \left[\lambda B_f(\delta^e, t) + (1-\lambda)\, B_f(\delta, t)\right] tv.$$

We show that there exists an equilibrium in which foreign taxes vary with the institutional quality of Home. This equilibrium induces the same choice of taxes, thus produces the same revenue obtained in the constrained regime under complete information.

Proposition 3 *In the constrained regime, there exists an equilibrium with* $t_C\left(\delta\right) = \frac{1}{2}\left[1 + \frac{\omega(1-\delta)}{v^2}\right]$, *where* $\delta \in \{\delta_L, \delta_H\}$.

Proof. If the Home government under a low institutional quality does not deviate, it must be that

$$\left\{\omega + B_f\left[\delta_L, t\left(\delta_L\right)\right]v\right\}t\left(\delta_L\right) \geq \left\{\omega + \lambda B_f\left[\delta_H, t\left(\delta_H\right)\right]v + (1-\lambda)B_f\left[\delta_L, t\left(\delta_H\right)\right]v\right\}t\left(\delta_H\right),$$

[7] The claim that there is no equilibrium in the unconstrained regime that achieves a higher revenue implicitly assumes that there can be no equilibria where taxes vary with the institutional quality which induces a higher revenue. There may though exist equilibria in which the Home government under a high institutional quality does not fully tax Home capital, even though such capital is immobile. Intuitively, a lower tax on Home capital may constitute a costly way through which the Home government under a high institutional quality can credibly communicate her type. In fact, in the Appendix, we show that there exists a unique equilibrium with this property. However, a feature of this equilibrium is that the revenue of the Home government under a high institutional quality is equal to the revenue of the Home government under a low institutional cost. Thus, from the point of view of the Home government, this equilibrium is inferior to the one in Proposition 2.

which can be rewritten as

$$\frac{\omega}{v}\left[t\left(\delta_L\right)-t\left(\delta_H\right)\right]\geq\left\{\lambda B_f\left[\delta_H,t\left(\delta_H\right)\right]+(1-\lambda)B_f\left[\delta_L,t\left(\delta_H\right)\right]\right\}t\left(\delta_H\right)-B_f\left[\delta_L,t\left(\delta_L\right)\right]t\left(\delta_L\right). \quad (5)$$

In turn, if the Home government under a high institutional quality does not deviate, it must be that

$$\left\{\omega+B_f\left[\delta_H,t\left(\delta_H\right)\right]v\right\}t\left(\delta_H\right)\geq\left\{\omega+\lambda B_f\left[\delta_L,t\left(\delta_L\right)\right]v+(1-\lambda)B_f\left[\delta_H,t\left(\delta_L\right)\right]v\right\}t\left(\delta_L\right),$$

which can be rewritten as

$$\frac{\omega}{v}\left[t\left(\delta_L\right)-t\left(\delta_H\right)\right]\leq B_f\left[\delta_H,t\left(\delta_H\right)\right]t\left(\delta_H\right)-\left\{\lambda B_f\left[\delta_L,t\left(\delta_L\right)\right]+(1-\lambda)B_f\left[\delta_H,t\left(\delta_L\right)\right]\right\}t\left(\delta_L\right). \quad (6)$$

Both conditions can be satisfied iff the right hand side of (5) is smaller than the right hand side of (6). After some computation we obtain that this can only be the case iff

$$\left[1-t\left(\delta_L\right)\right]t\left(\delta_L\right)<\left[1-t\left(\delta_H\right)\right]t\left(\delta_H\right),$$

which is always true since $t_C\left(\delta_L\right)=\frac{1}{2}\left[1+\frac{\omega(1-\delta_L)}{v^2}\right]>\frac{1}{2}\left[1+\frac{\omega(1-\delta_H)}{v^2}\right]=t_C\left(\delta_H\right)>\frac{1}{2}$. It remains to specify beliefs out of the equilibrium path. We assume that, whenever $t\notin\left\{t_C\left(\delta_H\right),t_C\left(\delta_L\right)\right\}$, the investors attach probability one that the underlying institutional quality is low. ■

If the institutional quality is low, this revenue is lower than the one achieved under the equilibrium described in Proposition 2. In fact, the introduction of uncertainty about the institutional environment decreases the revenue in the constrained regime if the institutional quality is low. Intuitively, in the unconstrained regime, taxes are the same as in the complete information case but a larger measure of investors choose to locate their capital in Home. However, the same is not true if the institutional quality is high. A corollary of Proposition 3 is that there exists a region of parameters in which the Home government under a high institutional quality achieves a higher revenue under the constrained regime, even though this regime limits her ability to discriminate between immobile domestic capital and mobile foreign capital. Intuitively, the existence of an equilibrium in which taxes on foreign capital vary with the institutional quality implies that the choice of taxes reveal information about the underlying institutions, which benefits the government when institutions are good.

Corollary 1 *If the institutional quality is high, then the revenue in the constrained regime is higher*

than the revenue in the unconstrained regime if

$$[1-t_C(\delta_H)]\frac{\omega}{v}+(1-\lambda)\left\{\begin{array}{c} B_f\left(\delta_H,\frac{1}{2}\right)\frac{1}{2} \\ - \\ B_f\left[\delta_H,t_C(\delta_H)\right]t_C(\delta_H) \end{array}\right\}<\lambda\left\{\begin{array}{c} B_f\left[\delta_H,t_C(\delta_H)\right]t(\delta_H) \\ - \\ E_\theta B\left(\frac{1}{2}\right)\frac{1}{2} \end{array}\right\}, \quad (7)$$

which can be rewritten as

$$\lambda(1-\theta)>\frac{(1-\delta_H)(1-\delta_L)}{\delta_H-\delta_L}\left[2-(1-\delta_H)\frac{\omega}{v^2}\right]\frac{\omega}{v^2}.$$

The left hand side of (7) captures the benefit of the unconstrained regime, as given by the possibility of setting a tax on domestic capital equal to 1 and taxes on foreign capital equal to $\frac{1}{2}$. In turn, the right hand side captures the benefit of the constrained regime, as given by the difference in the revenue from foreign capital taxation when the Home government can use taxes to credibly convey information to uninformed investors about the institutional quality in the Home economy. The advantage of the constrained regime is stronger when the measure λ of uninformed foreign investors and the difference $\delta_H-\delta_L$ between high and low quality institutions is sufficiently large.

2.4 Endogenous Regimes

We have shown that the preferred taxation regime in Home may depend on its institutional quality. In what follows, we extend our set up by allowing the Home government to condition the choice of the taxation regime on the prevailing institutional quality. Throughout, we assume that the equilibrium outcome in the interaction between the government and the investors that takes place after the taxation regime is chosen, is the one that produces the highest revenue for the Home government. Thus, the revenue in an unconstrained regime is given by the equilibrium in Proposition 2 and the revenue in the constrained regime is given by the equilibrium in Proposition 3.

In this modified setting, the strategy of the Home government includes a function

$$\sigma:\{\delta_L,\delta_H\}\rightarrow\{U,C\}$$

describing the choice of the taxation regime (U stands for unconstrained while C stands for constrained) as a function of the institutional cost. Figure 1 provides a matrix describing the four possible scenarios that may arise. The first entry in each cell gives the revenue of the Home government if the institutional quality is high, while the second entry gives the revenue of the Home government if the institutional quality is low.

		Low Institutional Quality: U	Low Institutional Quality: C
High Institutional Quality	U	$\omega + \lambda E_\theta B_f(1/2)v/2 + (1-\lambda)B_f(\delta_H,1/2)v/2$ $\omega + \lambda E_\theta B_f(1/2)v/2 + (1-\lambda)B_f(\delta_L,1/2)v/2$	$\omega + B_f(\delta_H,1/2)v/2$ $t_c(\delta_L)\omega + B_f[\delta_L, t_c(\delta_L)]t_c(\delta_L)v$
	C	$t_c(\delta_H)\omega + B_f[\delta_H, t_c(\delta_H)]t_c(\delta_H)v$ $\omega + B_f(\delta_L,1/2)v/2$	$t_c(\delta_H)\omega + B_f[\delta_H, t_c(\delta_H)]t_c(\delta_H)v$ $t_c(\delta_L)\omega + B_f[\delta_L, t_c(\delta_L)]t_c(\delta_L)v$

Figure 1: Payoff Matrix

First, note that, if the institutional quality is low, the Home government strictly prefers to choose an unconstrained regime. This comes from the fact that $B_f\left(\delta, \frac{1}{2}\right)\frac{1}{2} > B_f\left(\delta, t\right)t$ (choosing $t = \frac{1}{2}$ maximizes revenue given the institutional quality) and $B_f\left(\delta_H, t\right)t > B_f\left(\delta_L, t\right)t$ (high institutional quality provides a higher revenue, given the choice of taxes). Conditional on this result, the choice of the Home government if the institutional quality is high depends on whether inequality (6) is satisfied. It it is not, then it is optimal to choose the unconstrained regime. If, instead, (7) is satisfied, then it is optimal to choose the constrained regime.

3 Conclusion

We studied capital taxation in a small economy under a mobile tax base, in a context where institutional quality matters. Our main result is that, even when the government of a small economy does not strategically compete with other governments, it may be optimal to choose a non-preferential taxation regime, i.e., a regime, in which taxes does not discriminate across capital with distinct mobility. The reason is that the non-preferential regime is more efficient is accommodating the trade off between using taxes to convey information about institutional quality and using taxes to match the overall elasticity of the of the tax base.

Our analysis contributes to the literature on the determination of optimal taxes and the preferred

tax regime by offering a rationale to the advantage of non-preferential (constrained) tax regimes which is not driven by the downward pressure on revenues caused by unconstrained tax competition.

4 Appendix

Proposition 4 *Consider the unconstrained regime under incomplete information. There exists an equilibrium in which taxes convey information about the institutional quality. In this equilibrium*

$$t_f(\delta_L) = t_f(\delta_H) = \frac{1}{2}, t_h(\delta_L) = 1 \text{ and } t_h(\delta_H) = 1 - \frac{(1-\lambda)(\delta_H - \delta_L)v^2}{4(1-\delta_H)(1-\delta_L)\omega}.$$

Proof. Proposition 1 establishes that, in any equilibrium in which taxes convey information about the institutional quality, it must be that $t_f(\delta_L) = t_f(\delta_H) = \frac{1}{2}$. Then, if t_h is the choice of Home government under a high institutional quality, we must have

$$\omega + B_f\left(\delta_L, \frac{1}{2}\right)\frac{v}{2} \geq t_h\omega + \left[\lambda B_f\left(\delta_H, \frac{1}{2}\right) + (1-\lambda)B_f\left(\delta_L, \frac{1}{2}\right)\right]\frac{v}{2},$$

which can be rewritten as

$$t_h\omega \leq \omega - \lambda\left[B_f\left(\delta_H, \frac{1}{2}\right) - B_f\left(\delta_L, \frac{1}{2}\right)\right]\frac{v}{2},$$

and

$$t_h\omega + B_f\left(\delta_H, \frac{1}{2}\right)\frac{v}{2} \geq \omega + \left[\lambda B_f(\delta_L, \frac{1}{2}) + (1-\lambda)B_f(\delta_H, \frac{1}{2})\right]\frac{v}{2},$$

which can be rewritten as

$$t_h\omega \geq \omega - \lambda\left[B_f\left(\delta_H, \frac{1}{2}\right) - B_f\left(\delta_L, \frac{1}{2}\right)\right]\frac{v}{2}.$$

Thus, the only value of t_h which satisfies both inequalities is

$$t_h^* = 1 - \frac{(\delta_H - \delta_L)\lambda v^2}{4\omega(1-\delta_H)(1-\delta_L)}.$$

This tax is feasible, i.e., $t_h^* \in [0,1]$ iff

$$0 < 1 - \frac{(\delta_H - \delta_L)\lambda v^2}{4\omega(1-\delta_H)(1-\delta_L)} < 1.$$

It remains to specify beliefs out of the equilibrium path. We assume that, whenever $t_h \in (t_h^*, 1)$, the investors attach probability one that the underlying institutional quality is low. This ensures that, irrespective of the institutional quality, the Home government will have no incentive to deviate from the equilibrium path. ■

References

[1] An, Z. (2011) Taxation and foreign direct investment (FDI): empirical evidence from a quasi-experimental in China. International Tax and Public Finance. DOI 10.1007/s10797-011-9201-0.

[2] Baldwin, R. E. and Krugman, P. (2004) Agglomeration, Integration and Tax Harmonisation. European Economic Review, vol. 48, pages 1-23.

[3] Brunetti, A., G. Kisunko, and B. Weder (1997). Institutions in transition: Reliability of rules and economic performance in former socialist countries, (Washington, D.C.: World Bank), Working Paper, No. 1809, mimeo.

[4] Büthe, Tim, and Helen V. Milner. (2008). The Politics of Foreign Direct Investment into Developing Countries: Increasing FDI through International Trade Agreements? American Journal of Poli tical Science, vol.52 no.4 (October 2008): 741-762.

[5] Janeba, E. (1998) Tax Competition in Imperfectly Competitive Markets. Journal of International Economics, vol 44, pages 135-153.

[6] Janeba, E. (2000) Tax Competition when Governments Lack Commitment: Excess Capacity as a Countervailing Threat. American Economic Review, vol 90, pages 1508-1519.

[7] Janeba, E. (2002) Attracting FDI in a Politically Risk World, International Economic Review, vol 43, pages 1127-1155.

[8] Janeba, E., and W. Peters (1999). Tax Evasion, Tax Competition and the Gains from Nondiscrimination: The Case of Interest Taxation in Europe, Economic Journal 109, 93-101.

[9] Janeba, E., and M. Smart (2003). Is Targeted Tax Competition Less Harmful Than Its Remedies, International Tax and Public Finance, 10, 259-280.

[10] Jun, K.W. and Singh, H. (1996). The Determinants of Foreign Direct Investment: New Empirical Evidence, Transnational Corporations, Vol.5, pp.67-106.

[11] Kaufmann, D., Kraay, A. and Zoido-Lobaton, P. (1999). Governance matters. Policy Research Working Paper Series 2196, The World Bank.

[12] Keen, M. (2001) Preferential Regimes Can Make Tax Competition Less Harmful National Tax Journal, vol LIV(4), pp. 757-62.

[13] Kessing, S. G., Konrad, K. A. and Kotsogiannis, C. (2009) Federalism, weak institutions and competition for foreign direct investment. International Tax and Public Finance, 16(1), 105-123.

[14] Konrad, K.A. (2007). Mobile Tax Base as a Global Common, mimeo Free University of Berlin.

[15] Lamech, R., and Kazim S. (2003). What International Investors Look for When Investing in Developing Countries: Results from a Survey of International Investors in the Power Sector. Energy and Mining Sector Board Discussion Paper 6. World Bank, Washington, DC.

[16] Marceau N., Mongrain, S. and Wilson, J.D. (2010). Why Do Most Regions Set High Tax Rates on Capital? Journal of International Economics, 80, 249-259.

[17] Persson, T. and Tabellini, G. (1992). The Politics of 1992: Fiscal Policy and European Integration. Review of Economic Studies, 59, 689-701.

[18] Schneider F., and Frey B. (1985). Economic and Political Determinants of Foreign Direct Investment. World Development 13(2), 161-175.

[19] Slemrod, J. and Wilson, J.D. (2009) Tax competition with parasitic tax havens. Journal of Public Economics, vol 93, pages 1261-1270.

[20] Seyoum, B. (2011). Informal institutions and foreign direct investment. Journal of Economic Issues, XLV(4), 917-941.

[21] Wilson, J. D. (1986). A theory of interregional tax competition. Journal of Urban Economics,19, 296-315.

[22] Wilson, J.D. (2005). Tax Competition with and without Preferential Treatment of a Highly-Mobile Tax Base. In J. Alm, J. Martinez-Vasquez, and M. Rider, Editors, The Challenge of Tax Reform in a Global Economy, Springer.

[23] Wilson, J.D. and Janeba, E. (2005). Decentralization and international tax competition. Journal of Public Economics, 89, 1211-1229.

[24] Zodrow, G., and Miezkowski, P. (1986). Pigou, Tiebout, property taxation, and the underprovision of local public goods. Journal of Urban Economics, 19 (3), 356 -370.

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