FACULTY OF LAW, ECONOMICS AND FINANCE

CREA
Discussion
Paper
2011-10

Center for Research in Economic Analysis
University of Luxembourg

Tax havens or safe havens

available online : http://wwwfr.uni.lu/recherche/fdef/crea/publications2/discussion_papers/2011

Patrice Pieretti, CREA, University of Luxembourg.
Jacques-François Thisse, CORE, Université catholique de Louvain, CREA, Université du Luxembourg and CEPR.
Skerdilajda Zanaj, University of Luxembourg.

September, 2011

For editorial correspondence, please contact: crea@uni.lu
University of Luxembourg
Faculty of Law, Economics and Finance
162A, avenue de la Faïencerie
L-1511 Luxembourg

Tax havens or safe havens*

Patrice Pieretti† Jacques-François Thisse‡ Skerdilajda Zanaj§

August 24, 2011

Abstract

Our aim is to explain how a small country can be viable as an international banking center (IBC). We build a model in which mobile investors choose between two banking centers located respectively in a small country and in a large country. These countries compete in two instruments, taxation and institutional infrastructure. It follows that an IBC can be a tax haven, a safe haven, or both. A small country that hosts an IBC is a safe haven when it is able to provide a high level of institutional infrastructure, whereas it chooses to be a tax haven when it cannot be competitive in institutional infrastructure. Even in this last case, an IBC need not be as bad as claimed in the general press because its presence fosters institutional competition across countries, which is ultimately beneficial to all investors.

Keywords: international banking centers; portfolio investments; institutional infrastructure competition; tax competition.

JEL classification: H40, H54, G20.

*We thank M. Beine, F. Boudier-Bensebaa, A. Bourgain, J. Gabszewicz, J. Hindriks, A. Irmen, J. Sharman and participants to the PET conference at Bloomington (IN), 2011, for comments and suggestions.

†CREA, University of Luxembourg.

‡CORE, Université catholique de Louvain, CREA, Université du Luxembourg and CEPR. Corresponding author: jacques.thisse@uclouvain.be. Address: Voie du Roman Pays 34, B-1348 Louvain-la-Neuve, Belgium Tel.:32-10-474321 Fax:32-10-474301

§CREA, University of Luxembourg.

1 Introduction

Tax havens are in the midst of major political turmoil. The general press has widely argued that international banking centers are hidden tax havens, which are beneficial only to the rich. The conventional wisdom is that microstates slash tax rates to become attractive investment places, but it is unclear if this is actually the case. A recent study by Dharmapala and Hines (2009) investigated 209 countries and territories to determine which jurisdictions become tax havens and why. They found that successful jurisdictions are overwhelmingly small, but that they are especially well governed, with sound legal institutions and low levels of corruption. Poorly run jurisdictions fail to attract or retain foreign capital, and many do not even try. Thus, the quality of governance seems to matter for the existence of tax havens. And indeed, as noted by Gonzalez and Schipke (2011), there is some empirical evidence that countries that apply stronger regulation rules have benefited from highest portfolio investments.

One may wonder why tax havens are small and whether their small size is necessary. Sharman (2010) conducted an audit study realized by soliciting offers from 54 different financial service providers located in 22 countries. Gathering the responses to determine whether the existing legal and regulatory prohibitions on anonymity work in practice, Sharman (2010, p.134) concludes that his "findings cast strong doubt on the proposition that the problem of financial opacity is caused by palm-fringed tropical islands, rather than large high-income economies like the United States and Britain." In other words, the widespread opinion that tax havens are small places need not be true. This point is illustrated by the United Kingdom, which has a large number of offshore territories that are listed as tax havens by Dharmapala and Hines (2009).

The purpose of this paper is to analyze why and how a country may be viable as an international banking center (IBC). In the same vein, we address the following questions. When small jurisdictions specialize in international finance, are they necessarily tax havens intended to allow the rich to avoid paying income tax? Conversely, are big countries necessarily tax hells? Because governments seem to play a major role in the emergence and development of an IBC, what policy mix does a government choose to promote its IBC? To study these issues, we develop a model that features two banking centers located in a small country and in a large country as well as a large number of investors who choose where to make portfolio investments. Unlike the existing literature that focuses only upon tax competition (Wilson, 1991; Bucovetsky, 1991; Kanbur and Keen, 1993), we assume that countries compete to attract portfolio investments by using two instruments: *tax competitiveness* and *institutional attractiveness*. It is our contention that this feature has been neglected

in the existing literature on strategic tax competition.[1]

The institutional infrastructure built by a government describes the range of instruments designed to protect investors' assets and rights and to foster the development of financial intermediation through innovations in regulatory regimes. These instruments aim to secure portfolio investments, to disclose accounting rules that provide investors with the information they need and to enforce laws and rules by uncorrupted regulators or courts - in short, everything that ensures that investors get their money back. Our approach agrees with Gonzalez and Schipke (2001, p.45) for whom "Being a tax haven alone does not guarantee capital flows; strong regulations that inspire confidence are a crucial factor." An institutional infrastructure has the nature of a local public good (non-rivalry and non-exclusion) which benefits those who invest in the corresponding country. Countries have varying abilities to offer investors an attractive institutional environment (La Porta et al., 2000). Therefore, we contend that both tax and institutional competition are necessary to determine the conditions under which an IBC can emerge. In this view, a *tax haven* arises when the strategy to build an IBC is based on tax undercutting, whereas a *safe haven* emerges when the country attracts foreign investors by offering them a better institutional framework. Simply put, tax havens are not alike, and thus their analysis should not be viewed only as a problem of tax competition among countries displaying a high level of institutional and economic development, such as the OECD countries.

The reason why many tax havens are small is a feature common to small countries: these countries are quickly able to change existing rules and laws in response to new environments and opportunities because they display a high degree of political homogeneity (Alesina and Spolaore, 1997; Streeten, 1993). As noted by Morriss (2008), "Successful offshore financial centers' populations appear to have less trouble grasping the connection between their prosperity and international trade in financial services than the residents of larger onshore jurisdictions do in understanding the link between trade and prosperity for their economies." Indeed, reforming existing laws or passing new ones takes much longer in large and diversified economies, where any change in the status quo involves long negotiations involving a large variety of interest groups. By contrast, small countries are specialized in a handful of sectors, and thus the absence of a wide range of lobbyists makes the parliament and the entire administrative body much more flexible. Consequently, the ability of small

[1] This point has previously been raised in models of fiscal competition in which national governments tax firms but supply an infrastructure appealing to them (see, e.g., Justman et al., 2001; Hindriks et al., 2008; Pieretti and Zanaj, 2011). Our model differs from these models because our focus is on the banking sector and is related to the idea of "nation branding" developed by Konrad (2008). Countries advertise and invest in their brand name to attract direct investments. In our framework, investing in the quality of institutions can be seen as an investment by the small country under the brand of "a safe country in which to invest."

countries to quickly redesign their regulation environment for new crises and international laws or simply to update their legal system for new global or local situations explains why tax havens are small (Hampton and Christensen, 2002). Olsson and Hansson (2005) have provided empirical evidence of a robust negative relationship between the size of a country's territory and the rule of law. Thus, on average, a smaller country is likely to have better institutions. Such a relationship is critical when a country strives to become an IBC.

To highlight the relationship between tax rates and the quality of institutions, we pair the effective corporate tax rates (ECT) computed by Chen and Mintz (2008) with the Index of Economic Freedom (IEF) provided by the Wall Street Journal and the Heritage Foundation (Washington, DC) for the year 2008. The tax rates computed by Chen and Mintz are summary measures of the amount of tax paid on capital returns, whereas the IEF aims to capture the quality of economic institutions. Figure 1 reveals a high degree of heterogeneity across countries. Among other things, population size does not seem to matter significantly for the choice of a particular policy mix. Along the main diagonal, Australia, Japan and Luxembourg display a high IEF and charge high ECTs; at the other extreme lie India, Indonesia and Ukraine, which have both high ECTs and low IEFs. Along the secondary diagonal, China has both very high ECTs and poor IEFs, whereas Hong Kong, Singapore, Switzerland and the United States display low ECTs and very high IEFs. The case of the United States is interesting: compared to Singapore it is a tax haven, but compared to the Netherlands it is a safe haven. In other words, *a country is not a tax haven per se*, thus confirming the legal argument that there is no universal definition of a tax haven (Orlov, 2004; Sharman 2004). Accounting for such contrasting patterns is beyond the scope of the standard two-jurisdiction setting of fiscal competition. It is our belief, however, that the model presented in this paper is able to capture several salient features of IBCs.

Insert Figure 1 here

Our model displays the following features. Because we focus on interactions between marketplaces, each financial center is represented by a single bank (Gehrig, 1998). Depositors decide to invest their capital either in the domestic banking center or in the foreign one. When they invest abroad, they bear idiosyncratic costs, which can be explained as follows. All things being equal, people prefer to invest their savings in their home jurisdiction rather than abroad. When they invest abroad, they bear a Hotelling-like "transport cost," which accounts for the following two factors. First, investors are heterogeneous in their perceptions of the foreign banking centers. More precisely, in the spirit of the gravity equation, capital flows are inversely related to the psychological distance between the investors' locations and the foreign country. Second,

mobility costs reflect the degree of financial integration through a common unit cost: the lower this cost, the more integrated the two financial markets.

Finally, when choosing their policy mix, we acknowledge that governments may pursue different objectives. In line with standard public economics, we consider benevolent governments, which care about national income wherever their residents invest their capital (Hindriks and Myles, 2006). However, to test the robustness of our results, we also retain a public-choice perspective on tax-setting in which Leviathan governments maximize their budgets (Brennan and Buchanan, 1980). It is worth stressing that the difference between the two types of governments is immaterial when the small country is a microstate because the national investors taxed by the Leviathan stand for a very small share of investors, whereas the proceeds redistributed to the small country's inhabitants stem from taxing foreign investors.

Our main results may be summarized as follows. Consider first the case of Leviathan governments. When a small country is endowed with a strong comparative advantage in designing an attractive institutional infrastructure, it always chooses to become a safe haven. In other words, *an IBC need not be a tax haven.* In addition, the existence of a safe haven fosters institutional competition across countries, which is ultimately beneficial to all investors. Regarding tax competition, two cases may arise. First, when capital mobility is low, supplying high institutional quality is not sufficient for the small country to become an IBC; it must also offer a low tax rate. The picture is very different when capital mobility is high. In this event, all else being equal, tax competition tends to be fierce. Thus, the smaller country insulates from the damage of tax competition by supplying an institutional infrastructure with a much higher quality than the larger country. In turn, the smaller country can tax capital more than its rival can. By contrast, when the smaller country is not endowed with a comparative advantage in designing an attractive institutional infrastructure, we fall back on the standard result of the tax competition literature: the small country chooses to be a pure tax haven.

Note that, as in Rose and Spiegel (2007), mobility costs may reflect the geographical proximity between the two countries. Under this interpretation, the above results confirm that geographical proximity generates pro-competitive effects. However, our setting provides a richer perspective of these effects in that a higher proximity leads the smaller country to give up the tax field to provide welfare-improving institutional infrastructure.

When governments are benevolent, the mobility of capital leads to equilibria that obey patterns that are qualitatively similar to those described above. There are differences, however. On the one hand, there is a race to the bottom when capital mobility is low. In this case, the smaller country builds its institutional infrastructure by taxing banks' profits. On the other hand, when financial markets are well integrated, the smaller country's government adopts a strategy similar to the strategy of a Leviathan. There is another distinctive

difference: the benevolent government of the smaller country never chooses to be a tax haven, whereas the large country may choose to be a tax haven. This may explain why tax havens are developed in microstates where there is almost no conflict between social welfare and tax revenues. Indeed, Leviathan governments need not be predators; tax proceeds may redistribute to the local population through various mechanisms.

Comparing our results with the empirical findings of Dharmapala and Hines (2009), we find that tax havens are countries that supply both high-quality institutions and low tax rates, such as Singapore and Switzerland. Nevertheless, our model predicts that small countries can become IBCs without tax undercutting rival countries. Instead, they build high-quality institutions and charge relatively higher tax rates, as in the cases of Australia, Canada and Luxembourg. For this situation to arise, an IBC must supply a high level of institutional infrastructure. Striking pairwise comparisons are offered by Austria, on the one side, and Ukraine and Vietnam, on the other.

The remainder of the paper is organized as follows. The next section details the model. Section 3 describes the solution to the game with Leviathan and benevolent governments, and Section 4 concludes the paper.

2 The model

Consider a population of investors residing in two countries, H and F, having different sizes. As discussed in the introduction, investors are homogeneous in the perception of their home IBC, but heterogeneous in their attitudes toward the foreign IBC. For simplicity, investors' preferences are uniformly distributed along the Hotelling line. Investors are represented by two contiguous linear sub-segments of the unit segment. Country H is portrayed by the smaller segment and its size is given by $s \in (0, 1/2)$, whereas the larger segment depicts country F, the size of which is $1 - s$. We must stress that each segment shows the support of the distribution of investors' attitudes toward foreign investments, and *not* the geographical extent of the two countries. Two IBCs, located respectively in countries H and F, compete for investors who are evenly distributed with unit density along the segment $[0, 1]$. In what follows, we adopt the concept of competition between marketplaces introduced by Gehrig (1998), where firms set up in the same marketplace compete all together with other marketplaces. We thus neglect competition among banks set up within the same IBC in order to focus exclusively on the interactions between IBCs.

Each investor deposits a fixed sum normalized to 1 in one of the two IBCs. Banks invest the raised funds into an asset (not accessible to the individual investors), which yields a rate of return g. From the investors' viewpoint, their return is subject to country-specific risk. The quality of governance institutions, the degree of law enforcement, the level of corruption, political and

economic stability are all characteristics which affect such a risk. Because our primary objective is to study the impact of institutional protection, we isolate this effect by assuming that the intrinsic risk is the same in the two countries: $\tilde{r}_H = \tilde{r}_F = \tilde{r}$. Specifically, the gross return investors receive follows a normal distribution of mean $r = E(\tilde{r}) < g$ and variance σ^2. Investors are risk-averse and their utility is given by $U(\tilde{r}) = 1 - e^{-\rho\tilde{r}}$, where ρ is the degree of constant absolute risk aversion. Consequently, an investor's expected utility is given by

$$E\left[U(\tilde{r})\right] = U(r - \frac{1}{2}\rho\sigma^2) \backsim r - \frac{1}{2}\rho\sigma^2.$$

High institutional effectiveness mitigates frictions and uncertainty. Each country provides institutional infrastructures m_i, which positively affect the degree of risk in investing in country i. This variable captures the ability of country i to react to external shocks, changes in international laws, and the like. The more a country invests in its institutional infrastructure, the greater investors' protection there is. More precisely, the higher m_i, the lower the risk faced by an investor, with $0 \leq m_i \leq 1$. Thus, everything else equal, *a higher institutional quality reduces risk and makes investors better-off.*

Governments are aware that creating a trustful environment attracting investors has the nature of a local public good, which leads either to a higher revenue collected through taxes or to a higher total social surplus in its country. Clearly, the cost of investing in institutional infrastructures increases at an increasing rate due to the rising complexity involved. For simplicity, we assume that this cost is given by a quadratic function:

$$C(m_i) = \alpha_i m_i^2$$

where α_i measures the efficiency of country i in producing its institutional infrastructures. The numéraire is chosen for α_H to be normalized to 1.

We have seen that governments of small countries are often more responsive in adopting legislation and regulations favoring a specific sector, here the banking industry (Morriss, 2008). In the limit, microstates are fully specialized and the government is likely to be captured by the corresponding sector. For these reasons, we assume that the smaller country is more efficient than the larger one ($\alpha_F = \alpha > 1$). Stated differently, the smaller country has a Ricardian comparative advantage in providing institutional infrastructures. Even though we treat α parametrically, for the reasons discussed in the introduction we expect α to take on a larger value as country H has a smaller size.

Taking investors' protection into account, we can rewrite their expected utility as follows:

$$E\left[U(\tilde{r}, m_i)\right] = r - \frac{1}{2}\rho\sigma^2\left(1 - m_i\right)$$

where the unit of m_i is chosen for its coefficient to be 1. Setting $\Phi \equiv \rho\sigma^2/2$,

we obtain:[2]

$$E\left[U(\tilde{r}, m_i)\right] = r - \Phi(1 - m_i).$$

Thus, investing in institutional infrastructure m_i increases the expected utility of each investor proportionally to the degree of risk Φ present in the economy. Governments tax capital according to the source country principle. In other words, investors pay taxes in the country in which their capital is invested and *not* in the country in which they live. As mentioned in the introduction, the tax rates that matter to investors are the *effective* rates, denoted t_i, which may differ from the posted rates. Investors' utility, which depends on the location of their portfolio investments, is thus positively affected by the net return on their investments, $r - t_i$, as well as by the institutional and financial infrastructure of the country in which they invest, m_i.

An individual who invests abroad incurs a transaction cost equal to a "transport rate" $k > 0$ à la Hotelling, which reflects the overall mobility of capital, times the distance from her location to the border of the foreign country. The higher k, the lower the international mobility of investors.[3] In other words, the parameter k can be viewed as a measure of the degree of international financial integration. In particular, when k is arbitrarily large, there is no cross-border deposits. Furthermore, as mentioned above, the distance considered here is *not* the geographical distance between investors and the foreign country. Instead, its role is to capture the idea that individuals favor domestic investments over foreign investments, while recognizing that investors have idiosyncratic preferences in their attitudes toward foreign investments. In this context, an investor bearing a low cost does not care about where she invests her money. On the contrary, an investor who faces a high cost displays a strong reluctance to invest abroad. This heterogeneity may also reflect the subjective probabilities of being caught by the fiscal authority when investors are supposed to report the income earned from investments made abroad. The mobility of capital is, therefore, imperfect for the following two reasons: financial markets are imperfectly integrated and investors are heterogeneous.

Let $\bar{x} \in (0, 1)$ be the location of the marginal individual indifferent between investing home and abroad. Depositors located in $(0, \bar{x})$ invest in country H, whereas those located in $(\bar{x}, 1)$ invest in F. When the marginal investor resides in the smaller country, $\bar{x} \in (0, s)$, the indirect utility of a investor at x is given by

$$V(x) = \begin{cases} r - t_H - \Phi(1 - m_H) & \text{if} \quad x \in (0, \bar{x}) \\ r - t_F - \Phi\left(1 - m_F\right) - k(s - \bar{x}) & \text{if} \quad x \in (\bar{x}, s) \\ r - t_F - \Phi\left(1 - m_F\right) & \text{if} \quad x \in (s, 1)\,. \end{cases}$$

[2]Throughout the paper, we assume that Φ is sufficiently small for the expected utility of a deposit to be desirable.

[3]When $k = 0$, there is perfect capital mobility. In this case, depositors' heterogeneity ceases to matter.

Similarly, the indirect utility of the marginal investor who resides in country F, $\bar{x} \in (s,1)$, is given as follows:

$$V(x) = \begin{cases} r - t_H - \Phi(1-m_H) & \text{if} \quad x \in (0,s) \\ r - t_H - \Phi(1-m_H) - k(\bar{x}-s) & \text{if} \quad x \in (s,\bar{x}) \\ r - t_F - \Phi(1-m_F) & \text{if} \quad x \in (\bar{x},1)\,. \end{cases}$$

Regardless of her location, the marginal investor is located at

$$\overline{x} = s + \frac{t_F - t_H + \Phi(m_H - m_F)}{k} \tag{1}$$

which can be larger or smaller than s. When the tax rates and the institutional infrastructures are the same in the two countries, there are no cross-border deposits ($\overline{x} = s$).

In what follows, we will introduce lower bounds on k. When financial markets are highly integrated (i.e. k is very low), as shown by (1), the marginal investor is located at $x = 1$ ($x = 0$) when $\Phi m_H - t_H > \Phi m_F - t_F$ ($\Phi m_H - t_H < \Phi m_F - t_F$). Such corner solutions are uninteresting for our purpose. Therefore, from now on we will disregard very low values of k.

Accordingly, the supply of capital in the smaller country is $S_H = \bar{x}$ and the supply of capital in the bigger one is $S_F = 1 - \bar{x}$. Similar expressions hold, mutatis mutandis, if the marginal investor resides in the larger country. Since our purpose is to study the emergence and behavior of banking centers in small countries, we focus on equilibria in which the smaller country attracts foreign investors, i.e. $S_H > s$. That said, we will have to check under which conditions this assumption holds at the equilibrium of the game played by the two governments.

Regarding governments' objectives, we consider two distinct approaches with the aim of testing the robustness of our results. In the first one, governments are benevolent and care about national income, wherever their residents invest their capital. In doing so, governments recognize that their residents are free to choose their consumption mix. The second approach provides a public-choice perspective on tax-setting in which Leviathan governments maximize their budgets. Note also that this approach is consistent with a conventional welfarist perspective in which consumers place a high marginal valuation on merits goods. In other words, governments maximize the surplus they can extract from investors, which is ultimately used to finance such public goods.

Assume that S_H exceeds s. In the former approach, governments maximize their net national incomes given by

$$\begin{aligned} U_H &= (g-r)S_H + (r-t_H)s + t_H S_H - m_H^2 \\ &= (g-r)S_H + rs + t_H(S_H - s) - m_H^2 \end{aligned} \tag{2}$$

$$
\begin{aligned}
U_F &= (g-r)S_F + (r-t_F)S_F + (r-t_H)(S_H - s) + t_F S_F - \alpha m_F^2 \\
&= gS_F + (r-t_H)(S_H - s) - \alpha m_F^2. \qquad (3)
\end{aligned}
$$

In these expressions, the first term represents banks' profits, while the second accounts for the income of country F's residents who invest in their domestic banks. The third term in (3) represents the income of those who invest in the foreign banks.

In the latter, governments disregard residents they maximize their budgets

$$
\begin{aligned}
B_H &= t_H S_H - m_H^2 \qquad (4) \\
B_F &= t_F S_F - \alpha m_F^2. \qquad (5)
\end{aligned}
$$

In what follows, we consider a two-stage game in which governments choose, first, their levels of institutional infrastructures (m_i) and, then, their tax rates (t_i). This staging is dictated by the fact that changing institutions is far much less flexible than setting tax rates. The former is also more difficult to implement than the latter.

3 Leviathan governments

3.1 Fiscal competition

In the second-stage subgame, governments choose noncooperatively their tax rates to maximize their revenues conditional upon their institutional infrastructures (m_H, m_F):

$$
\underset{t_H}{\text{Max}} t_H S_H \qquad \underset{t_F}{\text{Max}}\ t_F(1 - S_H).
$$

The payoffs being strictly concave and quadratic in taxes, there exists a single Nash equilibrium. When this equilibrium is interior, it is given by

$$
\begin{aligned}
t_H^*(m_H, m_F) &= \frac{\Phi\,(m_H - m_F) + k\,(1+s)}{3} \qquad (6) \\
t_F^*(m_H, m_F) &= \frac{\Phi\,(m_F - m_H) + k(2-s)}{3}. \qquad (7)
\end{aligned}
$$

When the two countries do not differentiate their institutional infrastructures ($m_H = m_F$), or when there is no risk ($\Phi = 0$), regardless of the degree of capital mobility the smaller country must set a lower tax rate than the larger one to attract foreign investors. The tax gap is the reflection of the size difference; it shrinks as countries become less dissimilar in size, the tax rates being equal when countries have the same size. These results are in line with the existing literature on tax competition and country size (Wilson, 1991;

Bucovetsky, 1991). Note also that the imperfect mobility of capital softens the race to the bottom (Kanbur and Keen, 1993). Indeed, both tax rates increase with k because the tax basis becomes more captive. By contrast, when the two countries have different institutional infrastructures, the country that enjoys the institutional advantage can build on it to raise its tax rate whereas the other must lower its own rate to retain investors.

It is worth comparing tax rates when the two countries have different institutional infrastructures. It follows immediately from (6) and (7) that investing in institutional infrastructure does not increase tax rates in the same way. In particular, when $m_H > m_F$, the smaller country is able to set a tax rate $t_H^*(m_H, m_F)$ that exceeds its value when $m_H = m_F$, whereas the larger country must reduce its tax rate to compensate for its lower level of institutional infrastructure. A similar relationship holds, mutatis mutandis, when $m_H < m_F$.

Observe that both tax rates are positive if and only if

$$-k\,(1+s) \leq \Phi\,(m_H - m_F) \leq k(2-s). \tag{8}$$

When these conditions hold, which implies that the institutional difference $|m_H - m_F|$ is not too big, the equilibrium marginal investor is obtained by plugging (6) and (7) into (1):

$$\bar{x}(m_H, m_F) = \frac{\Phi\,(m_H - m_F) + k(1+s)}{3k}. \tag{9}$$

It is easy to check that $\bar{x}(m_H, m_F)$ belongs to $(0,1)$ provided that (8) holds. When one of the two conditions in (8) is not satisfied, at least one country sets up a tax rate equal to zero. The reader is referred to the appendix for more details.

Last, observe that the amount of cross-border deposits, measured by $\bar{x}(m_H, m_F) - s$, decreases (increases) with k when $m_H - m_F$ is positive (negative). This reflects the lower mobility of the tax base.

3.2 Institutional competition

Plugging (6), (7), and (9) into (4) and (5) shows that both B_H and B_F are concave (convex) with respect to own strategy if and only if $k > \Phi^2/9$ ($k < \Phi^2/9$).

Maximizing country i's budget with respect to m_i for $i = H, F$, we obtain the following solutions:

$$m_H^* = \frac{3k}{\Phi}\frac{\Phi}{3}\frac{3\alpha k\,(1+s) - \Phi^2}{9\alpha k - \Phi^2\,(1+\alpha)} \qquad m_F^* = \frac{\Phi}{3}\frac{3k\,(2-s) - \Phi^2}{9\alpha k - \Phi^2\,(1+\alpha)} \tag{10}$$

where it is readily verified that both m_H^* and m_F^* are smaller than 1. Because this paper aims to highlight the role played by institutional infrastructures

in the emergence of an IBC, we find it natural to restrict the analysis to the policy outcomes in which both countries choose positive levels of such infrastructures.[4] Furthermore, we are interested in finding positivity conditions that hold for any level of comparative advantage. As shown in Appendix, both m_H^* and m_F^* are positive for all admissible values of α when

$$k > 2\Phi^2/9. \tag{11}$$

In this case, the equilibrium tax rates, which are given by

$$t_H^* = \frac{3k}{\Phi} m_H^* \qquad t_F^* = \frac{3\alpha k}{\Phi} m_F^*$$

are both positive, and thus (10) is the equilibrium of the institutional competition game.

In equilibrium, portfolio investments in countries H and F are given respectively by

$$S_H^* \equiv \bar{x}(m_H^*, m_F^*) = \frac{3}{\Phi} m_H^* \qquad S_F^* \equiv 1 - \bar{x}(m_H^*, m_F^*) = 1 - \frac{3}{\Phi} m_H^*.$$

Using (11), we readily verify that $S_H^* > 0$ and $S_F^* > 0$. Observe that the positivity of S_F^* implies $t_H^* < k$. In other words, capital mobility acts as a tax cap for the smaller country. The existence of such a ceiling reflects the intrinsic size disadvantage of H.

For the smaller country to become an IBC, there must be cross-border deposits from F to H. This is so if and only if

$$S_H^* - s = \frac{\alpha\left(3k\left(1-2s\right) + \Phi^2 s\right) - \Phi^2\left(1-s\right)}{9\alpha k - \Phi^2\left(1+\alpha\right)} > 0. \tag{12}$$

When (11) holds, the sign of $S_H^* - s$ coincides with the sign of the numerator of (12), which is positive if and only if

$$k > \frac{\Phi^2}{3} \frac{1 - s\left(1+\alpha\right)}{\alpha(1-2s)}$$

which shows where the assumption $s < 1/2$ is needed for country H to accommodate an IBC. Interestingly, the smaller country H, the narrower the domain of parameters in which it becomes an IBC. This runs against the conventional wisdom, which states that very small countries are predestined to become IBCs. Our analysis shows that this belief is based on a pure tax competition argument (see, e.g. the rule of elasticity used in Kanbur and Keen, 1993). In

[4] Observe that both levels of institutional infrastructure are low when the parameter Φ measuring risk is small. In particular, when there is no risk ($\Phi = 0$), governments do not invest in institutional infrastructure because the need for depositors' protection vanishes.

this event, higher tax revenues can be generated by attracting more foreign investors, which is achieved by lowering tax rate. However, when capital mobility is very high ($k \approx 0$), low tax rates will prevent Leviathan governments to fund a high institutional quality. This explains why k must be bounded from below for the IBCs to offer an institutional infrastructure. The above expression also shows that a stronger comparative advantage α mitigates this effect.

This policy has more appeal as the size of country H gets smaller because the proceeds stemming from the residents are lower. A high capital mobility makes this policy especially worthwhile, which explains why k is bounded from below. In contrast, when countries also compete in institutional infrastructure, size ceases to be the only determinant for a country to become an IBC.

Observe also the link between capital mobility and the overall risk in the global economy for a small country to accommodate an IBC. The higher the overall risk Φ, the more stringent the above condition on k, hence, the lower the chances that the smaller country becomes an IBC. The reason is that the higher Φ, the higher the cost for the government of the smaller country to offer a policy mix better than the one offered by the government of the larger country.

As in the foregoing, we want this inequality to hold for all $\alpha > 1$, that is,

$$k > \Phi^2/3. \tag{13}$$

Note that this inequality is more stringent than both the concavity ($k > \Phi^2/9$) and the positivity ($k > 2\Phi^2/9$) conditions. Since our focus is on the viability of the small country as an IBC, we assume from now on that (13) always holds.

To describe the final outcome, we need comparing m_H^* and m_F^*. It is readily verified that the former exceeds the latter if and only if

$$\alpha > \bar{\alpha} \equiv \frac{2-s}{1+s}. \tag{14}$$

As a result, two cases may arise, i.e. $\alpha > \bar{\alpha}$ and $\alpha < \bar{\alpha}$.

Case 1. Assume that the comparative advantage of the smaller country is strong, that is, $\alpha > \bar{\alpha}$. Then, we have $m_H^* > m_F^*$. Whether country H chooses to be a tax haven depends on the interplay between capital mobility and the magnitude of its comparative advantage. Specifically, it is readily verified that $t_H^* < t_F^*$ if and only if

$$k > \bar{k}(\alpha) \equiv \frac{\alpha - 1}{\alpha} \frac{\Phi^2}{3(1-2s)}.$$

That the small country chooses to become a tax haven is in line with the literature on tax competition and country size: the smaller country chooses a lower tax rate because it faces a more elastic capital supply (Bucovetsky,

1991; Kanbur and Keen, 1993). What we add to this literature is that a tax haven may also provide its investors with a high-level regulatory environment when it has a sufficiently strong comparative advantage. The novelty here lies in the role played by governments in designing the institutional infrastructure. To be precise, when capital mobility relatively low ($k > \bar{k}(\alpha)$), the smaller country is both tax competitive and institutionally attractive ($t_H^* < t_F^*$ and $m_H^* > m_F^*$). This agrees with Dharmpala and Hines (2009) who observe that most of the small countries that succeed to attract foreign capital share two main features: (i) they are tax competitive and (ii) they display a high quality level of institutions.

To sum up,

Proposition 1 *Assume Leviathan governments. If the smaller country has a strong comparative advantage and capital mobility is low, the smaller country becomes an IBC by offering a better institutional infrastructure and a lower tax rate.*

Thus, our model reproduces one of the main stylized facts on IBCs. Given a high comparative advantage, Leviathan governments encourage foreign investors not only through high quality institutional infrastructure but also through undercutting tax rates on capital returns.

As shown by Figure 2, when $\bar{\alpha} < \alpha < 1/2s$ there is no restriction on k for Proposition 1 to hold. The comparative advantage of the smaller country is not strong enough for this country to set a higher tax rate than the larger country. This suggests the existence of another domain in which country H is not a tax haven when $\alpha > \bar{\alpha}$.

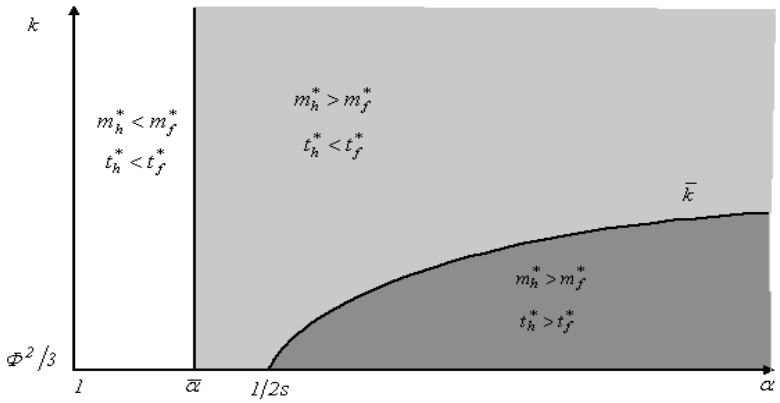


Figure 2

Indeed, provided that $\Phi^2/3 < k < \bar{k}(\alpha)$ we have $t_H^* > t_F^*$. In this case, the smaller country can build on its better institutional infrastructures to levy a higher tax rate than the larger country. However, for such a regime to arise, it must be that $\Phi^2/3 < \bar{k}(\alpha)$, which holds when the magnitude of country

H's comparative advantage is sufficiently high ($\alpha > 1/2s$). For instance, although Ukraine has a lower effective capital tax rate than Switzerland (Chen and Mintz, 2008), Switzerland remains an attractive place for Ukrainian investors. The reason probably lies in the fact that in Ukraine protection of property rights is weak, contracts are not well enforced and expropriation possible (Ukraine ranks 164 out of 178 countries in the 2011 Index of Economic Freedom).

Therefore, we have:

Proposition 2 *Assume Leviathan governments. If the smaller country has a strong comparative advantage and capital mobility is high, the smaller country becomes an IBC by offering a better institutional infrastructure but charging a higher tax rate .*

In other words, the smaller country may afford to tax investors more than the larger country because it has a much better institutional infrastructure because $\alpha > 1/2s$.[5] It is worth stressing that, differently from Proposition 1, the smaller country is able to tax investors more than the larger country when capital is more mobile. Hence, contrary to general beliefs, *the smaller country need not be a tax haven*. This configuration, though not necessarily the most common, is also in accordance with what Dharmpala and Hines (2009) observe. Note that, because the marginal investor belongs to country F, country H-residents invest in their own country.

Case 2. Assume that the comparative advantage is weak, that is, $\alpha < \bar{\alpha}$. In this case, the ranking of m_H^* and m_F^* is reverse: country H chooses a lower level of institutional infrastructure than country F. To counterbalance this effect, the smaller country must charge a lower tax rate than the larger one. Thus, we have:

Proposition 3 *Assume Leviathan governments. If the smaller country has a weak comparative advantage, it provides both a low level regulatory environment and a low tax rate.*

This scenario is the closest to the existing literature on tax competition which ignores the role played by institutional infrastructure (Hindriks and Myles, 2006). Indeed, because the smaller country has a weak comparative advantage, it cannot build a relatively strong institutional framework and thus its only way out to become an IBC is tax undercutting.

In sum, even when restricting ourselves to the case where only the smaller country accommodates an IBC, our analysis underscores the existence of contrasted financial environments, which in turn reflects the real world heterogeneity of IBCs stressed in the introduction. In particular, our paper highlights the

[5] This is reminiscent of Baldwin and Krugman (2004) who argue that governments can set higher tax rates in large and efficient metropolitan areas because local firms and workers benefit from an agglomeration rent.

following possible scenarios, which are depicted in Figure 2. *Small countries need not be tax havens.* In this event, *they compensate for their size disadvantage by being institutionally attractive* (the dark-grey domain). At the other extreme, small countries may offer bad institutions and very low taxes (the middle-gray domain). In between, these countries may choose to combine low tax and good institutions (the light-struck domain). Note also that, since $1/2s$ is arbitrarily large in the case of very small off-shore IBCs, the prospect of escaping from the tax haven status vanishes because it requires a degree of comparative advantage that is unlikely to be observed.

The foregoing analysis also shows that the magnitude of capital mobility is critical for the type of financial environment that emerges. Therefore, it is worth studying how governments react when capital mobility increases. Consider the case in which m_H^* exceeds m_F^*, that is, (14) holds. In this event, the IBC attracts more foreign investors (S_H^* decreases with k), while m_H^* (m_F^*) increases (decreases), thus implying that the two countries provide more differentiated institutional infrastructures. This intuition behind this result is straightforward. For given institutional infrastructures, we have seen that a higher capital mobility exacerbates tax competition. Hence, both countries have to differentiate more their institutional gap to relax tax competition. Since the small country's comparative advantage is strong ($\alpha > \bar{\alpha}$), this is achieved through the following two effects: the smaller country builds more institutional infrastructures, whereas the larger country cares less about its institutional attractiveness. As a consequence, the institutional gap widens and, everything else being equal, tax competition becomes softer. This leads more foreign investors to patronize the IBC. Furthermore, as shown by (7), when capital mobility rises the large country lowers its tax rate to dampen the impact of its wider institutional disadvantage. In contrast, the impact of k on t_H^* is ambiguous. Indeed, as shown by (6), this tax rate is determined by the balance of the positive effect of a bigger institutional advantage and the negative effect of its size disadvantage. Results are reverse when $m_H^* < m_F^*$, namely (14) does not hold.

Last, note that S_H^* increases with Φ as long as (14) holds. Accordingly, if the small country's comparative advantage in designing institutions is high enough ($\alpha > \bar{\alpha}$), *a global increase in uncertainty always leads to more foreign portfolio investments in country H.* This is because investors seek more protection against risk through better institutional infrastructures.

In equilibrium, banks' profits are as follows:

$$\Pi_H^* = (g-r)\frac{3}{\Phi}m_H^* \qquad \Pi_F^* = (g-r)\left(1-\frac{3}{\Phi}m_H^*\right)$$

which are positive as long as (11) holds, while the governments' budgets are

given by

$$B_H^* = \frac{\left(3\alpha k + 3\alpha ks - \Phi^2\right)^2 \left(9k - \Phi^2\right)}{9\left(9\alpha k - \Phi^2 - \alpha\Phi^2\right)^2} > 0$$

and

$$B_F^* = \frac{\left(3ks - 6k + \Phi^2\right)^2 \left(\alpha^2 9k - \Phi^2\right)}{9\left(9\alpha k - \Phi^2 - \alpha\Phi^2\right)^2} > 0.$$

4 Benevolent governments

4.1 Tax competition

Substituting (1) in (2) and (3), we readily verify that $U_H(t_H, t_F)$ is strictly concave in t_H. Applying the first-order condition yields the best reply

$$t_H^*(t_F) = \frac{t_F - (g - r) + \Phi(m_H - m_F)}{2}.$$

By contrast, $U_F(t_H, t_F)$ is linear in t_F. Since $\partial U_F/\partial t_F = -\left(g - r + t_H\right)/k$ is negative, the bigger country always sets a zero tax rate. Consequently, the equilibrium of the tax competition subgame is given by

$$t_H^* = \frac{-\left(g - r\right) + \Phi(m_H - m_F)}{2} \qquad t_F^* = 0 \tag{15}$$

where t_H^* is positive if and only if $m_H - m_F > \left(g - r\right)/\Phi$. When this inequality does not hold, the equilibrium is

$$t_H^* = 0 \qquad t_F^* = 0. \tag{16}$$

Observe that (16) is the only tax outcome when governments do not compete in institutional infrastructure ($m_i = 0$).

To sum-up, when government are benevolent, they get trapped into a race to the bottom in that the larger country never taxes investors, whereas the smaller one is able to tax investors only if it is able to build a relatively high level of institutional infrastructure. Otherwise, the smaller country cannot escape from a fierce tax competition environment that leads it to select a zero tax rate. Note that, unlike what we observe with Leviathan governments, *the smaller country is never a tax haven.*

When the two countries offer the same institutional frameworks, both equilibria collapse to a race to the bottom in which investors are not taxed. This underscores once more the implicit assumption made in the classical tax competition literature in which countries do not recognize the role of institutional quality in investors decisions.

Using (1), we have

$$\bar{x}(m_H, m_F) = s + \frac{g - r + \Phi(m_H - m_F)}{2k}$$

under (15), and

$$\bar{x}(m_H, m_F) = s + \frac{\Phi(m_H - m_F)}{k}$$

under (16). In both cases, higher capital mobility makes the smaller country more attractive when it accommodates an IBC. As in the previous section, a very low value of k leads to a corner solution, a case we have chosen to rule out.

4.2 Institutional competition

Plugging (15) or (16) in (2) and (3) shows that both $U_H^*(m_H, m_F)$ and $U_F^*(m_H, m_F)$ are strictly concave (convex) in their own strategy if and only if $k > \Phi^2/4$ ($k < \Phi^2/4$). Similarly to the case of budget-maximizing governments, we rule out the case in which payoffs are convex.

As seen above, two cases may arise.

Case 1. Under (15), the first-order conditions yields:[6]

$$m_H^* = \alpha\Phi\frac{g - r}{4\alpha k - \Phi^2(\alpha - 1)} \qquad 0 < m_F^* = \frac{m_H^*}{\alpha} < m_H^*. \tag{17}$$

The quality of institutions m_H^* is positive for all α if and only if

$$k > \Phi^2/4. \tag{18}$$

Observe that both m_H^* and m_F^* increase when financial markets are more integrated, but m_H^* rises at a higher rate than m_F^*. We also know that $t_H^* > 0$ if and only if $m_H^* - m_F^* > (g - r)/\Phi$. This condition holds when

$$k < \hat{k}(\alpha) \equiv \Phi^2(\alpha - 1)/2\alpha.$$

For such a regime to arise, $\hat{k}(\alpha)$ must exceed $\Phi^2/4$, i.e. $\alpha > 2$.

It remains to check that $S_H^* - s > 0$. Using (17), we have

$$S_H^* - s = \frac{\Phi^2(\alpha - 1)(g - r)}{2k\left[4\alpha k - \Phi^2(\alpha - 1)\right]}$$

which is positive by (18). Thus, we have shown:

[6] Imposing upper bounds on the exogenous banks' markup $g - r$ ensures that $m_H^* \leq 1$ and $m_F^* \leq 1$. The same holds in Case 2.

Proposition 4 *Assume benevolent governments. When the comparative advantage of the smaller country is strong and capital mobility is high, the smaller country becomes an IBC through the supply of better institutions.*

In this configuration, country H sets a tax rate equal to

$$t_H^* = \frac{(g-r)\left[\Phi^2(\alpha-1) - 2\alpha k\right]}{4k\alpha - \Phi^2(\alpha-1)}$$

which increases when capital mobility rises. The small country's government exploits the larger number of foreign portfolio investments to build a better institutional infrastructures that benefit to both its banks and residents. Observe that such a regime arises regardless of the nature of governments but for different domains of α.

Case 2. Under (16), we have

$$m_H^* = \frac{\Phi(g-r)}{2k} > 0 \qquad 0 < m_F^* = \frac{m_H^*}{\alpha} < m_H^*. \tag{19}$$

Since $t_H^* = 0$ here, it must be that $m_H^* - m_F^* \leq (g-r)/\Phi$ or, equivalently, $k \geq \hat{k}(\alpha)$. Note that

$$S_H^* - s = \frac{(\alpha-1)(g-r)\Phi^2}{2\alpha k}$$

is always positive. Consequently, we have

Proposition 5 *Assume benevolent governments. If the comparative advantage of the smaller country is strong and capital mobility is low, the smaller country becomes an IBC by offering better institutional infrastructure and zero tax rate.*

This result is in line with the previous proposition: as capital gets less mobile, the smaller country sets a decreasing tax rate. The threshold $t_H^* = 0$ is reached at $k = \hat{k}(\alpha)$, while the tax rate in the smaller country remains equal to zero when k gets larger. As shown by Figure 3, when $\alpha < 2$ there is no restriction on k for Proposition 5 to hold.

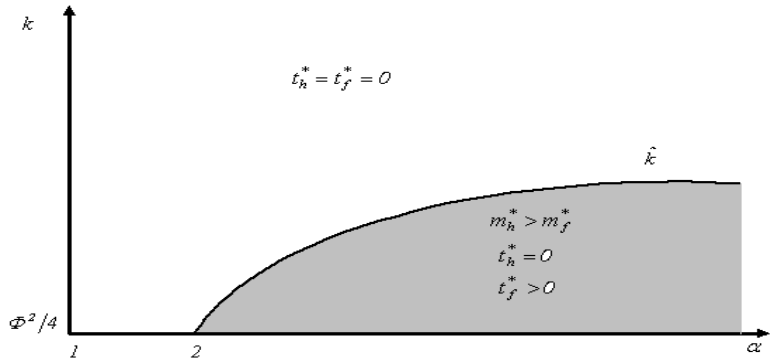


Figure 3

How does size matter? When governments are benevolent, the smaller country always provides a better institutional infrastructure than the larger country. In addition, whatever its size, the smaller country is never a tax haven. When capital mobility is high, the smaller country even levies higher tax rates than the larger one provided that its comparative advantage is sufficiently strong ($\alpha > 2$). In contrast, when governments are Leviathan, the smaller country will choose to become a safe haven provided that its comparative advantage is sufficiently large ($\alpha > \bar{\alpha}$). In this case, there is a predestination of microstates for being tax havens. Indeed, when the smaller country is a microstate ($s \approx 0$), it must use tax undercutting to become an IBC ($1/2s$ becomes arbitrarily large in Figure 1). Figure 2 also shows that tax havens built on tax undercutting only have a weak comparative advantage. This result concurs with Hines (2010) who observes that "evidence indicates that there are almost no poorly governed tax havens."

At this stage, it seems natural ask whether investors are better off paying higher taxes and receiving better institutions under benevolent governments. Taking into account the expected utility of investors, it is readily verified that the residents of *both* countries are better off when competition involves tax and institutional infrastructure than under pure tax competition ($m_i = 0$). They are also better off than in the absence of competition in which they pay no tax ($t_i = 0$ and $m_i = 0$). By supplying a good institutional setting, country H leads country F to invest in its own institutional infrastructure to retain investors, thus making better off its residents who choose to invest in their domestic market.

When a government sets a zero tax rate, one may wonder how it finances its institutional infrastructure? Since the government is benevolent, institutional infrastructure can be funded through a tax on banks' profits. But then, why should banks stay in a country taxing them? It is easy to check that banks in H make higher profits when the institutional infrastructure is built rather than not. In fact, given the exogenous markup $g-r$, the market share of banks in H is higher when $m_H = m_H^* > 0$ than when $m_H = 0$ because $S_H^* > s$ in the former case whereas $S_H^* = s$ in the latter. Similarly, in country F, the outflow of investors will be even bigger if m_F^* were set to zero. Thus, these banks are also willing to pay for m_F^*. Clearly, banks' profits will always exceed the cost of building the institutional infrastructures provided that the markup $g - r$ is high enough. Note also that governments may prevent the relocation of banks by taxing their residents.

5 Conclusions

Our main purpose was to pin down the reasons explaining how and why a small country can be viable as an international banking center. To address

this question, we have developed a model where investors choose to deposit their savings in a small country or in a large country. Instead of following the literature that focusses on tax competition only, we assume that countries use two instruments to attract investors, tax rate and institutional infrastructure. As discussed in the introduction, the empirical evidence supports our idea that tax competition is too restrictive an approach. Given the modeling strategy used here, we show that whether the small country becomes a tax haven depends on the integration of financial markets and the intensity of the small country's comparative advantage. The nature of government matters too to the extent that *benevolent governments never build a tax haven*. They prefer to erect an IBC through the provision of better institutional infrastructure.

By contrast, *tax havens may emerge under Leviathan governments*. This may explain why tax havens are developed in microstates where there is almost no conflict between social welfare and tax revenues because the local population benefits from the taxes which are mainly levied on foreign investors. However, having Leviathan governments does not necessarily imply that they choose to accommodate a tax haven. The small country may become an IBC that sets a higher tax rate by improving upon its institutional infrastructures. Our analysis also reveals that the presence of heterogeneous investors matters for the viability of the IBC and the nature of the policy mix.

A final word, in closing. IBCs need not be as bad as claimed in the media because they foster institutional competition which is beneficial to all investors. Our results provide evidence that safe havens have a place in the global financial environment and provide benefits to governments, firms and households.

References

[1] Alesina, A. and E. Spolaore (1997) On the number and size of nations. Quarterly Journal of Economics 112, 1027-56.

[2] Baldwin, R.E. and P.R. Krugman (2004) Agglomeration, integration and tax harmonization. European Economic Review 48, 1-23.

[3] Brennan, G. and Buchanan, J.M. (1980) The power to tax: Analytic foundations of a fiscal constitution, Cambridge: Cambridge University Press.

[4] Bucovetsky, S. (1991) Asymmetric tax competition. Journal of Urban Economics 30, 167-81.

[5] Chen D. and J. Mintz (2008) Taxing business investments: A new ranking of effective tax rates on capital. World Bank,

[6] Dharmapala, D. and J.R. Hines (2009) Which countries become tax havens?, Journal of Public Economics 93, 1058-68.

[7] Gehrig, T. (1998) Competing markets. European Economic Review 42, 277-310.

[8] Gonzalez, M. and A. Schipke (2011) Bankers on the beach. Finance & Development (June 2011), 42-48.

[9] Hampton, M.P. and J. Christensen (2002) Offshore pariahs? Small island economies, tax havens and the re-configuration of global finance. World Development 30, 1657-73.

[10] Hindriks J. and G.D. Myles (2006) Intermediate public economics. The MIT Press, Cambridge (MA).

[11] Hindriks, J., S. Peralta and S. Weber (2008) Competing in taxes and investment under fiscal equalization. Journal of Public Economics 92, 2392-402.

[12] Hines, J. R. (2010) Treasure islands. Journal of Economic Perspectives 24/4, 103–26.

[13] Justman, M., J.-F. Thisse and T. van Ypersele (2001) Taking the bite out of fiscal competition. Journal of Urban Economics 52, 294-315.

[14] Kanbur, R. and M. Keen (1993) Jeux Sans Frontieres: Tax competition and tax coordination when countries differ in size. American Economic Review 83, 877-92.

[15] Konrad, K. (2008) Mobile tax base as a global common. International Tax and Public Finance 15, 395-414.

[16] La Porta, R., F. Lopez-de-Silanes, A. Shleifer and R.W. Vishny (2000) Investor protection and corporate governance. Journal of Financial Economics 58, 3-27.

[17] Morriss, A.P. (2008) The role of offshore financial centers in regulatory competition. Illinois Law & Economics Research Paper No. LE07-032. Available at SSRN: http://ssrn.com/abstract=1275390.

[18] Olsson, O. and G. Hansson (2011) Country size and the rule of law: Resuscitating Montesquieu. European Economic Review 55, 613-29.

[19] Orlov, M. (2004) The concept of tax havens: A legal analysis. Intertax 32, 95-111.

[20] Pieretti, P. and S. Zanaj (2011) On tax competition, public goods provision and jurisdictions' size. Journal of International Economics 84, 124-130.

[21] Rose, A.K. and M. Spiegel (2007) Offshore financial centers: parasites or symbionts? The Economic Journal 117, 1310–1335.

[22] Sharman, J.C. (2004) International organisations, blacklisting and tax haven regulatory reform. International Studies Association, Quebec, Canada Online. 2009-05-26. Available at http://www.allacademic.com/meta/p73446_index.html.

[23] Sharman J.C. (2010) Shopping for anonymous shell companies: An audit study of financial anonymity and crime. Journal of Economic Perspectives 24/4, 127–40.

[24] Streeten, P. (1993) The special problems of small countries. World Development 21(2), 197-202.

[25] Wilson, J.D. (1991) Tax competition with interregional differences in factor endowments. Regional Science and Urban Economics 21, 423-51.

Appendix

For m_H^* to be positive regardless of α, it must be that both the numerator and denominator of m_H^* in (10) are (i) positive ($3k\alpha\left(1+s\right)-\Phi^2>0$ and $9k\alpha-\Phi^2\left(1+\alpha\right)$) for all $\alpha>1$ or (ii) negative ($3k\alpha\left(1+s\right)-\Phi^2<0$ and $9k\alpha-\Phi^2\left(1+\alpha\right)<0$) for all $\alpha>1$. Case (i) prevails if

$$k>\max\left\{\frac{\Phi^2}{3\alpha(1+s)},\frac{\Phi^2\left(1+\alpha\right)}{9\alpha}\right\} \tag{A.1}$$

while case (ii) prevails if

$$k<\min\left\{\frac{\Phi^2}{3\alpha(1+s)},\frac{\Phi^2\left(1+\alpha\right)}{9\alpha}\right\}. \tag{20}$$

Since both $\Phi^2/3\alpha(1+s)$ and $\Phi^2\left(1+\alpha\right)/9\alpha$ are decreasing w.r.t. α, we have to evaluate (A.1) at $\alpha=1$, which yields

$$k>\frac{2\Phi^2}{9}.$$

Since the RHS of (A.2) takes on its minimum value when $\alpha\to\infty$, it must be that $k<0$, which is impossible. Therefore, case (ii) may be disregarded.

Similarly, for m_F^* to be positive regardless of α, it must be that both the numerator and denominator of m_F^* in (10) are (i) positive ($3k\left(2-s\right)-\Phi^2>0$ and $9k\alpha-\Phi^2\left(1+\alpha\right)$) or (ii) negative ($3k\left(2-s\right)-\Phi^2<0$ and $9k\alpha-\Phi^2\left(1+\alpha\right)<0$). Case (i) prevails when

$$k>\max\left\{\frac{\Phi^2}{3\left(2-s\right)},\frac{\Phi^2\left(1+\alpha\right)}{9\alpha}\right\},$$

while case (ii) prevails when

$$k < \min\left\{\frac{\Phi^2}{3\left(2-s\right)}, \frac{\Phi^2\left(1+\alpha\right)}{9\alpha}\right\}.$$

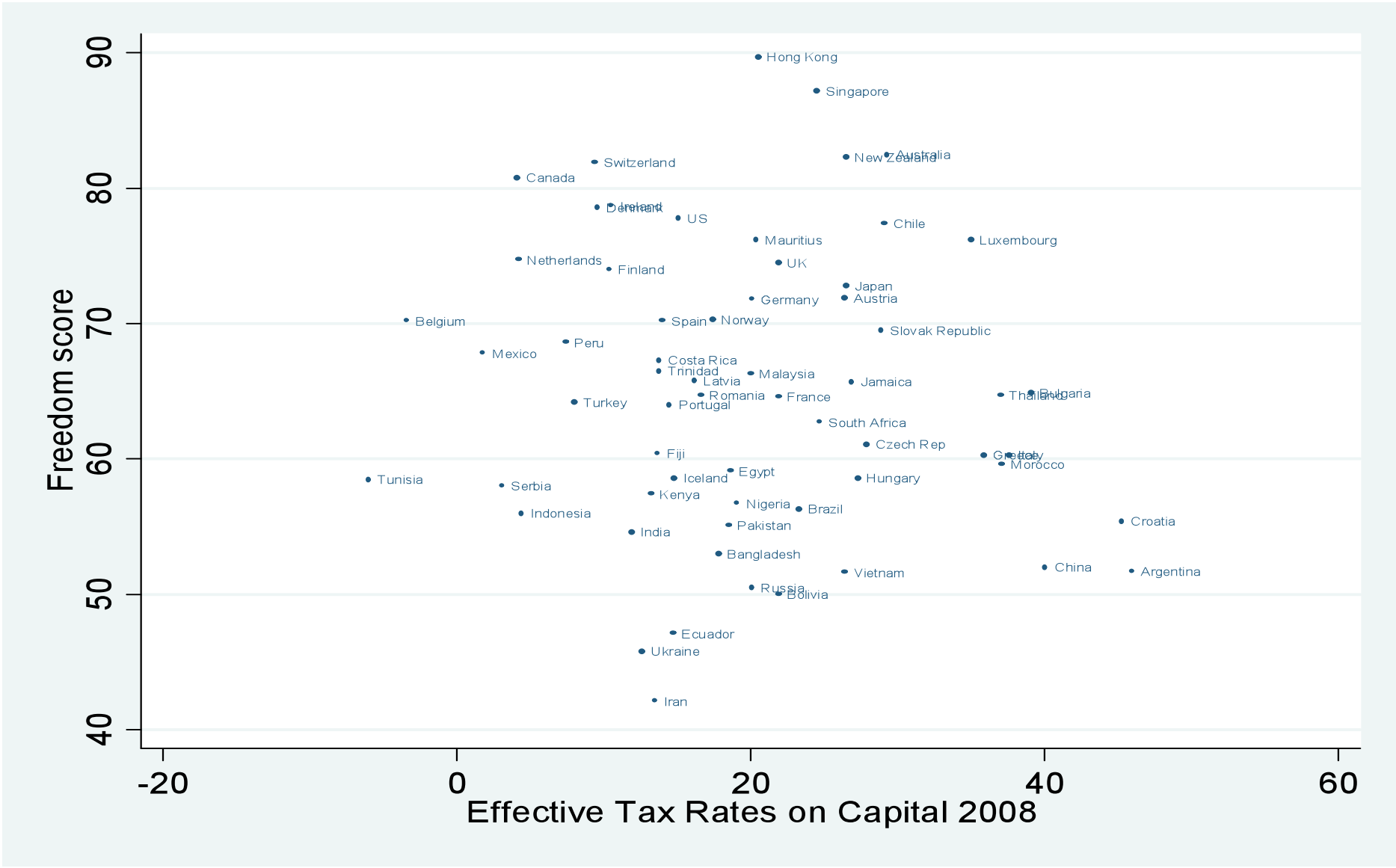
Repeating the above argument shows that case (i) prevails when

$$k > \frac{2\Phi^2}{9}$$

while case (ii) prevails when

$$k < \frac{\Phi^2}{3\left(2-s\right)}.$$

Combining the above three conditions on k, we see that both m_H^* and m_F^* are positive for any $\alpha > 1$ (and $s \in (0, 1/2)$) when $k > 2\Phi^2/9$.


Freedom score
90
80
70
60
50
40
-20
0
20
40
60
Effective Tax Rates on Capital 2008
Hong Kong
Singapore
Australia
New Zealand
Switzerland
Canada
Ireland
Denmark
US
Chile
Mauritius
Luxembourg
Netherlands
Finland
UK
Japan
Germany
Austria
Belgium
Spain
Norway
Slovak Republic
Peru
Mexico
Costa Rica
Trinidad
Malaysia
Latvia
Jamaica
Romania
France
Thailand
Bulgaria
Turkey
Portugal
South Africa
Czech Rep
Fiji
Greece
Italy
Morocco
Tunisia
Iceland
Egypt
Hungary
Serbia
Kenya
Nigeria
Brazil
Indonesia
Croatia
Pakistan
India
Bangladesh
China
Argentina
Vietnam
Russia
Bolivia
Ecuador
Ukraine
Iran