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Tax heavens or Safe Heavens

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Tax havens or safe havens*

Work in progress

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Abstract

Our aim is to explain why a small country can be viable as an international banking center. To this end, we develop a model where mobile investors choose between two banking centers which are respectively located in a small and in a large country. We assume that these countries compete in two instruments, which are taxes and institutional quality. We then show that whether or not a small country may become an international banking center depends on the nature of the governments' welfare function, the small country's level of comparative advantage in providing institutional quality to investors, and the degree of international financial openness.

KEY words: tax havens, tax competition, institutional infrastructure

JEL classification: H40, H54, G20

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1 Introduction

Modern economic analysis highlights the advantage of bigness for a country because its home market allows domestic firms to better exploit scale economies (Krugman, 1980; Romer, 1990). Yet, evidence shows that prosperous banking centers are often set up in small countries. How to explain, therefore, what seems to be a paradox? Moreover, the common wisdom is that international banking centers located in small countries use low taxes to attract foreign capital - the benefit of smallness (Wilson, 1991; Bucovetsky, 1991; Kanbur and Keen, 1993). But is it necessarily so? Our purpose is to provide an answer to these two questions.

A recent study by Hines and Dharmapala (2009) investigates 209 countries and territories, including 33 tax havens, to figure out why some jurisdictions become tax havens, whereas others do not. They find that successful jurisdictions are overwhelmingly small, wealthy and, especially, well governed with sound legal institutions and low levels of corruption. Badly run jurisdictions fail to attract or retain foreign capital, and many do not even try. Therefore, slashing tax rates is not enough to become an attractive tax haven (Survey : Offshore finance, 2007. *The economist*, February 22). It is our contention that the answer to the above paradox lies in a feature common to many small countries: these countries are able to change quickly existing rules and laws in reaction to new environments and opportunities because they display a high degree of political homogeneity (Alesina and Spolaore, 1997). Reforming existing laws or passing new ones takes much longer in big 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 few sectors, and thus the absence of a wide range of lobbyists makes the parliament and the whole administrative body much more flexible. As a consequence, the ability of small countries to have less inertia, and thus to redesign quickly their regulation environment to new crises and international laws or, simply, to

update their legal system to new global or local situations, would be the explanation of the above-mentioned paradox. And, indeed, this distinctive feature of small countries seems to affect positively the institutional quality supplied to domestic and foreign investors, the reason being that small countries adopt new laws making their banking sector more responsive to international competition, but also facilitate the launching of new banking products.[1]

To illustrate, Singapore has been able to score a number of successes against Hong Kong, its slower-moving rival, thanks to its nimbleness. New trust laws in Singapore have prompted Hong Kong to re-examine its own. Singapore was also ahead of Hong Kong in passing legislation on real-estate investment trusts (REITs), a relatively new investment class in Asia that has been growing rapidly, fuelled by the local property boom. "We are small in a big world. We survive because we stay ahead of the region," says Kelvin Chan, a former government official who is now with the Partners Group, a Swiss private-equity firm. "In this, being small is our strength." In the same vein, Luxembourg manages to move quickly even though it is part of the European Union and must comply with all EU directives, which have become increasingly complex and stringent over the years. Luxembourg dominates the market for a type of investment fund called UCITs[2], similar to mutual funds, which complies with stiff requirements so that it can be sold freely throughout Europe. To a large extent, this is because Luxembourg was the first country to incorporate the UCIT directive in the 1980s.

The purpose of this paper is to analyze the reasons explaining why a small country may be viable as an *international banking center* (IBC hereafter). In the wake, we also

[1]For instance, in Luxembourg, the law of 15 June 2004 relating to venture capital companies (SICAR) is aimed to bring together what is known as "venture capital" or "private equity" in a specialized undertaking. With this new product for financial markets, the venture capital company offers a balanced system for a whole range of public and private investors, which is not entirely covered by the legal instruments currently available.

[2]UCIT stands for Undertakings for Collective Investments in Transferable Securities.

address the following questions. If small jurisdictions specialize in international finance, are they necessarily tax havens? Since the government of a small economy seems to play a major role in the emergence and development of an IBC, what is the policy mix it chooses to foster? Our model features two banking centers located in a small and in a large country, as well as a large number of investors who choose where make deposits. Countries compete to attract deposits and use different instruments, especially, *tax competitiveness* and *institutional attractiveness*. In order to uncover the conditions under which an IBC can emerge in a small economy, we focus on these two instruments .

These countries are also differentiated by their ability to offer depositors an attractive regulatory frame. This one has the nature of a local public good (non-rivalry and non-exclusion) which benefit to those who invest in the corresponding country. Since we focus on interactions between marketplaces, each financial center may be 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 an idiosyncratic cost which can be explained as follows. All things being equal, depositors prefer to invest their savings in their home jurisdiction than abroad. When they invest abroad, they bear a "transport cost," which account for the following two factors. First, investors are heterogeneous in the perception they have of the foreign banking center. Hence, the capital mobility cost varies with the distance between the investors' "residence" and the border of the foreign countries. Investors' preferences are uniformly distributed along the Hotelling line. Empirical evidence highlights the existence of a significant home bias in international equity holdings. In other words, financial investments are sensitive to national biases (French and Poterba, 1991; Ahearne et al., 2004). This "nationalistic approval" for domestic investments might not be significant in all countries. Yet, it seems to be prevalent in many. Furthermore, in the wake of Hotelling and successors, we assume that the intensity of this bias varies across investors.

The mobility cost also reflects the degree of financial integration through a common

unit cost parameter k: the lower k, the more integrated the two financial markets. Last, we assume that jurisdictions maximize an objective function which provides a reconciliation between the following two extreme views of what a government can do. On one hand, it can be benevolent by caring about the overall welfare of its inhabitants. On the other hand, it can behaves as a Leviathan government which aims to maximize its budget. As will be seen below, the difference in goverments' objectives is crucial for the choices of instruments used in building an IBC.

The main results of the paper can be summarized as follows. When the objective of the government of a small country is to maximize tax revenues then a small country can become a successful IBC as a tax heaven when the capital mobility is low. While, when capital mobility is high, the small country can be a successful IBC by investing in high quality institutions, and not tax undercutting, if there exists a certain level of comparative advantage to build such institutions. Moreover, when the objective function of the small country is to maximize the welfare of its citizens, and there exists a comparative advantage of the small country to build high quality institutions for the investors, then, the only equilibrium that emerges is one where the small country is an IBC without the need to undercut taxes on capital. In fact, importantly, with benevolent governments, small countries choose never to be tax heavens. With benevolent governments, the small countries choose attractiveness rather than competitiveness.

Comparing our results with the empirical findings of Dharmapala and Hines (2009), we find that tax havens, which appear as IBCs in their analysis, in our paper are countries with Leviathan governments who supply both high quality of institutions and low tax rates to foreign investors. Nevertheless, our model predicts that jurisdictions could become IBCs even taxing foreign investors more than their rival countries. For this to be the case, an IBC shall supply a higher level of institutional quality and be well integrated with the origin countries of its foreign investors.

Our work is related with the existing literature on the effects of governance institutions

on economic policy. For instance, it is related with the existing literature on the legal determinants of external finance like La Porta et al (1997) or Perotti and Volpin (2007). These authors answer the question : why do some countries have a such bigger capital market than others. The answer according to La Porta et al is the level and type of investor protection in a broad sense measured by both the character of the rules and the quality of law enforcements. More specifically, Perotti and Volpin (2007) find that countries with more accountable political institutions have better investor protection. Similarly, in our paper, small countries succeed to be international banking centers because they may have an advantage in supplying institutions (investor protection included) that reduce the risk faced by investors. Another strand of literature close to our paper is the so called nation branding (Konrad, 2008). Countries widely advertise and invest in their brand name to attract direct investment or capital. In our framework, investing in the quality of institutions can be seen as an investment of the small country on the "safe country to invest in" brand.

The paper is organized as follows. The next section details the model. Section 3 is dedicated to the solution of the game with Leviathan and Section 4 to the solution with benevolent governments. Section 5 concludes.

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. 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 their country. Two BCIs, 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 market places introduced by Gehrig (1998), where firms locate within the same market place compete all together with other market places. We thus neglect competition among banks set up within the same IBC in order to focus exclusively on the interactions between IBCs.[3]

Each investor deposits a fixed sum normalized to 1 in one of the two IBCs. Banks invest the raised funds into a risky asset (not accessible to the depositors), which yields a gross random rate of return $\widetilde{g}$, which follows a normal distribution of mean g and variance σ^2. Both g and σ^2 are exogenously given and the same in the two IBCs. As a result, depositors face the risk of a loss, and thus the gross return $\widetilde{r}_i$ they get on their investment in country i is uncertain. When the profit margin is the same in the two banking centers, we have $\widetilde{r}_H = \widetilde{r}_F = \widetilde{r}$. In this case, the gross return investors receive follows a normal distribution of mean $r = E(\widetilde{r}) < g$ and variance σ^2. Banks are risk-neutral, but investors are risk-averse. Their utility is given by $U(\widetilde{r}) = 1 - e^{-\rho\widetilde{r}}$, where ρ is the degree of constant absolute risk aversion. Consequently, an investor's expected utility is given by

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

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. As seen in the introduction, the quality of governance institutions, the degree of law enforcement, the level of corruption, political and economic stability are all characteristics which affect the perception of risk in a country. The more a country invests in its institutional infrastructures, the greater investors'

[3]See Neven et al. (1991) for a similar approach applied to international trade.

protection there is. More precisely, the higher m_i, the lower the risk faced by an investor. Everything else equal, *a higher institutional quality 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 this involves. 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, whereas the smaller country is more efficient than the larger one ($\alpha_F = \alpha > 1$). Stated differently, we assume that the smaller country has a Ricardian comparative advantage in providing institutional infrastructures. One reason for making this assumption is that the resistance to institutional changes, which favors a specific sector like the banking industry, tends to be weaker in microstates due to their less diversified domestic economies.

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

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

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

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

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 deposits, is thus positively affected by the net return

on their investments, $r - t_i$, as well as by the institutional and financial infrastructures 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. 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 said 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 tend to rate domestic investments higher than 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 high 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 depositor resides in the smaller country, $\bar{x} \in (0, s)$, the indirect utility of a depositor at x is given by

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

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

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

It is readily verified that the marginal investor, who is indifferent between investing home or abroad, is located at

$$\overline{x} = s + \max\left\{\frac{t_F - t_H + \Phi(m_H - m_F)}{k}, 0\right\} \tag{1}$$

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. As expected, the same holds when capital mobility is very low (k is high).

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.

We consider two extreme views of what a government does. On the one hand, as in standard public economics, each government is benevolent in that it cares about the overall level of welfare within its jurisdiction. On the other hand, as suggested by Brennan and Buchanan (1985), the government is a Leviathan, which may reflect the influence of its bureaucracy: it aims to increase its budget. Accordingly, the governments' objective functions are as follows.

Benevolent governments care about the well-being of *all* its residents, wherever they invest their capital. However, because the idiosyncratic costs generated by cross-border deposits are not observable by governments, they are not taken into account in their social welfare function. Similarly, the utility function is not observed by the governments,

so finally, the objective function of the governments is the total income generated in its territory. Assuming that S_H exceeds s, we have:

$$W_H = (g-r)S_H \ + [r-t_H]s + t_H S_H - m_H^2 \tag{2}$$

$$W_F = (g-r)S_F \ + [r-t_F]S + [r-t_H](S_H - s) + t_F S_F - \alpha m_F^2. \tag{3}$$

Since individual utilities are expressed in pecuniary terms, W_i may be interpreted as the expected gross national product of country i.

Leviathan governments maximize their budgets:

$$B_H \ = \ t_H S_H \ - m_H^2 \tag{4}$$

$$B_F \ = \ t_F S_F \ - m_F^2. \tag{5}$$

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 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 obtained by solving the first-order

conditions:

$$t_H^*(m_H, m_F) = \frac{\Phi\,(m_H - m_F) + k\,(1+s)}{3} \tag{6}$$

$$t_F^*(m_H, m_F) = \frac{\Phi\,(m_F - m_H) + k(2-s)}{3}. \tag{7}$$

When the two countries provide the same institutional infrastructures, these two expressions show that, regardless of the degree of capital mobility, *the smaller country always sets a lower tax rate than the larger one so as to attract foreign investors.* Furthermore, the tax differential is the reflection of the size difference because it shrinks as countries become less dissimilar in size, and tax rates are the same when countries have the same size. These results are in line with the existing literature on tax competition and country size, which disregards the fact that countries typically offer different institutional frameworks (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 comparative advantage can build on it to charge a higher tax rate whereas the other country must lower its own to retain enough investors.

Observe that (6) and (7) 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 Appendix A 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), thus reflecting the idea that the tax basis is less mobile.

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 $k > \Phi^2/9$ ($k < \Phi^2/9$). When financial markets are sufficiently integrated for the condition $k < \Phi^2/9$ to hold, investors' decisions are primarily driven by differences in interest rates, thus making the market segmentation we focus on unlikely.

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

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

Because the focus of this paper is on 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. Furthermore, we are interested in finding positivity conditions that hold for any level of comparative advantage. As shown in Appendix B, 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, deposits 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

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

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. Therefore, we assume from now on that (13) always holds.

We are now equipped to determine the conditions for country H to become an IBC.

Proposition 1 *Assume Leviathan governments. If $k > \Phi^2/3$, then the smaller country always accommodates an IBC.*

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

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

or, equivalently,

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

We now study the policy mix chosen by the smaller country. Two cases may arise.

Case 1. Assume that the comparative advantage is strong, that is, $\alpha > \bar{\alpha}$. Then, we have $m_H^* > m_F^*$. Whether country H chooses to be a tax heaven 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 in order to build an IBC 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. In other words, 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 2 *Assume Leviathan governments. When the comparative advantage is strong and capital mobility relatively low, the smaller country becomes an IBC by offering better institutional infrastructure and a lower tax rate.*

Thus, our model reproduces one of the main stylized facts on IBCs. As shown by Figure 1, when $\bar{\alpha} < \alpha < 1/2s$ there is no restriction on k for Proposition 2 to hold. The

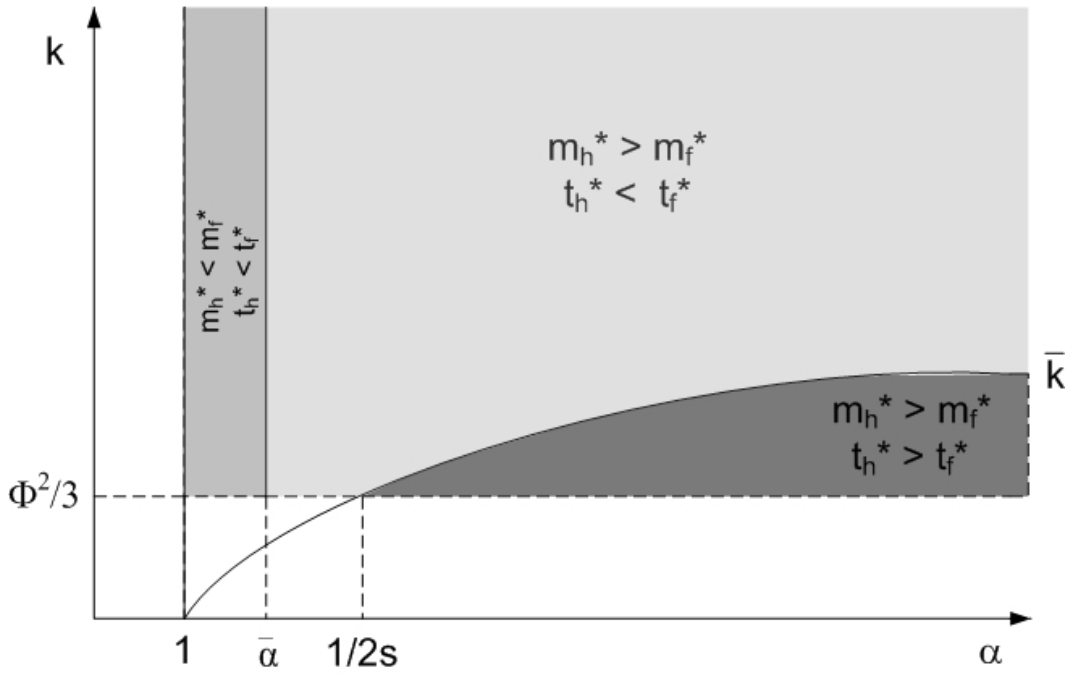

Figure 1: Heterogeneity of IBCs with Leviathan governments

comparative advantage of the smaller country is not strong enough for this country to set a higher tax rate than the large one. This suggests the existence of another domain in which country H is not a tax haven for $\alpha > \bar{\alpha}$.

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 capital 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 ($\alpha > 1/2s$).

Therefore, we have:

Proposition 3 *Assume Leviathan governments. When the comparative advantage is strong and capital mobility relatively high, the smaller country becomes an IBC through the supply of better institutions only.*

In other words, the smaller country may afford to tax investors more than the larger

country because of its much better institutional infrastructure. Contrary to general belief, *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.

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 infrastructures than country F. As a result, the smaller country must charge a lower tax rate than the larger one. Thus, we have:

Proposition 4 *Assume Leviathan governments. When the comparative advantage is weak, the smaller country provides both a low level regulatory environment and a low tax rate.*

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. In particular, our paper highlights the following possible scenarios, which are depicted in Figure 1. *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 but very low taxes (the middle-gray domain). In between, these countries may choose to combine low tax and good institutions (the light-gray domain). Note also that, since $1/2s$ is arbitrarily large in the case of very small off-shore ICBs, 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 has shown that the magnitude of capital mobility is critical for the type of financial environment that emerges. It remains to see 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 attract more foreign investors (S_H^* decreases with k), while m_H^* (m_F^*) increases (decreases), thus implying that the the two countries provide more

differentiated institutional infrastructures. This intuition behind this result is as follows. 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), its 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, due to a financial crisis for example, always leads to more foreign deposits 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.

4 Benevolent governments

In this section, governments aim to maximize the total income of its citizens, regardless where they deposit their savings. Simplifying expressions (2) and (3), we obtain the

following payoffs:

$$W_H = (g - r + t_H) S_H + (r - t_H)s - m_H^2 \quad (15)$$

$$W_F = gS_F + (r - t_H)(S_H - s) - \alpha m_F^2. \quad (16)$$

4.1 Tax competition

In the second-stage subgame, each country chooses its tax rate given and the level of institutional infrastructures selected in the first stage. Substituting (1) in (15) and (16), we readily verify that $W_H(t_H, t_F)$ 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, $W_F(t_H, t_F)$ is linear in t_F. Since $\partial W_F/\partial t_F = -(g - r + t_H)/k$ is negative, the bigger country always sets a zero tax. Consequently, the equilibrium of the tax competition subgame is given by

$$t_H^* = \frac{-(g - r) + \Phi(m_H - m_F)}{2} \qquad t_F^* = 0 \quad (17)$$

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

$$t_H^* = 0 \qquad t_F^* = 0. \quad (18)$$

To sum-up, when government are benevolent, they get trapped into a race to the bottom in that the larger country never tax investors, whereas the smaller one is able to tax investors only if it is able to build a 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 one more

the implicit assumption made in the classical tax competition literature, namely 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 (17), and

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

under (18). In both cases, higher capital mobility makes the smaller country more attractive when it accommodates an IBC.

4.2 Institutional competition

Plugging (17) or (18) in (2) and (3) shows that both $W_H(m_H, m_F)$ and $W_F(m_H, m_F)$ 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 Leviathan governments, we rule out the case in which payoffs are convex.

As seen above, two cases may arise.

Case 1. Under (17), the first order conditions lead to

$$m_H^* = \alpha\Phi\frac{g - r}{4\alpha k - \Phi^2(\alpha - 1)} \qquad m_F^* = \frac{m_H^*}{\alpha} < m_H^*. \tag{19}$$

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

$$k > \Phi^2/4. \tag{20}$$

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 (19), we have

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

which is positive by (20). Thus, we have shown:

Proposition 5 *Assume benevolent governments. When the comparative advantage is strong and capital mobility relatively high, the smaller country becomes an IBC through the supply of better institutions only.*

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

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

which increases when capital mobility rises. Actually, the small country's government exploits the larger number of foreign deposits to build a better institutional infrastructures that benefit to both its banks and residents.

Case 2. Under (18), we have

$$m_H^* = \frac{\Phi (g - r)}{2k} > 0 \qquad m_F^* = \frac{m_H^*}{\alpha} < m_H^*. \tag{21}$$

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

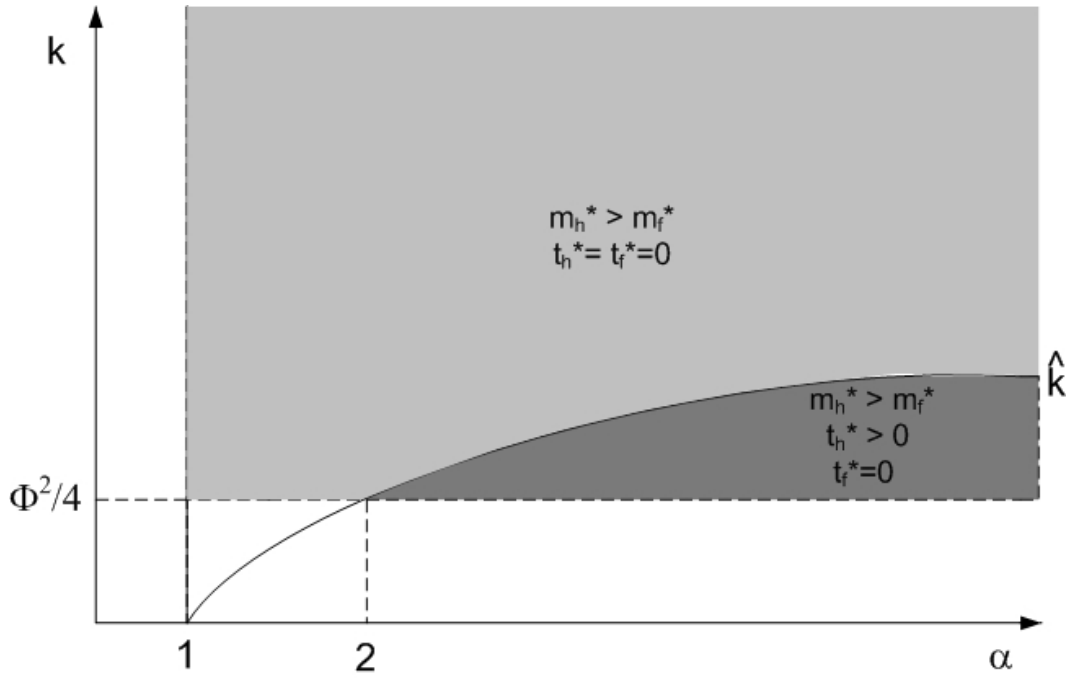

Figure 2: Heterogeneity of IBCs with benevolent governments

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 2, when $\alpha < 2$ there is no restriction on k for Proposition 5 to hold.

Furthermore, (21) shows that a more risky environment leads both benevolent governments to invest more in institutional infrastructure, which tends to make all residents better-off.

A last remark is in order. When a government sets a zero tax rate, one may wonder how it finances its institutional infrastructures? Since this government is benevolent, institutional infrastructure can be funded through a lump sum tax on banks' profits and/or on its residents.[4]

[4]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 $S_H^* > s$

5 Conclusions

Our purpose was to analyze the reasons why a small country can be viable as an international banking center. To address this question, we have develop a model where investors choose to deposit their savings in a small 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, that is, taxes and institutional infrastructures. As discussed in the introduction, the empirical evidence supports our idea that tax competition is too restrictive an approach. Given the modeling strategy retained here, we show that whether or not the small country may become an international banking center depends on the nature of governments' objective functions. In particular, *benevolent governments never develop a tax haven.* They prefer to build an IBC through the provision of better institutional infrastructures. By contrast, *tax havens may emerge under Leviathan governments.* However, having such governments does not necessarily imply that they choose to accommodate a tax haven. The smaller country may become an IBC that sets a higher tax rate by improving upon its institutional infrastructures. Our analysis also reveals that the assumption of perfect capital mobility is not warranted. Indeed, we have seen that how imperfect is capital mobility matters for the nature of the policy equilibrium.

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in the former case whereas $S_H^* = s$ in the latter. Similarly, in country F, the outflow of depositors will be even higher if m_F^* were set to zero. Thus, these banks are 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. In any case, governments may prevent the relocation of banks by taxing its residents.

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Appendix

5.1 Appendix A

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 ($3k\alpha(1+s) - \Phi^2 > 0$ and $9k\alpha - \Phi^2(1+\alpha)$) for all $\alpha > 1$ or (ii) negative ($3k\alpha(1+s) - \Phi^2 < 0$ and $9k\alpha - \Phi^2(1+\alpha) < 0$) for all $\alpha > 1$. Case (i) prevails if

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

while case (ii) prevails if

$$k < \min\left\{\frac{\Phi^2}{3\alpha(1+s)}, \frac{\Phi^2(1+\alpha)}{9\alpha}\right\}. \tag{22}$$

Since both $\Phi^2/3\alpha(1+s)$ and $\Phi^2(1+\alpha)/9\alpha$ 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 ($3k(2-s) - \Phi^2 > 0$ and $9k\alpha - \Phi^2(1+\alpha)$) or (ii) negative ($3k(2-s) - \Phi^2 < 0$ and $9k\alpha - \Phi^2(1+\alpha) < 0$). Case (i) prevails when

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

while case (ii) prevails when

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

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

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

while case (ii) prevails when

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

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 $k > 2\Phi^2/9$.