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Offshore financial centers and bank secrecy[*]

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Abstract

We study the impact of an offshore financial center on the economy in the presence or absence of bank secrecy in a two-country setting with heterogeneous investors who choose where to deposit their savings. Rather than focussing on tax competition, we acknowledge that countries use two instruments to attract investors: tax rate and institutional infrastructure. Owing to its ability to quickly redesign its regulation environment, the small country has a comparative advantage in providing high-quality institutional infrastructure. We show that the presence of an offshore financial center fosters competition in institutional infrastructure, which is beneficial with or without bank secrecy.

Keywords: offshore financial centers; portfolio investments; institutional infrastructure competition; tax competition.

JEL classification: G20, H40, H54

1 Introduction

In a recent study, Dharmapala and Hines (2009) investigated 209 countries and territories to determine which jurisdictions become offshore financial centers (OFCs) 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 matters for the existence of OFCs. Despite of this, OFCs are in the midst of major political turmoil. The medias and the academics alike have widely argued that such financial centers are tax havens, which are beneficial only to the rich (Slemrod and Wilson, 2009). As a consequence, OFCs face strong international pressures to share information about cross-border deposits, which have led some of them to announce that they will comply with the removal of bank secrecy.

The purpose of this paper is to analyze the behavior and impact of OFCs in the global economy, with and without bank secrecy. When there is bank secrecy, we address the following key question. Since the quality of governance seems to play a major role in the emergence and development of OFCs, what policy mix does a government choose to promote an OFC? By contrast, when bank secrecy is removed, one may wonder if there is still room for an OFC and, if yes, how governments can adjust their strategies?

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 investors who choose where to make portfolio investments. Unlike the existing literature that focuses mainly on tax competition (Wilson, 1991; Bucovetsky, 1991; Kanbur and Keen, 1993), we recognize that countries compete to attract portfolio investments by using two instruments: tax rate and institutional infrastructure.[1]

In the present context, institutional infrastructure 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 devices 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 thus agrees with Gonzalez and Schipke

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[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 (Justman et al., 2001; Hindriks et al., 2008; Zissimos and Wooders, 2008; Pieretti and Zanaj, 2011). We differ from these authors by focussing on financial investment. Our approach is also related to the idea of "nation branding" developed by Konrad (2008) in which countries advertise and invest in their brand name to attract foreign direct investments. In our framework, investing in the quality of institutions can be seen as an investment made by the small country under the brand of being a safe country where to invest.

(2001, p.45) for whom "Being a tax haven alone does not guarantee capital flows; strong regulations that inspire confidence are a crucial factor." Indeed, 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. In this respect, it will be especially interesting to analyze the impact of bank secrecy on institutional competition among OFCs and onshore countries.

Countries have very different 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 OFC can emerge. In this view, a *tax haven* arises when the strategy to build an OFC is based on tax undercutting, whereas a *safe haven* emerges when the country attracts foreign investors by offering them a better institutional framework. Observe that a country can be both a tax and safe haven by offering simultaneously a low tax rate and a good institutional environment. In this event, depositors put their savings to escape tax authorities of their origin country and simultaneously benefit from a better financial industry in the OFC. By contrast, when bank secrecy is removed, depositors can legally invest their money in the OFC by paying the tax differential in their home country. In this scenario, the OFC must continue to invest in institutional infrastructure to attract foreign investors, thus promoting competition in institutional infrastructure among onshore countries and OFCs.

Our model displays the following main features. First, all things being equal, individuals prefer to invest their savings in their home country rather than abroad. When they invest abroad, investors bear idiosyncratic costs. Specifically, we assume that they bear a Hotelling-like "transport cost." We show how this cost takes into account investors' heterogeneity in their attitude toward OFCs as well as the imperfect integration of financial markets. Second, the vast majority of OFCs have a small population size. Such countries display a high degree of political homogeneity, which allows them to change quickly existing rules and laws in response to new environments and opportunities (Alesina and Spolaore, 1997; Streeten, 1993). 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, here the banking industry, and thus the absence of a wide range of lobbyists makes the parliament and the entire administrative body much more flexible. Consequently, owing to their ability 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, we find it reasonable to assume that small countries are endowed with a comparative advantage in providing high-quality institutional infrastructure (Hampton and Christensen, 2002). Last, 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). Note that this approach is consistent with a more conventional welfarist perspective in which consumers place a high marginal valuation on specific merits goods. In this case, governments maximize the surplus they can extract from investors to finance these public goods.

Our paper is organized in two parts. In the first one, we assume bank secrecy. This implies that depositors in the OFC do not declare income in their home country. Yet, in accordance with recent international taxation agreements, depositors should be taxed on their capital return according to the residence principle. Bank secrecy thus allows investors who offshore their savings to evade paying taxes in their home country.[2] Nevertheless, when they are caught by their taxing authority such investors incur a fine. In the second part, using the same setup, we investigate the effects of the removal of bank secrecy on investors' choices and study how OFCs react to this new institutional environment. Consequently, tax evasion is excluded. Note that our model does not consider the use of OFCs for other illegal activities, such as money laundering.

Our main findings may be summarized as follows. Under bank secrecy and Leviathan governments, when a small country is endowed with a sufficiently strong comparative advantage in designing institutional infrastructure, it always chooses to become *both* a safe haven and a tax haven. This finding is in accordance with the empirical evidence provided by Dharmapala and Hines (2009) and Sharman (2010). Instead, when a small country's comparative advantage to supply institutional infrastructures is low, it can be attractive to foreign portfolio investments

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[2]Thus, we consider the most extreme case about investors' behavior. Indeed, it is conceivable that individuals make use of OFCs for more legitimate reasons, taking for example advantage of the existence of institutions that offer higher investors' protection. Accounting for such a clientele makes the analysis more difficult, but does not change the main message of the paper.

by being a pure tax haven only. This is consistent with standard results in the tax competition literature.

Under bank secrecy and benevolent governments, the mobility of capital leads to equilibria that obey patterns that are qualitatively similar to those described above. There are important differences, however. On the one hand, there is a race to the bottom when capital mobility is low. In this case, both countries build their 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's. A further distinctive feature is worth noting. A benevolent government never builds an OFCs that is a pure tax havens.

From the welfare viewpoint, we show that the global surplus increases when countries choose to compete in institutional infrastructure, and not just in tax, the reason being that all investors get a better protection of their saving. One might think that this result is driven by the gains made in the OFC. Quite the opposite, we show that the surplus of the larger country, which supposedly is hurt by the action of the OFC, is higher when both countries engage in institutional competition. In other words, the supply of high-quality institutional infrastructure mitigates the damaging effects associated with pure tax competition.[3]

Removing bank secrecy may have unsuspected results. First, we show that benevolent governments do not change their provision of institutional infrastructure. Nevertheless, there is an important difference. Under bank secrecy, benevolent governments get trapped into a race to the bottom, which drives capital taxes to zero. In this case, providing institutional infrastructures requires taxing banks' profits. By contrast, in absence of bank secrecy, governments can tax capital returns to finance infrastructure expenditures without inducing capital movements. The picture changes dramatically when governments are Leviathan as removing bank secrecy implies the disappearance of institutional infrastructure. In this scenario, international capital movements have no reason to arise because there is no scope for tax evasion and there is no difference in institutional infrastructure.

The next section presents the model. Section 3 describes the equilibrium policy mix chosen under bank secrecy. Section 4 investigates the effects of the removal of bank secrecy. Section 5

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[3]This idea is in line with recent empirical research in public economics, which highlights the fact that governments combine tax breaks and the provision of material infrastructure to attract firms (Bénassy-Quéré et al., 2007; Hauptmeier et al.,2012).

concludes.

2 The model

Consider two countries S and L whose population size are, respectively, given by $0 \leq s < 1/2$ and $1 - s > 1/2$. Both countries accommodate a banking center. Each resident has the same fixed amount of capital that she deposits in one of the two centers. Without loss of generality, the total capital amount including the capital return is normalized to 1. In what follows, we disregard competition among banks and focus on strategic interactions between governments that determine the international distribution of financial investments.[4] Country S accommodates an OFC, whereas the onshore center established in country L does not. Since we focus on OFCs, the financial mobility of the smaller country's residents is irrelevant. In other words, only investors of the larger country are mobile.

One of the main points of this paper is that the quality of governance, the degree of law enforcement, the level of corruption, and the political and economic stability are all characteristics that affect the risk faced by investors. As a result, country $i = S, L$ provides institutional infrastructure m_i with the aim to decrease the risk of investing therein. This variable captures the ability of country i to react to external shocks, changes in international laws, and the like. More precisely, the higher $m_i \geq 0$, the higher the utility derived from capital investment in country i. Thus, everything else being 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 surplus in its country. However, the cost of investing in institutional infrastructure increases at an increasing rate due to the rising complexity involved. For simplicity, we assume

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[4]Admittedly, by considering a two-country setting, we disregard competition between OFCs. However, one of the main messages of this paper being that countries choose to supply differentiated institutional infrastructure, it is reasonable to expect OFCs to relax competition within their group by being differentiated too. In particular, armchair evidence shows a certain geographical specialization of OFCs (Laulajainen, 2003). For example, the Cayman Islands and the Bahamas host the largest banking services directed toward US clients, whereas Luxembourg is mainly oriented toward the residents of its neighboring countries (Germany, France and Belgium).

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 infrastructure. Though α_i is treated here as exogenous, we recognize that its level is the outcome of a complex political process. Dealing explicitly with such a process would take us far from the main objective of the paper. Nevertheless, as discussed in the introduction, it is reasonable to assume that the smaller country is more efficient than the larger one in designing institutional infrastructure: $\alpha_S < \alpha_L$. The numéraire being chosen for α_S to be normalized to 1, we have $\alpha \equiv \alpha_L > 1$.

Taking institutional infrastructure into account, we can write an investor's indirect utility as follows:

$$V_i = 1 + m_i - t_i$$

where country i provides the institutional infrastructure m_i and sets a tax t_i.[5] Investors' utility, which depends on the location of their portfolio investments, is thus positively affected by the net return on their investments, $1 - t_i$, as well as by the institutional and financial infrastructure of the country in which they invest, m_i.

As discussed in the introduction, country L's residents are homogeneous in the perception of their home country but heterogeneous in their attitudes toward the OFC, whereas country S's residents invest home. To be precise, we assume that S- country investors are located at $x = 0$ with mass s. By contrast, L- country investors are uniformly distributed along the line $[0, 1-s]$. An individual who invests in the OFC incurs a transaction cost, which has the nature of a "transport cost" $\tau x > 0$ à la Hotelling (1929). The parameter τ can be viewed as an inverse measure of the degree of international financial integration: the lower τ, the more integrated the financial markets.[6] Furthermore, the distance x from an investor's location to the OFC is *not* the geographical distance between this investor located in country L and the border of country S. 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 investing in the OFC. In this context, an investor bearing a low cost does not

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[5]Gross return on investment is equal to $1 + r$, where r is normalized to 0 for simplicity because r is an exogeneous parameter in our analysis.

[6]When $\tau = 0$, there is perfect capital mobility. In this case, depositors' heterogeneity no longer matters.

care much about where she invests her money. On the contrary, an investor who faces a high cost displays a strong reluctance to invest abroad. The mobility of capital is, therefore, imperfect for the following two reasons: financial markets are imperfectly integrated and investors are heterogeneous.

3 Bank secrecy

We assume bank secrecy, which means that the OFC does not share information about account holders with the origin country. Then, a country L's resident who invests offshore is assumed not to report her foreign interest income to her home government. She thus faces a probability p of being caught for tax evasion. As a result, her expected indirect utility is given by

$$(1-p)(1+m_S- t_S-\tau x)+p\left(1+m_S- t_S-\varphi-\tau x\right)$$

where φ is the fine she has to pay when she is caught.

Let $\bar{x} \in (0, 1-s)$ be the location of the investor indifferent between investing home and abroad. Depositors located in $(0, \bar{x})$ invest in country S, whereas those located in $(\bar{x}, 1-s)$ invest in L. The indirect utility of an investor is as follows

$$V(x) = \begin{cases} 1+m_S- t_S & \text{if} \quad \text{home residents} \\ 1+m_S- t_S-\phi-\tau x & \text{if} \qquad x \in (0, \bar{x}) \\ 1+m_L-t_L & \text{if} \quad x \in (\bar{x}, 1-s) \end{cases}$$

where $\phi \equiv p\varphi$ is the expected fine. Hence, $\phi + \tau x$ may be interpreted as the total cost borne by an investor at x when she chooses to deposit her capital in the OFC.

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

$$\bar{x} = \frac{m_S - m_L + t_L - t_S - \phi}{\tau} \tag{1}$$

which must belong to the interval $[0, 1 - s]$. When financial markets are highly integrated and/or investors almost homogeneous (formally, τ is very low), (1) shows that the marginal investor is given by $\bar{x} = 1 - s$ ($\bar{x} = 0$) when the numerator is positive (negative). In this case, small deviations in tax rates or in institutional infrastructure lead all investors to move *en masse*. Such corner solutions are often implausible, as is the solution to the Bertrand price

game. In the next section, we will introduce a lower bound on τ that guarantees the existence of an interior solution for the marginal investor.

The supply of capital in the smaller country is $s + \bar{x}$ and the supply of capital in the larger one is $1 - s - \bar{x}$. Since our purpose is to study the emergence and behavior of OFCs in small countries, we focus on equilibria in which the smaller country attracts foreign investors, i.e. $\bar{x} > 0$. Therefore, we will have to check under which conditions this assumption holds at the equilibrium of the game played by the two governments.

Assume that $\bar{x}$ is positive. Since the mobility costs are not mediated by the market, benevolent governments maximize their national income. Furthermore, both those who invest home and abroad use their income to cover their expenditure. As a result, the offshore investors repatriate their income. If $0 \leq n \equiv p\bar{x} \leq \bar{x}$ of them are caught by the fiscal authority, their net total income is $(1 - t_S - \varphi)n$. In this event, the government collects an additional income equal to $n\varphi$. Therefore, the total income generated by the offshore investors is equal to $(1 - t_S)\bar{x}$. As a consequence, national incomes are given by

$$
\begin{aligned}
Y_S &= R(s + \bar{x}) + (1 - t_S)s + t_S(s + \bar{x}) - m_S^2 \\
Y_L &= R(1 - s - \bar{x}) + (1 - t_L)(1 - s - \bar{x}) + \\
&\quad + (1 - t_S)\bar{x} + t_L(1 - s - \bar{x}) - \alpha m_L^2.
\end{aligned}
\tag{2}
$$

In these two expressions, R is the constant banks' profit margin, so that the first term represents banks' profits, while the second one stands for the income of residents who invest in their domestic banks. As seen above, the third one in Y_L represents the income of the large country residents who invest in the OFC. The last terms are the tax collected net of the investment costs.

Leviathan governments maximize their budgets

$$
B_S = (\bar{x} + s)t_S - m_S^2 \tag{3}
$$

$$
B_L = (1 - \bar{x} - s)t_L - \alpha m_L^2. \tag{4}
$$

We do not find it reasonable to add $p\bar{x}\phi$ to the budget B_L because this would mean that the large country's government aims to manipulate the number of residents investing offshore. Moreover, using this alternative specification for B_L does not affect the message of Section 3.1.

In the next analysis, we consider a two-stage game in which governments, first, choose their institutional infrastructure (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. In other words, there is *infrastructure-then-tax* competition.

3.0.1 Leviathan governments

Tax competition. In the second-stage subgame, governments choose noncooperatively their tax rates to maximize their revenues conditional upon their institutional infrastructures (m_S, m_L). The payoffs being strictly concave and quadratic in taxes, there exists a single Nash equilibrium. When this equilibrium is interior, it is given by

$$t_S(m_S, m_L) = \frac{\tau(1+s) - \phi - (m_L - m_S)}{3} \tag{5}$$

$$t_L(m_S, m_L) = \frac{\tau(2-s) + \phi + (m_L - m_S)}{3}. \tag{6}$$

Thus, tougher measures against fiscal evasion leads the OFC to decrease its tax rate while allowing the larger country to raise its own rate. Plugging (5) and (6) into (1) yields

$$\bar{x}(m_S, m_L) = \frac{\tau(1-2s) + r(m_S - m_L) - \phi}{3\tau}. \tag{7}$$

If the two countries offer the same institutional infrastructures $(m_S = m_L)$, or do not compete in infrastructure $(m_S = m_L = 0)$, the tax rates are given by

$$t_S^t = \frac{\tau(1+s) - \phi}{3} \tag{8}$$

$$t_L^t = \frac{\tau(2-s) + \phi}{3} \tag{9}$$

and thus

$$\bar{x}_t = \frac{\tau(1-2s) - \phi}{3\tau}. \tag{10}$$

Hence, regardless of the degree of capital mobility, to attract foreign investors the smaller country must set a lower tax rate than the larger one: $t_S^t < t_L^t$. The resulting tax gap is the reflection of the population size difference: it widens as countries become more dissimilar in size. This result is 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 τ because the tax base of the larger country becomes more captive. By contrast, when the two countries have different institutional infrastructure, 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.

Infrastructure competition. Plugging (5), (6), and (7) into (3) and (4) shows that both B_S and B_L are concave (convex) with respect to own strategy if and only if $\tau > 1/9$ ($\tau < 1/9$). Because we exclude corner solutions, we assume that $\tau > 1/9$.

Maximizing country i's budget with respect to m_i for $i = S, L$, we obtain the following solutions:
$$m_S^* = \frac{\alpha\tau(s+1) - \alpha\phi - 1/3}{9\alpha\tau - (1+\alpha)} \qquad m_L^* = \frac{\tau(2-s) + \phi - 1/3}{9\alpha\tau - (1+\alpha)}. \tag{11}$$

We determine below a sufficient condition for m_S^* and m_L^* to be strictly positive. Using (5) and (6), the corresponding equilibrium tax rates are given by

$$t_S^* = 3\tau m_S^* \qquad t_L^* = 3\alpha\tau m_L^*. \tag{12}$$

Thus, in each country the tax rate rises with the institutional infrastructure it supplies. However, the tax rate increases at the higher pace in the larger country because of its comparative institutional disadvantage.

The marginal depositor is located at

$$\bar{x} = \frac{3\alpha\tau(1-2s) - \alpha(3\phi - s) - (1-s)}{9\alpha\tau - (1+\alpha)}. \tag{13}$$

The smaller country is viable as an OFC if portfolio investments flow from L to S. In other words, the condition $\bar{x} > 0$ must hold. For notational simplicity, we want this condition to be satisfied for all admissible values of α. It is then readily verified that this is so when $\alpha = 1$, which yields

$$\tau > \frac{1}{3} + \frac{\phi}{1-2s}. \tag{14}$$

Under this condition, both the numerator and denominator of m_S^* are positive. Using (11), it is easy to show that m_L^* is also positive, while (12) implies that t_S^* and t_L^* are positive too. In sum, it follows from (14) that all the equilibrium choices made by governments are positively signed regardless of the value of $\alpha > 1$. Note, finally, that (14) implies $\bar{x} < 1 - s$.[7] However, it should be kept in mind that the condition (14) is more restrictive than what is needed for our analysis to be valid. Indeed, our results hold for a larger set of τ-values. This would require replacing (14) with a less stringent inequality in which the right-hand side depends on α. For simplicity, we assume that (14) holds, which also implies the concavity of payoffs ($\tau > 1/9$).

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[7]Indeed, $\bar{x} < 1 - s$ holds if and only if $\tau > \frac{1-3\phi}{3(2-s)}$, which is always satisfied under (14).

The condition (14) is more likely to be satisfied when s is very small, i.e. country S is a microstate. In other words, the smaller is country S, the easier it is for this country to become an OFC. By contrast, (14) is unlikely to hold when the expected fine is very high. In particular, since (13) decreases with ϕ, *the OCF ceases to be viable when the expected fine is sufficiently high.*

Consider first the institutional gap

$$m_S^* - m_L^* = \frac{\tau\left[\alpha\left(1+s\right)-\left(2-s\right)\right]-\phi\left(1+\alpha\right)}{9\alpha\tau-\left(1+\alpha\right)}. \tag{15}$$

The condition (14) implies that the denominator of this expression is positive. As for the numerator, it is positive if and only if $\alpha > \bar{\alpha}$ where

$$\bar{\alpha} \equiv \frac{\tau\left(2-s\right)+\phi}{\tau\left(s+1\right)-\phi} > 1.$$

In other words, the smaller country provides better institutions when its comparative advantage is sufficiently large. Nevertheless, a higher expected fine makes it more difficult for the OFC to be a safe haven. As a result, a smaller OFC will cease being a safe haven before a larger one. To put it bluntly, Switzerland is more likely to be a safe haven than Liechtenstein if efforts to crack down on tax evasion increase.

Consider now the tax differential $t_S^* - t_L^*$. Using (11) and (12), we get

$$t_S^* - t_L^* = \tau\frac{\alpha - 3\alpha\tau(1-2s) - 6\alpha\phi - 1}{9\alpha\tau - (1+\alpha)} \tag{16}$$

which means that $t_S^* - t_L^* < 0$ if and only if $\alpha < \hat{\alpha}$ and $\hat{\alpha} > 0$ where

$$\hat{\alpha} \equiv \frac{1}{1 - 3\tau(1-2s) - 6\phi}.$$

It is easy to show that if $\hat{\alpha}$ is negative we always have $t_S^* - t_L^* < 0$ for all α. Under (14), $\hat{\alpha}$ is negative, if and only if the condition

$$s < \frac{9\phi}{2} \tag{17}$$

holds. As a result, the OFC is a tax haven when country S is sufficiently small, the expected fine is high, or both.

The following propositions summarize our main results.[8]

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[8]Can "pure" safe havens exist? A *pure* safe haven is an OFC that displays a higher level of institutional infrastructure than its rival and sets a higher level of taxes. In our model, we can recover such a configuration

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Proposition 1 *Assume bank secrecy. If the OFC is small and/or the larger country's taxing authority fierce enough ($s < 9\phi/2$) and if the OFC has a strong comparative advantage in designing institutional infrastructures ($\alpha > \bar{\alpha}$), it is both a tax and safe haven.*

The novelty here lies in the role played by governments in supplying infrastructures that protect investors. This agrees with the empirical evidence provided by Dharmpala and Hines (2009) and Hines (2010) 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.

Proposition 2 *Assume bank secrecy. If $s < 9\phi/2$ and if the OFC has a weak comparative advantage ($\alpha < \bar{\alpha}$), it is a tax haven only.*

This scenario is close 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, the size is too small for it to build a relatively strong institutional framework. As a consequence, its only way out to become an OFC is tax undercutting. Under these circumstances, the tax differential $t_L^* - t_S^*$ must be sufficiently wide to compensate the foreign investors for the low institutional infrastructure gap provided by the OFC. Indeed, since $m_S^* - t_S^*$ always exceeds $m_L^* - t_L^*$, it must be that

$$m_L^* - m_S^* < t_L^* - t_S^*.$$

Welfare implications. What are the welfare effects of infrastructure-then-tax versus tax competition? Since preferences are quasilinear, the social surplus of a country is equal to the

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as an equilibrium choice made by the smaller country. Indeed, if we relax our assumption (17) and allow the taxing authority of the larger country to adopt a policy such that $\phi < 2s/9$, then the threshold $\hat{\alpha}$ takes on a positive value under (14). This has as a direct and surprising consequence: the OFC may then choose a tax level that exceeds the tax rate selected by the larger country, $t_S^* > t_L^*$. To be precise, if $\alpha > \hat{\alpha} > \bar{\alpha}$, using (15) and (16) shows that $m_S^* - m_L^* > 0$ and $t_S^* - t_L^* > 0$. For this to happen, the following conditions must be satisfied. First, international pressures on OFCs has to be lax ($\phi < 2s/9$). Incidentally, this condition shows that a very small country is unlikely to become a pure safe haven. Second, financial markets have to be fairly well integrated for τ not to be too large, and thus $\hat{\alpha} > \bar{\alpha}$. Third, and last, the small country must have a strong comparative advantage ($\alpha > \hat{\alpha}$). Because it is hard to meet these three conditions simultaneously, it seems unrealistic to expect an OFC, especially when the country is very small, to be a pure safe haven.

sum of its residents' indirect utilities. Therefore, the social surplus is equal to the national income minus the mobility costs borne by the residents who invest offshore.

We first compare the world surplus generated when governments compete in tax only or when they compete in tax and institutional infrastructure. Under pure tax competition, the world surplus is given by

$$
\begin{aligned}
W^t &= R(s + \bar{x}_t) + R(1 - s - \bar{x}_t) + \left(1 - t_S^t\right)(s + \bar{x}_t) + t_S^t(s + \bar{x}_t) \\
&\quad + \left(1 - t_L^t\right)(1 - s - \bar{x}_t) + t_L^t(1 - s - \bar{x}_t) - \frac{1}{2}\tau \bar{x}_t^2 \\
&= R + 1 - \frac{1}{2}\tau \bar{x}_t^2
\end{aligned}
$$

where the tax rates, t_S^t and t_L^t, and the marginal investor, $\bar{x}_t$, are given by (8)-(9) and (10), respectively.

When there is infrastructure-then-tax competition, the world surplus becomes

$$
W = R + 1 - \frac{1}{2}\tau \bar{x}^2 + m_S(s + \bar{x}) + m_L(1 - s - \bar{x}) - m_S^2 - \alpha m_L^2
$$

where m_S and m_L are given by (11) and the marginal investor $\bar{x}$ by (13).

The difference between the welfare levels reached under these two policies is such that

$$
W - W^t = \left(\underbrace{m_S(s + \overline{x}) + m_L(1 - s - \overline{x})}_{\text{institutional quality gain}} \right)
$$
$$
- \underbrace{\left(m_S^2 + \alpha m_L^2\right)}_{\text{global institutional investment cost}} + \underbrace{\frac{1}{2}\tau\left(\bar{x}_t^2 - \bar{x}^2\right)}_{\text{global mobility cost}}. \tag{18}
$$

Substituting (11) and (13), it can be shown that the sum of the first two terms is positive. The sign of the third term is determined by

$$
\bar{x}_t - \bar{x} = \frac{\tau(s + 1) - \phi}{3\tau(9\alpha\tau - (1 + \alpha))}(\bar{\alpha} - \alpha)
$$

which is positive if and only if $\alpha < \bar{\alpha}$. Hence, when $\alpha < \bar{\alpha}$ the global surplus under infrastructure-then-tax competition always exceeds the global surplus under pure tax competition.

Because $\bar{x}_t^2 - \bar{x}^2 = 0$ at $\bar{\alpha}$, by continuity (18) remains positive when α exceeds $\bar{\alpha}$ but is not too large.[9] As a consequence, *infrastructure-then-tax competition yields a higher global surplus*

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[9] The proof is tedious and is available upon request from the authors.

than tax competition when the smaller country's comparative advantage is not too large. The intuition goes as follows. First, when α is very large, investing in institutional infrastructures is very costly for the larger country. Furthermore, there are more foreign investors in country S under infrastructure-then-tax competition than under tax competition. This results in higher total mobility costs. When α is very large, these two forces become strong enough to make infrastructure-then-tax competition welfare-detrimental at the global level.

A natural question that arises at this point is whether the increase in global welfare implies that the onshore country also experiences an increase in its own welfare under infrastructure-then-tax competition. To answer this question, we have to compare W_L and W_L^t. The inequality $W_L > W_L^t$ is equivalent to

$$m_L \left(1 - s - \bar{x} - m_L \alpha\right) + R(\bar{x}_t - \bar{x}) > \frac{1}{2} \left(\bar{x} - \bar{x}_t\right) \left(\tau \left(\bar{x} + \bar{x}_t\right) + 2\right)$$

where the right-hand side is negative when $\alpha < \bar{\alpha}$. From (14), it follows that the left-hand side is positive. As a consequence, we obtain the desired result for $\alpha < \bar{\alpha}$.

To sum up, we have:

Proposition 3 *Assume bank secrecy. If the smaller country is a tax haven ($\alpha < \bar{\alpha}$), infrastructure-then-tax competition yields a higher global surplus and a higher surplus in the larger country than tax competition.*

Hence, when the comparative advantage of the smaller country is not too large ($\alpha < \bar{\alpha}$), competition in infrastructure is welfare-improving compared to the standard tax competition case. This improvement is global and may be driven by the increase of welfare in the larger country. By continuity, the same holds when $\alpha > \bar{\alpha}$ but is not too large. However, when α is very large, both the world and the larger country surpluses may be dampen by an over-provision of institutional protection and very high mobility costs.

3.0.2 Benevolent governments

The national income functions (2) can be rewritten in a more compact way as follows:

$$Y_S = R(s + \bar{x}) + s + t_S \bar{x} - m_S^2 \tag{19}$$

$$Y_L = (R+1)\left(1 - s - \bar{x}\right) + \left(1 - t_S\right)\bar{x} - \alpha m_L^2. \tag{20}$$

Substituting (1) in (19) and (20), we readily verify that $Y_S(t_S, t_L)$ is strictly concave in t_S. Applying the first-order condition yields the best reply

$$t_S(t_L) = \frac{m_S - (m_L - t_L) - \phi - R}{2}.$$

By contrast, $Y_L(t_S, t_L)$ is linear in t_L. Since $\partial Y_L / \partial t_L = -(R + t_S)/\tau$ is always negative, the larger country sets a zero capital tax: $t_L^* = 0$. Therefore, the equilibrium of the tax competition subgame is given by

$$t_S^* = \max\left\{\frac{m_S - \phi - m_L - R}{2}, 0\right\} \qquad t_L^* = 0. \tag{21}$$

This means that benevolent governments get trapped into a race to the bottom: the larger country never taxes 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 too.

By implication, when benevolent governments engage only in tax competition ($m_i = 0$), the unique equilibrium outcome is given by $t_S^* = t_F^* = 0$, which is reminiscent of Bertrand price competition. Since there are no differences between the two banking centers, there are no cross-border deposits ($x^* = 0$). This underscores once more the implicit assumption made in the classical tax competition literature that does not recognize the role of institutional quality in investors decisions.

Furthermore, it follows from (21) that m_S^* must exceed m_L^* for the smaller country to be an OFC.[10] Indeed, if $t_S^* = 0$, the only way to attract foreign investors into the smaller country is to offer them a better institutional infrastructure than that of the larger country. This is a fortiori true when $t_S^* > 0$. Hence, unlike what we observe with Leviathan governments, *the smaller country is never a pure tax haven.* But then, how do governments finance their institutional infrastructure? Since governments are benevolent, institutional infrastructure can be funded through a tax on banks' profits. Clearly, banks' profits will always exceed the cost of building the institutional infrastructures provided that their markup R is sufficiently high. In other words, *benevolent governments tax banks instead of investors to build better institutions.*

Summarizing the above discussion, we have:

Proposition 4 *Assume bank secrecy and benevolent governments. Then, the larger country*

---

[10]Under (14), the payoffs of the first-stage game are concave.

never sets a tax rate exceeding that of the smaller country. Furthermore, the provision of institutional infrastructures may require the taxation of banks' profits.

As in subsection 3.1.3, we compare the welfare effects of infrastructure-then-tax and tax competition in the relevant case where $t_S^* = t_L^* = 0$. In this event, we obtain

$$0 < m_L^* = \frac{1}{2}\frac{R}{\alpha\tau} < m_S^* = \frac{1}{2}\frac{R}{\tau} \tag{22}$$

while the viability condition of the OFC is given by

$$\bar{x}^* = \frac{(\alpha - 1)R - 2\alpha\tau\phi}{2\alpha\tau^2} > 0. \tag{23}$$

Since the utility difference is now given by

$$W - W^t = sm_S + (1 - s)m_L - \alpha m_L^2 - m_S^2 - \frac{1}{2}\tau\bar{x}^2$$

substituting (22) and (23) into this expression shows that $W - W^t$ as a function of α is described by a concave parabola. As a consequence, for relatively low levels of α, *infrastructure-then-tax competition between benevolent governments is welfare-enhancing.* In addition, as in subsection 3.1.3, even the larger country's residents are better-off. However, when the comparative advantage of the smaller country becomes sufficiently high, infrastructure-then-tax competition is detrimental to both countries due to the high mobility costs borne by the investors and the high investments costs made by the larger country.

4   Removing bank secrecy

Assume that bank secrecy is removed, which means that automatic information exchange for tax purposes is implemented. Owing to the application of the residence principle of capital return taxation, tax competition is ruled out. Indeed, if the tax rate on capital income is lower in the OFC, the onshore depositors will have to pay in their home country the tax difference between the small and the large countries. There is no reason anymore to transfer savings offshore for tax purposes. Furthermore, the OFC now returns the tax receipt gained from the cross-border investments to the large country. In this scenario, OFCs can be attractive only if they provide institutional advantages.

The outflow of capital towards the OFC is now given by

$$\bar{x} = \frac{m_S - m_L}{\tau}.$$

We will check that $\bar{x} > 0$ at the equilibrium (m_S^*, m_L^*).

4.1 Leviathan governments

In absence of tax competition, we may treat t_S and t_L as exogenous. Since Leviathan governments maximize their respective net budgets given by

$$
\begin{aligned}
B_S &= st_S - m_S^2 \\
B_L &= (1-s)\,t_L - \alpha m_L^2
\end{aligned}
$$

it is easy to check that

$$
m_S^* = m_L^* = 0.
$$

Hence, we have:

Proposition 5 *Assume Leviathan governments. If bank secrecy is removed, then governments do not invest in institutional infrastructure.*

It immediately follows that there are no flows of cross-border investments. As a matter of fact, if governments are Leviathan in both countries and bank secrecy is removed, there is no reason left to deposit money in the OFC since governments do not provide institutional infrastructure. By contrast, when bank secrecy prevails, the proceeds of tax competition are partially used by the two governments to provide institutional infrastructures, which in turn allow them to increase their budgets.

Since there are no cross-border deposits, the world surplus boils down to $R+1$. Comparing this to the surplus obtained under bank secrecy shows that the former exceeds the latter when the comparative advantage of the OFC is large enough. In this case, governments overspend on infrastructure, which induces high mobility costs. Conversely, when α is not too large, removing bank secrecy is globally harmful because Leviathan governments have no incentive to invest in institutional infrastructure.

4.2 Benevolent governments

When governments are benevolent, they maximize their respective national income given by

$$
\begin{aligned}
Y_S &= R(s+\bar{x}) + (1-t_S)s + t_S s - m_S^2 \\
Y_L &= R(1-s-\bar{x}) + [(1-s-\bar{x})(1-t_L) + \bar{x}(1-t_S) - \bar{x}(t_L - t_S)] \\
&\quad + (1-s-\bar{x})t_L + \bar{x}(t_L - t_S) + \bar{x}t_S - \alpha m_L^2.
\end{aligned}
$$

National income in each country is composed of: (i) the banks' profit $R(s + \bar{x})$ in S and $(1 - s - \bar{x})$ in L; (ii) the net capital return earned by the depositors, namely $(1 - t_s)s$ in country S and $(1 - s - \bar{x})(1 - t_L) + \bar{x}(1 - t_S) - \bar{x}(t_L - t_S)$ in country L. (Note that the mass $\bar{x}$ of the larger country's investors who offshore their money have to pay the tax differential $\bar{x}(t_L - t_S)$ to their home country); (iii) the tax revenue collected by each country, which are equal to st_S in country S and to

$$(1 - s - \bar{x})t_L + \bar{x}(1 - t_S) + \bar{x}(t_L - t_S) + \bar{x}t_S$$

in country L. The large country collects $(1 - s - \bar{x})t_L$ on the capital that is not offshored and $\bar{x}(t_L - t_S)$ on the offshored capital. In addition, the amount $\bar{x}t_S$ is transferred from country S to country L. After simplifications, we obtain:

$$
\begin{aligned}
Y_S &= R(s + \bar{x}) + s - m_S^2 \\
Y_L &= R(1 - s - \bar{x}) + (1 - s) - \alpha m_L^2.
\end{aligned}
$$

Then, the equilibrium level of institutional infrastructure provided by the competing jurisdictions is given as follow:

$$m_S^o = \frac{1}{2}\frac{R}{\tau} \qquad m_L^o = \frac{1}{2}\frac{R}{\alpha\tau}$$

Using (22), we get the following :

Proposition 6 *Assume benevolent governments. If bank secrecy is removed, then the equilibrium provision of institutional infrastructure is the same as in the bank secrecy case.*

This shows that, when governments are benevolent, the removal of bank secrecy does not affect the provision of institutional infrastructure, while the tax receipts are positive in both countries. However, countries are left with more possibilities to finance infrastructure expenditures than in the bank secrecy case where both countries have to tax banks' profits to be able to finance their institutional infrastructure. In the absence of bank secrecy, the large and the small countries tax capital returns to fund infrastructure expenditures without inducing capital movements.

Welfare implications. At equilibrium, the marginal depositor is located at

$$\bar{x}^o = \frac{R(\alpha - 1)}{2\alpha\tau^2}.$$

Observe that $\bar{x}^o - \bar{x}^* = \phi/\tau > 0$. In other words, when governments are benevolent and the OFC removes bank secrecy, *the flow of offshore deposits increases.* As shown by (1), although there is no tax differential, foreign investors no longer face the prospect of being caught for fiscal evasion.

Turning our attention to welfare considerations, we calculate the level of national income in absence of bank secrecy, for the small and the large country:

$$
\begin{aligned}
Y_S^o &= R(s + \bar{x}^o) + s - (m_S^o)^2 \\
Y_L^o &= R(1 - s - \bar{x}^o) + 1 - s - \alpha (m_L^o)^2 .
\end{aligned}
$$

It is readily verified that $Y_S^o - Y_S^* = \phi R/\tau$ and $Y_L^o - Y_L^* = -\phi R/\tau$ because $m_i^o = m_i^*, (i = S, L)$. In other words, following the removal of bank secrecy, the national income rises in the smaller country whereas it falls in the larger country. This is because more foreign investors are willing to benefit from the better infrastructure supplied in the smaller country without facing the prospect of having to pay a fine for fiscal evasion.

5   Conclusion

Our main purpose was to pin down the reasons explaining why and how a small country can be viable as an OFC in the presence or absence of bank secrecy. To address this question, we have developed a model where heterogeneous 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 acknowledge that countries use at least two instruments to attract investors, i.e. tax rate and institutional infrastructure. As discussed in the introduction, the empirical evidence supports our idea that tax competition is too restrictive an approach.

In presence of bank secrecy, we show that whether the smaller 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 initiate an OFC through the provision of better institutional infrastructure. Furthermore, in presence of bank secrecy, infrastructure-then-tax competition dominates tax competition in terms of welfare, both in the large and the small countries when infrastructure expenditures and mobility costs are not too high.

When bank secrecy is removed, *the presence of the OFC elicits beneficial competition in institutional infrastructure when governments are benevolent.* Interestingly, this positive effect does not depend on the presence or absence of bank secrecy. As a matter of fact, removing bank secrecy leaves invariant the choice of institutional infrastructure. However, the results are very different under Leviathan governments as the removal of bank secrecy eliminates investment in institutional infrastructure.

Admittedly, the foregoing results must be considered with care. The first caveat concerns the assumption that the removal of bank secrecy affects only tax evasion. Bank secrecy is also used for other illegal activities, which are not taken into account in our analysis. Our model also uses specific functional forms, so that more work is called for to check the robustness of our conclusions. Nevertheless, we view our paper as one the first that provides a rigorous appraisal of the often passionate debate about the pros and cons of OFCs.

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