International Tax Competition: There Is No Need For Cooperation In Information Sharing

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Abstract

We investigate a model where small open economies choose the degree of information exchange among tax authorities and an unrestricted set of capital income taxes. We show that cooperation in information sharing does not matter in equilibrium outcomes. This comes in striking contrast to existing results and the common belief among policy practitioners. The reason for this result is that if the set of distortionary taxes is unrestricted then, depending on the characteristics of the economy, either information sharing becomes redundant or the non-cooperative equilibrium is characterised by zero information exchange and overprovision of information.

Keywords: Tax Competition, Information Sharing

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1 Introduction

In a world with highly integrated capital markets, small open countries may try to affect the net of domestic taxes rates of return of the various assets in order to affect the movement of various tax bases for ‘nationalistic’ efficiency concerns. This kind of non-cooperative behaviour raises a number of interesting issues that point to the observation that there may be scope for tax cooperation. Given this observation and the fact that tax authorities generally face difficulties in monitoring investment abroad by their residents, a common conjecture is that another way that small open economies might engage in competition for tax bases is by having their governments to provide no information for domestically generated income to other tax authorities.

In fact, given that tax evasion is so widespread, the ability governments have of not exchanging information has led policy makers to advocate the need for cooperation in information sharing. For instance, as Bacchetta and Espinosa (1995) (BE hereafter) report, the first bilateral treaty of information sharing among governments had taken place in 1843 between France and Belgium. Other examples of coordinated efforts for increasing information exchange are reflected in OECD (1977), Article 26, and the Council of European Communities (1977) Directive on Mutual Assistance. Behind all these efforts, lies, among others, a common belief among policy practitioners that non-cooperative behaviour on the part of tax authorities with respect to information transmission results in underprovision of information and thus that there is a need for increased information sharing.

\[1\] Giovannini (1990), Keen (1993) and Wilson (2000) are some excellent surveys of the literature on international capital (income) taxation. For an investigation of similar issues in a federal system where all levels of government can tax capital see Keen and Kotsogiannis (2001).

\[2\] For a description of domestic prudential regulations and international tax avoidance strategies, one can consult OECD (1987) and Giovannini (1989).

\[3\] See International Fiscal Association (1990) and Bacchetta and Espinosa (1995) for the degree of information sharing in practice. Giovannini (1989) is as well a very good source for a brief description of laws in Europe that protect the privacy of investors, such as secrecy and blocking laws, and additional references.

\[4\] The ability governments have of not sharing information raises as well the issue of the feasibility.
This belief is, in particular, shared by the majority, if not all, of the European partners, and is strikingly reflected in the most recent debate within the European Union around the European Union plans for a minimum withholding tax on non-resident savings. For instance, in the European Union summit in Helsinki in December 1999 ‘London was given the option of providing limited information about ... investors to their own tax authorities’ as a compromise offer to Britain’s continuing opposition to the withholding tax.\(^5\) Another example of this belief is that, in an effort to break the deadlock over European Union tax policies, the UK Treasury has proposed cooperation in information sharing, instead of a minimum withholding taxes, and has argued that ‘information exchange is superior to previous EU plans’.\(^6\)

The conjecture that there is scope for cooperation in information exchange has recently been confirmed by the work of BE, in which the degree of information exchange among tax authorities is treated as a variable, chosen alongside taxes by governments. However, the results in BE rely on a rather heroic assumption: the institutional features of the tax system are given from the outset to tax authorities. In particular, BE assume that the tax rates imposed on residents’ monitored incomes from investing domestically and abroad are equal, and that the tax rate imposed on non-residents’ income from investing domestically is either exogenously fixed or equal to the tax rate imposed on residents’ monitored savings. This assumption seems highly unrealistic to us, since in principle institutional characteristics of the tax system are chosen by - and not imposed ex ante upon - sovereign governments.

In this paper, instead, governments face an unrestricted set of distortionary capital income taxes. In particular, we analyse the case in which all distortionary tax rates can be different and endogenously determined. That is, institutional features of the tax system are chosen by tax authorities themselves. This simple extension to the BE model has profound of implementing the residence principle of capital income taxation - see, for instance, Razin and Sadka (1991a) and the case for withholding taxes within the European Union - as this has been proposed by researchers and policy makers - see, among others, Giovannini (1989) and Razin and Sadka (1991), and OECD (1977) - as a second-best means to tax cooperation. In fact, given that tax evasion is so widespread, full information sharing among governments seems to be one of the ways for the residence principle of capital income taxation to be implemented. However, as BE show, if this principle of taxation is imposed upon tax authorities, then the non-cooperative level of information is indeterminate and thus the above problem does not seem important.

\(^5\) ‘Portugal pledges to resolve tax deadlock’ by Peter Norman, The Financial Times, 7 January 2000.

implications for whether there is a need for cooperation in information sharing. In fact, it turns out that cooperation in information exchange does not matter in equilibrium outcomes.

In more detail, in this paper we show the non-cooperative tax setting for any given level of information transmission implies, depending on the characteristics of the economy, either of the following two cases:

- Taxes can be used by tax authorities to render equilibrium allocations and thereby welfare independent of information exchange. In this case, information sharing becomes redundant and equilibrium outcomes are dominated by tax instruments.

- Information exchange does affect equilibrium allocations, and the non-cooperative equilibrium is characterised by zero information transmission. However, and perhaps more surprisingly, this equilibrium is also characterised by overprovision of information: a reduction in information transmission can increase global welfare. Notwithstanding, the degree of information transmission cannot be, by definition, strictly negative. Thus a coordinated decrease in the degree of information exchange is non-feasible and hence cooperation in information yields once more the same outcome with non-cooperation.

Clearly, these results run in striking contrast to common intuition.

Our result, that non-cooperative and cooperative information sharing equilibria coincide, has an important policy implication that runs in contrast to common belief. Namely, as we have also seen above, there is a long lasting concern regarding whether countries should exchange more information or not. Increased information exchange would include, among other things, full information sharing and a review of bank secrecy laws. Nevertheless, our finding implies that such a coordinated increase in the information sharing not only will make no difference - and thus countries should not be involved in time and resource consuming negotiations for such coordinated reforms - but in the case where information exchange matters in equilibrium outcomes it will even leave countries worse off?7

Before leaving this section, it is of interest to draw an analogy between our and BE’s work and that of Bond and Samuelson (1989) and Janeba (1995). In these papers a somewhat related issue has been investigated. Specifically, a capital-exporting and a capital-importing

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7This may even justify why offshore centres and countries that have laws protecting the privacy of investors refuse to comply with directives of international bodies for increased information exchange.
country set non-cooperatively their corporate taxes to maximise national income treating as given a rule that specifies the double taxation treatment scheme. The double taxation rule is treated as given when tax rates are set because the decision about the double taxation treatment rule seems to be of a longer run character than tax rate decisions. Note that this is also the case in our and BE’s model regarding the decisions about the tax rates and the degree of information sharing. In Bond and Samuelson (1989), countries can discriminate between domestically located and foreign located capital or between domestically owned and foreign owned capital when they set their taxes. On the contrary, in Janeba (1995) it is assumed that the capital exporting country cannot discriminate against foreign direct investment by setting different tax rates. In fact, this is the only differentiating element of these two papers. Note that the degree of discrimination in the tax setting is also what distinguishes our model from that of BE. It turns out, then, that in the model of Bond and Samuelson (1989) both countries are better off by adopting the tax deductions scheme, whilst in the model of Janeba (1995) governments are indifferent as to which double taxation rule to choose. That is, in the case of double taxation treaties and corporate taxation, it is when governments face constraints in the set of available taxes that long run policies like double taxation rules can be dominated by tax instruments in the determination of allocations. However, after comparing our results with those in BE, we can see that it is when governments do not face constraints in the set of available capital income taxes that long run policies like information sharing can be dominated by tax policies in the determination of allocations.

The organisation of this paper is as follows. In Section 2 we set up the model, while in Section 3 the non-cooperative equilibrium is characterised. In Section 4 we solve for cooperative equilibria. Finally, in Section 5, we summarise our findings and point out some possible areas of further research.
2 The Model

The basic framework is familiar from BE, so its description will be brief.\(^8\) There are two countries, home and foreign (the latter denoted by an asterisk). In each country, there is a representative household and a benevolent government. Countries may differ in tastes, but face the same endowments. Countries produce a single traded good by using the same linear technology with the common and exogenously given rate of return denoted by \(r\). In each country, there is a market for capital which non-residents have access to. There is no uncertainty and the state of the economy is captured by \(r\) and the endowments.

The typical home household possesses an initial endowment of one unit of the single traded good. This endowment is allocated to home, \(D\), and foreign, \(F\), capital. There is a net cost from investing abroad which is represented by a strictly convex function \(\eta(F)\), with \(\eta(0) = 0\), and is the same for both home and foreign households. Finally, the household consumes its net of tax and cost returns from investment, \(C\).

Since it is our intention to compare our results directly with those in BE, we follow BE in allowing for the possibility that the net cost of investing abroad is negative for an initial range of foreign investment. Allowing for such a cost function is an attempt to capture in a simple way an environment where (a) foreign investment, apart from bearing a mobility cost, provides gains in addition to the rate of return, and (b) such gains dominate the mobility costs only for low levels of foreign investment. Increasing gains from foreign investment, for at least low levels of exported capital, can be justified by noting that multinationals often set up foreign subsidiaries for reasons that are independent of the rate of return on capital abroad. To capture such a possibility in a simple manner we assume that \(\eta'(0) \leq 0\). Given\(^9\) the convexity of \(\eta(F)\), it follows directly that if \(\eta'(0) < 0\) then there are increasing gains from foreign investment as

\(^8\)An often heard criticism of the paper by Bacchetta and Espinosa (1995) is that their modelling of information exchange is rather unusual, and that a more persuasive formulation might be a setting with uncertainty. However, we believe that the framework used by Bacchetta and Espinosa (1995) captures the basic elements of the issues involved. For this reason, and also in order to be able to compare directly the implications of governments having an unrestricted access to distortionary taxation, we choose to work within the boundaries of that model. An extension of the model in Bacchetta and Espinosa (1995) to incorporate uncertainty is desirable but out of the scope of the present work.

\(^9\)Another justification could be that this model is the certainty equivalent version of a model with uncertainty and \(\eta'(0) < 0\) captures possible benefits from diversification on the part of investors. See also BE.
long as $F \leq \bar{F}$ where $\bar{F} > 0$ is defined by $\eta'(\bar{F}) = 0$. If on the other hand\textsuperscript{10} $\eta'(0) = 0$ foreign investment bears only an increasing mobility cost for any $F \geq 0$.

Governments are assumed to possess commitment technologies that enable them to abide by their policy announcements. The home government chooses government spending, $G$, and taxes. The government can employ only distortionary taxes on monitored returns from investment to finance public expenditures. Governments, though are assumed to have perfect information about domestically generated income, cannot prove in a court the level of their residents’ foreign investment. Accordingly, governments cannot tax capital income generated abroad, unless they receive some further hard information on it by the foreign tax authorities.

We denote by $\lambda \in [0, 1]$ the proportion of foreign investment in home country capital on which the home tax authorities give hard information to the foreign government.\textsuperscript{11} We assume that this proportion is a choice variable for the government. Moreover, it is assumed that this proportion is known to households and that there is no cost to tax authorities in exchanging information. Given this proportion, the foreign household has to pay foreign taxes on the return to the level $\lambda F^*$ of its foreign investment only.

The taxes available to the home tax authorities are the following. There is a tax on the return of investment in home capital by residents, $t_{RD}$, a tax on the return of monitored investment in foreign capital by residents, $t_{RA}$, and a tax imposed on the return of investment in home capital by non-residents, $t_{NR}$. Our model differs from that in BE only with respect to the set of the available distortionary taxes. Note that in BE the government faces a restricted set of available distortionary taxes, since, in that paper, it is assumed that $t_{RD} = \tau_{RA} \equiv t$ and that $t_{NR}$ is either exogenously fixed or $t_{NR} = t$. As it will be seen, this sole difference has a major impact on the results.

Following BE, we define $T \equiv t^*_NR(1 - a) + t_{RA}$ as the effective tax on monitored capital income of home residents from investing abroad, where $a \in [0, 1]$ reflects the double taxation treatment scheme. That is, $a$ is the proportion of the foreign withholding tax which the home government provides tax credit on. We assume that $a$ is known to households. Notice that the double taxation treatment scheme, $a$, will be treated as exogenously given throughout the paper. This is also the case in BE. However, our result do not change if $a$ is as well a choice

\textsuperscript{10}It is assumed, for simplicity, that these possible extra benefits from investing abroad cannot be taxed.

\textsuperscript{11}For more on this assumption and alternative interpretations of $\lambda$, see BE.
variable on the part of the government.

The home household has the following utility function\textsuperscript{12}:

\begin{equation}
U(C) + V(G),
\end{equation}

with $U(\cdot)$, $V(\cdot)$ non-negative real valued strictly increasing and concave functions. The home household’s budget constraint is:

\begin{equation}
C = 1 + (1 - t_{RD})r(1 - F) + (1 - T)r\lambda^*F + (1 - t^*_{NR})r(1 - \lambda^*)F - \eta(F).
\end{equation}

The home representative household’s problem is to choose $F$ to maximise (1) subject to (2), taking as given prices and policies. We have the following first order condition (FOC hereafter):

\begin{equation}
r[t_{RD} - \lambda^*t_{RA} - t^*_{NR}(1 - a\lambda^*)] = \eta'(F).
\end{equation}

Equation (3) is an arbitrage condition stating that the net of tax and transaction cost rates of return on the various assets are equal. This condition defines implicitly the home household’s foreign investment as a function of the various policies $F = F(\lambda^*, a, t_{RD}, t_{RA}, t^*_{NR})$.\textsuperscript{13}

Now, the home government’s budget constraint is

\begin{equation}
G = t_{RD}r(1 - F) + (t_{RA} - at^*_{NR})r\lambda^*F + t_{NR}rF^*.
\end{equation}

Combining the individual budget constraint, (2), and the government’s budget constraint we get the resource constraint of the whole economy

\begin{equation}
C + G = 1 + r - t^*_{NR}rF + t_{NR}rF^* - \eta(F).
\end{equation}

This states, in terms of second period units, that the endowment and the net income flows from trade in capital equal total, private and public, consumption plus costs from investment abroad. Finally, we define as the home national income, $NI$, the right hand side (RHS) of equation (5).

At this point it will prove useful for developing our intuition for the forthcoming results to note the following. If the foreign withholding tax is strictly positive, domestic national income

\textsuperscript{12}The use of an additive separable utility function does not affect our results.

\textsuperscript{13}We hereafter suppress the dependence of all variables in question on the fixed $r$. 
is decreasing with capital exports if there are no gains from foreign investment in addition to
the rate of return, i.e. if $\eta'(0) = 0$. Accordingly, in this case, restricting capital outflows is
welfare enhancing for the domestic government. If on the other hand $t^*_{NR} > 0$ and investing
abroad entails extra benefits that are independent of the rate of return on capital, i.e. $\eta'(0) < 0$,
then domestic national income is increasing with capital exports if and only if $F < F'$ where
$F'$ is defined by $\eta'(F') = -rt^*_{NR} < 0$. Note that $F' < \bar{F}$. Therefore, in this case, it is welfare
improving for the domestic country to encourage foreign investment, but only up to the level
$F'$ which depends on the foreign withholding tax rate.

Governments make decisions independently and simultaneously in two stages to maximise
the welfare of their representative household. Governments, in doing so, are constrained by
their budget constraint and by the private sectors’ reaction functions. Following BE, we set the
government’s problem as a two-stage one because the decision about the degree of information
exchange seems to be of a longer run character than tax decisions.\footnote{See BE for more on this assumption.} Governments first decide
the information to be transmitted to the other government. At the second stage, tax authorities
choose their taxes and public expenditures. In the remainder of the paper we solve for the non-
cooperative and cooperative equilibria (the latter to be defined later on) by means of backwards
induction.

3 The Non-Cooperative Equilibrium

3.1 The Government’s Second Stage Problem

The home private competitive equilibrium is characterised by (2) and (3). These equations can
be solved for: $C(\lambda^*, a, t_{RD}, t_{RA}, t^*_{NR})$ and $F(\lambda^*, a, t_{RD}, t_{RA}, t^*_{NR})$. These functions give home
private decisions as functions of policies. We call them home private reaction functions. Given
the private reaction functions, each government, at the second stage, maximises its resident’s
welfare with respect to its tax instruments and the level of public expenditures subject to its
resource constraint, (5). In doing so, each government takes as given the foreign taxes and
level of public good and the degree of information exchange among tax authorities.

The above problem can be simplified by introducing the following reparametrisation:
notice that for any given $\lambda, \lambda^*, t^*_{RD}, t^*_{RA}$ and $t^*_{NR}$ we have from (3) that the home household’s
foreign investment depends only on $s \equiv t_{RD} - \lambda^* t_{RA}$. It then follows that the home private consumption depends only on $t_{RD}$ and $s$. Finally, from the foreign counterpart of (3), $F^*$ depends only on $t_{NR}$. To summarise, we have that $F = F(s, .)$, $F^* = F^*(t_{NR}, .)$ and $C = C(t_{RD}, s, .)$. Accordingly, the home government’s choice variables at the second stage are, effectively, $s$, $t_{RD}$ and $t_{NR}$. Hence, the home government’s problem at the second stage, effectively, is:

$$\max \{ t_{RD}, s, t_{NR} \} \quad U(C(t_{RD}, s, .) + V(1 + r - t_{NR}^* r F(s, .) + t_{NR} r F^*(t_{NR}, .) - \eta(F(s, .)) - C(t_{RD}, s, .)).$$

After some straightforward manipulations, the FOCs, after assuming an interior solution, with respect to $t_{RD}$, $s$ and $t_{NR}$ are:

$$U'(C) = V'(G), \quad t_{NR}^* = -\frac{\eta'(F)}{r} \quad \text{(6)}$$

and

$$F^* = \frac{r t_{NR}(1 - a^* \lambda)}{\eta''(F^*)} \quad \text{(7)}$$

respectively. These conditions tell us that in a non-cooperative tax setting the home government provides, for any given $\lambda, \lambda^*, a$ and $a^*$, the public good according to the Samuelson rule (condition (6)). Moreover, the home government maximises its national income with respect to its tax instruments $s$ and $t_{NR}$.

Accordingly, the government has the appropriate number of tax instruments to maximise its national income in a non-cooperative way and then allocate it in a lump-sum way between home private and public consumption.

Building on our previous discussion of the effects of investing abroad on domestic national income, note that if $t_{NR}^* > 0$ then maximisation of national income with respect to $s$ is consistent with encouraging foreign investment up to a level $F^*$. In other words, non-cooperative

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15 This reparameterisation is actually a shortcut. Strictly speaking the above discussion is valid if and only if $\lambda^* \neq 0$. Notwithstanding, as it is shown in the appendix, even if $\lambda^* = 0$, conditions (6)-(10) still give a solution to the government’s problem. Moreover, it should be emphasised that the above reparameterisation is without loss of generality and is deployed purely for expositional clarity. I am grateful to Michael Keen for suggesting to me this reparameterisation.

16 Again, we analyse only interior solutions in order to be able to compare our results directly with those in Bacchetta and Espinosa (1995).

17 To see the latter note that maximisation of home national income with respect to $s$ and $t_{NR}$ implies (7) and (8) respectively.
setting of \(s\) by the home government is inducing a level of foreign investment that strikes a balance between the implied mobility costs, possible extra benefits that are independent of the rate of return on capital and foregone national income due to the foreign withholding tax. At the same time, the foreign government sets its withholding tax in order to maximise the positive effect of capital imports on its national income (see the foreign counterparts of (5) and (8)). Accordingly, the non-cooperative equilibrium level of domestic capital exports \(F\) is determined by the interaction of the above incentives on the part of the competing governments. This level is found by combining (7) and the foreign counterpart of (8):

\[
F = -\left(1 - \lambda^*a\right)\frac{\eta'(F)}{\eta''(F)}.
\]

The analogous argument vis-a-vis \(F^*\) leads to:

\[
F^* = -\left(1 - \lambda^*a^*\right)\frac{\eta'(F^*)}{\eta''(F^*)}.
\]

At this point we can already derive our first results. Consider, firstly, the case where \(a = a^* = 0\), i.e. the case of no double taxation relief. Conditions (7) and (9) and their foreign counterparts imply that both home and foreign withholding taxes and levels of investment abroad are independent of the degree of information exchange, irrespective of the form of the net cost function \(\eta(\ )\). That is, non-cooperative maximisation of national incomes by tax authorities implies that in equilibrium \(t_{NR}, t'^*_{NR}, F\) and \(F^*\) are independent of \(\lambda\) and \(\lambda^*\). Consequently, the equilibrium home national income and thereby welfare will be independent of information transmission, if \(a = a^* = 0\), regardless of whether foreign investment entails extra benefits in addition to the rate of return on capital. Symmetrically, this holds for the foreign country.

To understand the intuition behind this result note firstly that the credit rates, \(a\) and \(a^*\), and the degree of information exchange, \(\lambda\) and \(\lambda^*\), do not affect national incomes directly; they affect national incomes solely through their effects on foreign investment. Secondly, note that due to information transmission the credit rate home (resp. foreign) households face is effectively equal to \(a\lambda^*\) (resp. \(a^*\lambda\)). Thus, if there is no double taxation relief the ‘effective credit rates’ \(a\lambda^*\) and \(a^*\lambda\) are equal to zero. If this is the case, it then follows directly from the home household FOC, (3), and its foreign counterpart that \(F\) and \(F^*\) depend solely on \(t^*_{NR}\) and \(t_{NR}\), and the ‘tax parameters’ \(s\) and \(s^*\), respectively. Therefore, the maximum level
of home national income, which is attained through the appropriate non-cooperative choice of the policy instruments $t_{NR}$ and $s$, is independent of the degree of information transmission, and thereby information exchange is redundant in determining equilibrium allocations. This is true whether $\eta'(0) = 0$ or $\eta'(0) < 0$.

Consider, now, the case where $\eta'(0) = 0$. In this case, and for any form of double taxation relief, it can be very easily shown by means of contradiction that (9) and (10) imply that the non-cooperative equilibrium will then be characterised by zero trade in capital. That is, non-cooperative maximisation of national incomes by tax authorities implies that in equilibrium $F = F^* = 0$, for any given information sharing policies. This in turn implies that the equilibrium home national income and hence welfare will be independent of $\lambda$ and $\lambda^*$, if $\eta'(0) = 0$. Similarly, for the foreign country.

To understand the intuition behind this result note that, if withholding taxes are strictly positive, foreign investment entails a cost in terms of foregone national income. In addition, if $\eta'(0) = 0$, foreign investment bears a mobility cost and, more importantly, no extra gain on top of the rate of return on capital. This implies, as we have already mentioned that if $\eta'(0) = 0$ then it is welfare improving from a domestic point of view to restrict capital outflows. Given then that the government has an obvious incentive - and the appropriate number of tax instruments - to maximise its national income, it should not be surprising that home (resp. foreign) tax authorities set the tax parameters in such a way that $F = 0$ (resp. $F^* = 0$) for any given policy concerning tax relief and information sharing. Hence, in this case as well, information transmission is redundant in determining equilibrium allocations.\footnote{In this case also, one can show that there are no gains from internationally coordinated efforts to raise taxation. This may come at no surprise given the result in Oates and Schwab (1991) that when there is a first-best provision of public good there is no scope for tax coordination. However, it should also be stressed out that if $\eta'(0) < 0$ then one can show that there is indeed scope for tax coordination, despite the fact that there is a first-best provision of public good under non-cooperation in taxes.}

Accordingly, if $a = a^* = 0$ and/or $\eta'(0) = 0$, then there is no need for cooperation in information sharing, simply because $\lambda$ and $\lambda^*$ do not matter in equilibrium allocations. The reason is that (in some sense) if the set of distortionary taxes is unrestricted, then in the cases considered above information sharing becomes redundant in determining equilibrium allocations. In other words, if the institutional features of the tax system are chosen by governments themselves and not imposed upon them, then in the above cases information exchange is dom-
inated by tax instruments in the determination of allocations.

Given the above results, we confine our attention hereafter to the case where \( a > 0, \ a^* > 0 \) and \( \eta'(0) < 0 \). Finally, in what follows we assume, for the clarity of exposition, and only, that \( \eta''(\ ) \equiv \xi > 0 \), with \( \xi \) being a constant. We now proceed to the government’s first stage problem.

### 3.2 The Government’s First Stage Problem if \( \eta'(0) < 0 \)

For the derivation of the non-cooperative degree of information transmission among tax authorities, we need to find the home and foreign country equilibrium levels of consumption and public expenditures as functions of \( \lambda \) and \( \lambda^* \). In particular, \( C = C(\lambda, \lambda^*) \) and \( G = G(\lambda, \lambda^*) \) are given from the home government’s FOCs (6) and (7), their foreign counterparts, conditions (9) and (10) and the home resource constraint, (5). Analogously for the corresponding foreign variables.

Given these equilibrium functions of \( \lambda \) and \( \lambda^* \) for home private and public consumption, the home tax authorities choose, at the first stage, the value for \( \lambda \) that maximises (1) subject to the inequality constraints \( \lambda \geq 0, \ 1 - \lambda \geq 0 \). In doing so, the home government takes as given \( \lambda^* \). Denoting with \( \mu_1 \) and \( \mu_2 \) the corresponding Kuhn-Tucker multipliers of the above inequality constraints, the FOC, after some straightforward manipulations that involve the use of the envelope theorem, is:

\[
-U'(C) \left[ \frac{\eta'(F^*)a^*}{(2 - \lambda a^*)\xi} \right] \lambda + \mu_1 - \mu_2 = 0. \tag{11}
\]

Moreover, we have that:

\[
\mu_1 \lambda = 0, \quad \mu_2 (1 - \lambda) = 0, \quad \mu_1 \geq 0, \quad \mu_2 \geq 0. \tag{12}
\]

It follows then directly by making use of the properties of the functions \( U(\ ) \) and \( \eta(\ ) \) that countries do not exchange information, i.e. \( \lambda = \lambda^* = 0 \). The intuition behind this result is the following. Due to the non-cooperative tax setting each government, effectively, maximises its national income with respect to the degree of information sharing. Note, however, from (7) and (9) that \( \lambda \) does not affect the foregone national income due to the foreign withholding tax, \( t^*_{NR} F \), and due to the net cost of investing abroad \( \eta(F) \). Yet, the home national income is a strictly increasing function of the imported tax revenues that arise from the use of a withholding tax, \( rt_{NR} F^* \). Thus the non-cooperative setting of \( \lambda \) is driven purely from the
incentive to maximise the imported tax revenues $rt_{NR}F^*$. It turns out, from (10) and the foreign counterpart of (7), that these revenues are a strictly (for $\lambda > 0$) decreasing function of $\lambda$. It follows, then, that the home government has an incentive to drive $\lambda$ to zero to import as much revenues as possible and maximise home resources available for consumption. Therefore, if $\eta'(0) < 0$, under non-cooperation the equilibrium exchange of information is determined by the incentive on the part of the governments to compete over tax revenues, and not, as one might have expected, by the incentive on the part of policy-makers to encourage capital exports due to the presence of increasing, up to the level $\bar{F}$, gains from investing abroad.

Given that countries behave non-cooperatively, there are, as it can be easily shown in the present context, efficiency losses, due to presence of the usual in international settings policy externalities. Hence there are potential gains from policy cooperation. However, in this paper our aim is to investigate the validity of the common belief among policy practitioners and the result in BE that in general there is underprovision of information - and thereby scope for cooperation in information exchange. Consequently, for the rest of the paper, we will restrict our attention to potential gains from cooperation in the setting of the information sharing policies. We turn to this next.

4 The Cooperative Equilibrium if $\eta'(0) < 0$

In this Section we examine the potential gains from cooperation in the setting of $\lambda$ and $\lambda^*$, whilst countries continue to set their tax policy in a non-cooperative way.\(^{19}\) It is assumed that international lump-sum transfers of tax revenues are not available.\(^{20}\)

A cooperative regime between the home and foreign countries is defined as the regime where there is a social planner that maximises, at the first stage, the sum of the ‘union’ members’ welfare functions with respect to $\lambda$ and $\lambda^*$ - hereafter, structural policies. The social planner, in doing so, takes into account the non-cooperative tax setting of both governments and the reaction functions of the private sector.

In such a regime, the private sector’s problem and the public sector’s second stage problem

\(^{19}\)Obviously, this regime bears a strong similarity to the regime which is preferred by the British government to previous EU plans. See our discussion in the Introduction behind footnotes 5 and 6.

\(^{20}\)As it can be shown, in our model once countries start cooperating in their tax setting there are no further gains from cooperation in the degree of information transmission.
are the same as in Sections 2 and 3.1 respectively. Then, we have that the social planner maximises, at the first stage, the sum of home and foreign welfares with respect to \( \lambda \) and \( \lambda^* \) and subject to the inequality constraints \( \lambda \geq 0, 1 - \lambda \geq 0, \lambda^* \geq 0, 1 - \lambda^* \geq 0 \), taking into account the equilibrium functions of structural policies for private and public consumption in both the home and foreign countries.

Let \( \bar{\mu}_1, \bar{\mu}_2 \) denote the corresponding Kuhn-Tucker multipliers of the first two inequality constraints above. The FOC with respect to \( \lambda \) is, after some straightforward manipulations that make use of the envelope theorem:

\[
-\frac{[\eta'(F^*)]^2a^*}{(2 - \lambda a^*)}\xi[U'(C)\lambda a^* + U''(C^*)(1 - \lambda a^*)] + \bar{\mu}_1 - \bar{\mu}_2 = 0. \tag{13}
\]

Moreover, we have that:

\[
\bar{\mu}_1 \lambda = 0, \quad \bar{\mu}_2 (1 - \lambda) = 0, \quad \bar{\mu}_1 \geq 0, \quad \bar{\mu}_2 \geq 0. \tag{14}
\]

Note that the FOC with respect to \( \lambda^* \) is symmetric to the above.

It follows then directly by making use of the properties of the functions \( U(\cdot) \) and \( \eta(\cdot) \) that in the cooperative equilibrium \( \lambda = \lambda^* = 0 \). That is, it is not optimal for the countries to exchange information even if they cooperate in structural policies.

To understand the intuition behind this result, recall that under non-cooperation each government has an incentive not to exchange information in order to expand its imported tax revenues. However, in doing so, it does not take into account the effect of such policy on the national income of the other country. In particular, the, say, home government when decides on \( \lambda \) does not take into account that by inducing a marginal increase in the capital imports, by means of a decrease in \( \lambda \), it affects the foregone foreign national income that arises due to the home withholding tax and the net cost of investing abroad. Notwithstanding, it turns out that due to the non-cooperative behaviour of tax authorities in the second stage the foreign national income is as well a decreasing function of the home structural policy \( \lambda \). Hence, the non-cooperative equilibrium is characterised by overprovision of information, in contrast to common beliefs.\(^{21}\) In other words, the non-cooperative level of \( \lambda \) (and \( \lambda^* \)) is inappropriately high. Therefore, a social planner - who, in principle, internalises policy externalities - has an incentive to set a lower degree of information transmission than the one under non-cooperation.

\(^{21}\)This is reminiscent of the result in Mintz and Tulkens (1996) that tax competition may lead to overtaxation in the presence of international tax credits. I would like to thank an anonymous referee for bringing this into my attention.
An alternative way of explaining the cooperative setting of structural policies is the following. Recall from the previous section that under non-cooperation we have that $\lambda = \lambda^* = 0$. This in turn implies that the non-cooperative equilibrium level of foreign investment is strictly positive and such that the maximum gains from investing abroad, which are present due to $\eta'(0) < 0$, are not exploited (that is $0 < F < \bar{F}$ and $0 < F^* < \bar{F}$).\(^{22}\) That is, non-cooperative policy setting leads to inappropriately low home (and foreign) capital imports $F^*$ (and $F$).\(^{23}\) Therefore, a social planner has an incentive to set a lower degree of information transmission than the one under non-cooperation in order to encourage further trade in capital between countries.

Nevertheless, no matter how one may view the incentives on the part of a social planner, $\lambda$ and $\lambda^*$ are nonnegative, by definition. Accordingly, the best the social planner can do, in the present context, is to set $\lambda = \lambda^* = 0$. It follows then directly that the cooperative equilibrium coincides with the one under full scale non-cooperation. It should be emphasised, however, that the incentives behind the setting of structural policies on the part of a central planner differ from the corresponding incentives on the part of non-cooperating governments. The latter set their policies to maximise imported revenues, whilst the former chooses the degree of information sharing in order to encourage trade in capital and internalise the existent structural policy externalities.

As a recap, if $a = a^* = 0$ and/or $\eta'(0) = 0$, then there is no need for cooperation in information sharing, simply because structural policies do not matter in equilibrium allocations. In some sense if the institutional features of the tax system are chosen by governments themselves, then in the above cases information exchange becomes redundant and equilibrium outcomes are dominated by tax instruments. If $a > 0$, $a^* > 0$ and $\eta'(0) < 0$, then countries are indifferent between setting the structural policy in a non-cooperative or in a cooperative way.

The reason is that in these cases under non-cooperation there is zero information transmission and overprovision of information, a fact that makes a coordinated decrease in the degree of information exchange, which in principle would be welfare increasing, non-feasible. These results are in striking contrast to common belief among policy makers and the result in BE. In fact, in that paper - where the institutional features of the tax system are not chosen by

\(^{22}\)Note that (10) with $\lambda = 0$ is violated if $F^* \leq 0$ or $F^* \geq \bar{F}$. Similarly for (9).

\(^{23}\)As it can be easily shown the first-best level of capital exports is $F = F^* = \bar{F}$. 

governments themselves but are imposed upon them ex ante - we have underprovision of information and the cooperative choice of the degree of information transmission is higher than the non-cooperative one. Hence, summarising our findings we have that there is no scope for cooperation in information sharing policies.

The above result has an obvious important policy implication. In contrast to common intuition and policy practice, countries should not be involved in (time and resource consuming) negotiations for the adoption of information sharing treaties.

5 Conclusions

This paper has taken part in the discussion of some of the issues that arise when policy makers of small open economies use the degree of information transmission and an unrestricted set of distortionary capital income taxes under non-cooperation. The framework used in this paper is more general than that used in BE, since, in that model, governments face restrictions in the set of available distortionary taxes. The results obtained here differ significantly from those reached by BE.

The contribution of this paper is to show that there is no scope for cooperation in information sharing, irrespective of the form of the transactions cost function and of the double taxation treatment schemes. This is in striking contrast to BE: they find that there are welfare gains from cooperation in the degree of information sharing. Moreover, our conclusions run contrary to the common conjecture of policy makers, who persistently urge for increased cooperation in information sharing.

Our assumption that endowments and the transactions cost function are the same across countries is not crucial to the result. In fact, we could derive all of our results as long as both countries face a strictly convex cost function. An interesting extension of our model, however, could be, apart from those already highlighted in BE, the investigation of the same issues in a model where untaxed rents to immobile factors of production are present; such restrictions on the set of the available tax instruments may have profound results in the implied tax policy rules\textsuperscript{24}.

\textsuperscript{24}See, for instance, Apel and Dillen (1994).
6 Appendix

In this Appendix we show that (6)-(10) give a solution to the government’s second period problem even if \( \lambda^* = 0 \). Note that for \( \lambda^* = 0 \) the government’s objective function is

\[
W(t_{RD}, t_{NR}) \equiv U(1 + (1 - t_{RD})r(1 - F) + (1 - t_{NR}^*)rF - \eta(F)) + V(t_{RD}r(1 - F) + t_{NR}rF^*)
\]

where \( F = F(r(t_{RD} - t_{NR}^*)) \) and \( F^* = F^*(t_{NR}, \cdot) \).

The FOCs, after assuming an interior solution, with respect to \( t_{RD} \) and \( t_{NR} \) are

\[
[V'(\cdot) - U'(\cdot)](1 - F) = V'(\cdot) \frac{rt_{RD}}{\eta'(F)}
\]

and

\[
F^* = \frac{rt_{NR}}{\eta''(F^*)}
\]

For the above objective function to be concave we must have that \( W_{11} \leq 0, W_{22} \leq 0 \) and \( W_{11}W_{22} - (W_{21})^2 \geq 0 \), where \( W_{ij} \) denotes the first partial derivative of \( W_i \) with respect to the \( j^{th} \) argument of \( W(\cdot) \) and \( W_i \) denotes the first partial derivative of \( W(\cdot) \) with respect to its \( i^{th} \) argument. Assume that this is the case and accordingly that the above system gives a global maximand (note that the necessary conditions are also sufficient for a global maximum is an implicit assumption throughout the paper, as it is in BE). Note that due to the FOC with respect to \( t_{NR} \) we have that at the optimum \( W_{21} = 0 \). Therefore, at the optimum, only the second order necessary conditions are satisfied; that is, the above (assumed to be concave) objective function may have multiple maximands.

Consider now the solution of the above system that satisfies \( V'(\cdot) = U'(\cdot) \) and thereby \( t_{RD} = 0 \). Conditions (6) and (7) then follow directly from \( V'(\cdot) = U'(\cdot), t_{RD} = 0 \) and \( F = F(r(t_{RD} - t_{NR}^*)) \), and condition (10) follows from (16) and the foreign counterpart of (7) - which in a similar manner holds for any \( \lambda^* \geq 0 \).

It should be noted that, as it can be very easily shown after some tedious calculations, \( W_{11} < 0 \) and \( W_{22} < 0 \) - evaluated at this solution. Thus, the above solution is indeed a maximum. Moreover, given \( W_{21} = 0 \), the system of (15) and (16) may involve multiple solutions. However, all such possible solutions would give the same pay-off to the government (given the assumed concavity of the objective function). Moreover, any other (possible) solution apart from the one we consider in this paper would involve a discontinuity at \( \lambda = 0 \), which would
complicate the analysis considerably. Therefore, it seems natural to select the solution in question.
References


