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INCENTIVES AND INFORMATION EXCHANGE IN INTERNATIONAL TAXATION

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Abstract: The exchange of taxpayer-specific information between national tax authorities has recently emerged as a key and controversial topic in international tax policy discussions, most notably with the OECD's harmful tax practices project and the EU's savings tax initiative. This paper analyses the effects of information exchange and withholding taxes, recognizing that countries which agree to exchange information do not forfeit the ability to levy withholding taxes, and also focusing in particular on the effects of innovative revenue-sharing arrangements. Amongst the findings are that: (i) the transfer of withholding tax receipts to the residence country, as planned in the EU, has no effect on equilibrium tax rates, but acts purely as a lump sum transfer; (ii) in contrast, allocating some of the revenue from information exchange to the source country—counter to usual practice (though no less so than the EU agreement)—would have adverse strategic effects on total revenue; (iii) nevertheless, any withholding tax regime is Pareto dominated by information exchange combined with appropriate revenue sharing; and, in particular, (iv) sharing of the additional revenues raised from information provided, while efficiency-reducing, could be in the interests of large (high-tax) countries as a means of persuading small (low-tax) countries to provide that information voluntarily.

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I. INTRODUCTION

The exchange of taxpayer-specific information between national tax authorities, especially in relation to capital income, has emerged over the last few years as a (arguably, the) central issue in the discussion and formation of international tax policy. It is at the heart, in particular, of recent controversial and high-profile initiatives by both the OECD and the European Union (EU)—of which more later. The problem to which information exchange is addressed—the ease with which residence-based taxes on capital income can be escaped by depositing funds in low-tax jurisdictions and failing to declare the proceeds to the residence authorities¹—is by no means new, though its practical importance is widely believed to have increased substantially as a consequence of reduced impediments to international capital movements. Until very recently, however, solutions to this have generally been sought, in both theory and practice, in raising the (withholding) tax rates set by the low-tax jurisdictions. But political resistance to such interference in the setting of tax rates on capital income² has proved almost entirely overwhelming. Faced with these difficulties, attention has turned to the alternative strategy of encouraging countries to pass to the tax authorities of the residence country sufficient information for the latter to bring all the capital income of their residents into tax. This has the appeal of enabling the residence principle to be bolstered without infringing the sovereignty of any jurisdiction in setting its own tax rates.

Reflecting these considerations, two recent initiatives to establish information exchange on a much more extensive basis than double tax treaty commitments provide for³ have gathered far more political momentum than has any proposal for the coordination of rates or bases of taxation. The OECD's project to counter 'harmful tax practices' amongst both members and—more contentiously—non-members (initiated in 1998),⁴ has ultimately come to be essentially an exercise in achieving effective information exchange.⁵ And, to date, a successful one too: 30 of the 35 jurisdictions originally identified as tax havens have now entered into commitments to provide information of this kind. In its work on the taxation of cross-border savings, the EU has also come to focus on effective information exchange. This has now resulted in agreement⁶ that 12 member states will implement automatic information

¹ Issues of information exchange also arise in relation to indirect taxation, in particular value-added taxes. These require somewhat different modeling and are not addressed here.

² Within the EU, there has been acceptance of some restrictions on rates of value-added tax and excise taxation. Agreement in respect of capital income taxation, however, has proved elusive.

³ The institutional, legal, and administrative details and issues that arise in relation to tax information exchange—which are many and complex—are discussed in Keen and Ligthart (2004a) and Tanzi and Zee (1999, 2001).

⁴ See OECD (1998). Luxembourg and Switzerland abstained from this project.

⁵ The other focus of the OECD project is on ensuring transparency in tax matters. At the outset, it also identified as 'harmful' any regime offering especially low rates 'ring-fenced' to particular activities, but this criterion was dropped in respect of non-OECD members following the 2001 change of administration in the United States.

⁶ European Commission (2001), as modified by a political settlement in January 2003, and subsequently adopted in June 2003 (see European Commission (2003)). Austria, Belgium, and Luxembourg agreed to adopt automatic exchange of information—which requires relaxing their bank secrecy restrictions—once Switzerland

(continued)

exchange while the other three (Austria, Belgium, and Luxembourg) will instead adopt a withholding tax of at least 15 percent for the first three years, 20 percent for the next three years, and 35 percent thereafter. The EU savings tax directive has a further striking but little remarked-upon feature: those member states adopting withholding must transfer 75 percent of the revenue they collect to the country of residence.

There is, however, a fundamental difficulty to be faced in encouraging countries to adopt effective information exchange: while it is clear enough what high-tax countries have to gain, information exchange would seem to run counter to the interests of low-tax jurisdictions, as stressed by Tanzi and Zee (2001). For by providing information to the home tax authorities that enables them to levy further tax, low-tax countries make themselves less attractive to foreign investors. Thus those tax havens which were induced to commit to effective information exchange under the 1998 OECD project did so with the prospect of OECD members adopting ‘defensive measures’ against them if they did not. There are of course ethical issues here: high-tax countries argue that in not providing information low-tax countries are conniving in what is often illegal tax evasion; low-tax countries respond that they cannot be held to blame if citizens of other countries choose to break foreign laws. Leaving aside the possibility of compulsion—which can be politically very costly, and difficult to exercise against some of the more influential low-tax countries—the question arises as to whether information exchange can ever be—or be made to be—in the interests of all countries, and hence voluntarily adopted by all. That is a central concern of this paper.

The analytical literature on the international exchange of tax information remains relatively small, with contributions including Bacchetta and Espinosa (1995, 2000), Keen (2001), Eggert and Kolmar (2001, 2002) and Huizinga and Nielsen (2003). These papers, especially the first, have identified one possible source of mutual benefit from information exchange: by diminishing the attractions of trying to escape domestic tax by saving abroad and concealing the proceeds, information exchange may have the effect of weakening the tendency of each country to set a low tax rate in order to protect its own tax base. This strategic effect may thus lead to a mutually beneficial general increase in tax rates.

This paper develops and extends the previous literature in four (inter-related) ways.

The first is analytically minor but crucial to the economics of the issue. Previous analyses—including in particular Huizinga and Nielsen (2003) and Eggert and Kolmar (2001, 2002)—have assumed that countries which exchange information do not also levy any withholding tax on savings income of non-resident investors. But there is in practice no reason why they should not do so: there is nothing in either the EU directive on savings taxation⁷ or the

and five other non-EU countries also implement information exchange on request (including for civil cases). This in turn has caused difficulties for the OECD project, with some non-OECD jurisdictions arguing that this imposes stronger obligations on them than the EU agreement places on some OECD members.

⁷ Article 16 of the EU savings tax directive explicitly provides that for those countries adopting information exchange, the directive “...shall not preclude member states from levying withholding taxes...in accordance with their national laws and double tax conventions.”

OECD (2002) model agreement⁸ on information exchange—or, more generally, in established custom and practice—that precludes a country levying withholding taxes and sharing information at the same time. Indeed, double tax treaties typically envisage both the levying of withholding taxes and some information exchange, and neither the EU nor the OECD agreement seeks to over-ride this.⁹ The point is important, since the previous modeling approach (combined with an assumption on the allocation of revenues to which we return below) means that the adoption of information exchange entirely eliminates any potential revenue gain to a country from attracting cross-border savings. This is a powerful implication, and one which we believe rules out what is in practice a significant motivating factor for many tax havens. Here we instead allow countries to simultaneously share information and levy a withholding tax, as they are in practice free to do. Only in this way can the pattern of incentives associated with information exchange be properly understood.

A second distinctive purpose of the analysis here is to explore the effects of the EU's innovative plan to transfer part of the revenue raised by withholding taxes to the country of residence of the investor. While apparently designed simply to go some way towards reallocating revenue in accordance with the residence principle, the question arises as to whether such a transfer rule will itself have strategic effects that affect not only the allocation of revenues but also their aggregate sum. And, if so, in which direction does this strategic effect operate? Is it better to allocate withholding tax revenues mainly to the source country (meaning that in which the income from savings arises) or mainly to the residence country (that in which the saver resides)?

This EU proposal also raises a further thought, prompting a third focus of the analysis here. Standard practice, and the conventional presumption, is that the additional revenue that is obtained as a result of information exchange be retained entirely by the residence country (where it is collected). It is by no means obvious, however, that this is in any sense optimal. Certainly the theoretical case for preferring the residence principle over source taxation—the preservation of global production efficiency¹⁰—is silent on which country should actually receive the revenue that residence-based taxes collect. The question thus arises as to whether it may be possible to generate Pareto gains by accompanying information exchange with some transfers of these additional revenues to the source country. Would such transfers have beneficial strategic effects? Might they provide a way in which countries inclined to set high taxes can induce those inclined to set low taxes to enter, voluntarily, into mutually advantageous arrangements for the exchange of tax information?

⁸ See Keen and Ligthart (2004a) for a discussion of the OECD instrument, which deals with information exchange on request.

⁹ Many countries combine withholding with spontaneous and specific information exchanges, although it is less commonly used together with automatic exchange: see Huizinga and Nicodeme (2004) for the case of savings taxation.

¹⁰ See, for instance, Razin and Sadka (1994). Keen and Wildasin (2004) show, however, that global production efficiency is not always desirable when inter-country transfers cannot be made. This opens up the further possibility that revenue sharing of the kind analyzed here might in itself make the residence principle more attractive than it otherwise would be. We do not pursue this here.

A final feature of the analysis here is a particular focus on the potential conflict of interest arising from asymmetries in country size, which are clearly of the essence in understanding current policy issues. The tax competition literature has provided strong reasons to suppose that tax rates on mobile activities will be lower, all else equal, in small countries;¹¹ and indeed 21 of the 35 jurisdictions identified as ‘tax havens’ by the OECD have populations of less than 100,000. While the role of size in relation to information exchange is addressed in Keen (2001) and Huizinga and Nielsen (2003) it there emerges, somewhat surprisingly, as of little significance.¹² Here, in contrast, it emerges as central.

The plan of the paper is as follows. Section II outlines the basic model, and characterizes the non-cooperative equilibria with and without information exchange, particular interest attaching to the way in which these equilibria are affected by the manner in which the revenues from cross-border savings are allocated across countries. Section III then compares these equilibria and examines how the scope for mutual gain from information exchange is affected by country size and the revenue allocation rules. Section V brings together the various results and their implications.

II. INCENTIVES, EQUILIBRIUM AND REVENUE SHARING

The underlying framework is essentially as in Huizinga and Nielsen (2003), which in turn draws on Gros (1990). The world is a contiguous line divided into two countries, each of length unity. Since recent initiatives in the area of information exchange clearly arise from the impact of ‘tax havens,’ and since both theory and practice suggest that these tend to be small, the two countries may differ in size: one is ‘small’ (and referred to by the use of lower case letters) and the other ‘large’ (upper case). The population is distributed uniformly within each country,¹³ with that of the large country, N , assumed throughout to be at least as large as that of the small, n . Thus, $\theta \equiv n/N \leq 1$.

Each resident of each country has one unit of savings to invest. This they can do either at home or abroad: the former is costless, but the latter incurs transactions costs of δs , where $s \in [0,1]$ is an index representing the consumer’s ‘distance’ from the border.¹⁴ The pre-tax return ρ (taken as fixed) is assumed to be the same in each country, so that the investment decision turns on a comparison between the transactions costs incurred in investing abroad to the taxes saved in doing so.

¹¹ This point is explored, for example, in Wilson (1987), Kanbur and Keen (1993), and Hansen and Kessler (2001).

¹² Except in Huizinga and Nielsen’s analysis of ‘mixed’ regimes, not considered here.

¹³ The results of Nielsen (2001) suggest that little would change if the difference in size were modeled as a difference in the ‘lengths’ of the two countries rather than in their population densities.

¹⁴ The geographic interpretation is of course inessential, the essence being the heterogeneity of transactions costs that could arise, for instance, from differences in access to information.

Governments, it is assumed, simply seek to maximize their tax revenues. Results from the tax competition literature—especially Trandel (1994) and Haufler (1996)—suggest that similar conclusions to those below would be obtained if the objective of each were instead to maximize domestic welfare (a weighted sum of tax revenues and the surplus enjoyed by domestic citizens on their savings), so long as the weights attached to the provision of local public goods in the two countries are not too dissimilar.

Each country taxes the domestic savings of its own residents at the specific rate $\tau > 0$, which we take to be arbitrary and fixed.¹⁵ Savings of non-residents are taxed at the specific rates t and T , which are endogenous. Thus countries are assumed to be able to identify whether savings in their own country come from residents or non-residents; without assistance from the other country, they cannot, however, identify those of their own residents who have saved abroad. In these circumstances, the first-best—maximizing the sum of revenue across the two countries—is to set $t = T = \tau$,¹⁶ which is equivalent to closing the border for capital flows.

This section characterizes the non-cooperative equilibria with and without information exchange. For brevity, throughout the paper we use the shorthand ‘W’ to refer to a situation Without information exchange (in which case, there is a Withholding tax only), and ‘IE’ to refer to a situation with Information Exchange (though recall too, as stressed above, that in this case withholding taxes may also be deployed). We start with the former, which proves somewhat simpler.¹⁷

A. Without Information Exchange (W)

In this case each individual simply pays the resident tax τ if they save at home and the non-resident tax, t or T , if they save abroad. A resident of the small country located at a distance s from the border will therefore choose to invest abroad iff $\rho - T - \delta s \geq \rho - \tau$; and similarly for the typical resident of the large country. There will thus be cut-off points in the two countries,

$$\hat{s} \equiv \frac{\tau - T}{\delta}; \quad \hat{S} \equiv \frac{\tau - t}{\delta}, \quad (1)$$

such that those closer to the border than this will save abroad, and all others will save at home. Note that there is thus, in general, ‘cross-hauling’ of savings, with some residents of each country saving in the other.

¹⁵ Allowing resident tax rates to differ between the two countries without modeling the sources of that difference would give rise only to tedious qualifications. Keen and Ligthart (2004b) consider the reasonably plausible case in which countries cannot discriminate between residents and non-residents, enabling the common tax rate on resident and non-residents to be endogenized.

¹⁶ Any other configuration of tax rates would induce some form of tax arbitrage that can only reduce aggregate tax revenues.

¹⁷ The two regimes can be nested in a single model, but separate treatment is more transparent.

All this much is as in the treatment of the case without information exchange in Huizinga and Nielsen (2003). Here, however, we will also allow for some sharing of the revenues from non-resident withholding taxes between the two countries: the proportion $1 - \lambda$ is retained by the source country and the remainder, λ , is passed on to the residence country.¹⁸ The norm in practice (and the implicit assumption, for example, in Huizinga and Nielsen (2003)) is that all revenue from withholding is retained by the country that collects it, corresponding to $\lambda = 0$; we refer to this case as that of ‘simple withholding.’ While simple withholding is the norm, the EU savings tax directive introduces an innovative departure from this by specifying that $\lambda = 0.75$, so that the bulk of revenue from withholding taxes levied by member states that do not share information is transferred to the residence country. With a general revenue-sharing scheme of this kind, revenues in the two countries are:

$$r(t, T, \lambda) = \tau n(1 - \hat{s}) + (1 - \lambda)tN\hat{S} + \lambda Tn\hat{s}, \quad (2)$$

$$R(t, T, \lambda, \cdot) = \tau N(1 - \hat{S}) + (1 - \lambda)Tn\hat{s} + \lambda tN\hat{S}. \quad (3)$$

In (2), for instance, the first term is the revenue that the small country collects from the proportion $1 - \hat{s}$ of its own residents who save at home; the second is the revenue it retains from the withholding tax it levies on savings by residents of the large country; and the last is the transfer that it receives in respect of the withholding tax paid in the large country by its own residents who save abroad.

Each government chooses its non-resident tax rate taking as given the revenue-sharing parameter λ , and attention then focuses on the implications of different choices of that parameter.

Using (1) in (2)-(3), non-resident taxes in the Nash equilibrium are readily shown to be:

$$t^* = T^* = \frac{\tau}{2}, \quad \lambda \in [0, 1), \quad (4)$$

where asterisks denote equilibrium values. These non-cooperative tax rates, which are of course below their first-best levels, are independent of country size. It will be seen in Section II.B that this is also true under information exchange. The reason is the same in both cases: each country’s non-resident tax rate affects only that part of revenues collected from non-residents, so that the number of domestic residents is simply irrelevant to the choice of this rate, with the number of residents of the other country simply scaling up or down the revenue to be maximized.

More striking for present purposes is the implication of (4) that:

¹⁸ It is assumed throughout that the revenue-sharing parameters are the same for both countries. There is no logical necessity for this, but allowing also an arbitrary asymmetry in this dimension adds much complication to little clear end.

PROPOSITION 1: *Under W , equilibrium tax rates (and hence also aggregate tax revenue) are independent of the allocation of revenue from withholding taxes (that is, of λ).*

Proof: From (4), $dt^*/d\lambda = dT^*/d\lambda = 0, \forall \lambda \in [0,1)$. \square

Thus, the EU savings tax directive, for example, has no strategic effect on the nature of the equilibrium in tax setting, but simply moves revenue between countries in a lump-sum fashion.

To see why this is, note that λ affects each country's revenue in two ways: through the amount it ultimately receives from its own taxation of non-residents—which is $(1-\lambda)tN\hat{S}$, taking for concreteness the case of the small country—and through the taxation by the other country of its own residents who invest abroad ($\lambda nT\hat{s}$). For the latter, however, the extent of the revenue raised (and hence shared) by the other country is independent of the non-resident tax rate set by the small country, since this has no impact on the choice that residents of the small country make between investing at home or abroad (which rests on comparing τ and T , with t immaterial). For the former, revenue sharing acts, in effect, as a proportional tax that each country must pay on its collection of revenue from non-residents; and since there is no other effect of the non-resident tax to consider, it is in effect a lump-sum tax, leaving the choice of non-resident tax rate unaffected.

B. Information Exchange (IE)

When information exchange is in place, the payment of non-resident withholding tax by those who save abroad is not the end of the story. With some probability $p \in (0, \bar{p})$, we now suppose, the source country provides enough information to the residence country for it to charge the resident tax τ on a resident who has invested abroad, giving a credit for the non-resident withholding tax paid there.¹⁹ To focus on the core strategic issues in tax setting, there is assumed to be no penalty levied on taxpayers who are identified to their home tax authorities in this way. Thus, for example, a resident of the large country located at a distance S from the border will save abroad iff $\rho - t - p(\tau - t) - \delta S \geq \rho - \tau$. The critical values dividing those who save abroad from those who save at home are thus now:

$$\hat{s} \equiv \frac{(1-p)(\tau - T)}{\delta}; \quad \hat{S} \equiv \frac{(1-p)(\tau - t)}{\delta}. \quad (5)$$

Mirroring the sharing of revenues from withholding taxes above, it is assumed that the residence country transfers to the source country a proportion $1 - \mu$ of the revenue it collects

¹⁹ In practice, tax authorities may also use information on their residents' income from abroad to uncover evasion of other taxes (on business income, for example). This use of information from abroad for this purpose—which can be expected to enhance the attractions of information exchange relative to the use of withholding taxes—is not considered here.

as a result of information passed to it by the latter, retaining the rest for itself.²⁰ Normal practice—all revenue retained by the residence country—thus corresponds to $\mu = 1$ (as is implicitly assumed to be the case, for example, in Huizinga and Nielsen (2003));²¹ we refer to this as ‘simple’ information exchange. Simple information exchange is indeed the international norm, but there is in principle no reason why revenues should not be shared between the two countries: doing so would be perfectly consistent, as noted in the introduction, with the fundamental production efficiency rationale for the residence principle.

With an arbitrary revenue-sharing scheme of this sort, revenues under IE are:

$$r(t, T, \mu) = \tau n(1 - \hat{s}) + tN\hat{S} + \mu(\tau - T)pn\hat{s} + (1 - \mu)(\tau - t)pN\hat{S}, \quad (6)$$

$$R(T, t, \mu) = \tau N(1 - \hat{S}) + Tn\hat{s} + \mu(\tau - t)pN\hat{S} + (1 - \mu)(\tau - T)pn\hat{s}. \quad (7)$$

The third term in (7), for example, is the revenue that the large country ultimately obtains by bringing into tax those of its own residents who have been revealed by the small country to have saved there; and the fourth term is the amount passed on to it by the small country in respect of the additional revenue that the information supplied by the large country has enabled the small country to collect. Note that information sharing is assumed in itself to be costless, the purpose of this simplification being to abstract from the rather different case for sharing the revenues gained from information transfer that would arise if it were not.²²

Each government again chooses its non-resident tax rate taking the revenue-sharing parameter, now μ , as given. The parameter p characterizing the effectiveness of information exchange is also taken as given, since this is in the nature of a treaty obligation quite distinct from the choice of tax rate.²³ The EU savings tax proposal, for instance, anticipates automatic information exchange (which might seem to imply $p = 1$, though practical problems in making use of information received—arising from linguistic difficulties, for instance, or from difficulties in matching information across countries in the absence of common taxpayer identification numbers—are likely to make exchange far from fully effective). And the

²⁰ It may help to remember that λ and μ both refer to revenue ultimately collected by the residence country. To retain symmetry with the specific functional form under withholding, the side-payment is a fixed percentage of the revenue gain, that is, the revenue collected due to the policy measure. Note the direction of the transfer under IE is of course the opposite to that under W.

²¹ The source country, however, keeps all the revenue it collects from its non-resident withholding tax.

²² Most double tax agreements provide for some reimbursement of extraordinary costs incurred by the source country in exchanging information.

²³ The choice of p is examined, in somewhat different contexts, by Bacchetta and Espinosa (1995), Keen (2001) and Huizinga and Nielsen (2003), in each case identifying and focusing on the possibility—noted in the Introduction—that increasing p may actually benefit the provider of the information (even without any direct interest in the revenue consequently raised) by inducing the receiving country to set a higher tax rate.

OECD (2002) model instrument provides for information exchange only on specific request by the residence country. It is assumed, for simplicity, that p is the same in both countries, with (see (8) below) $p < \bar{p} \equiv 1/(2(1-\mu)) < 1$ to ensure strictly positive taxes in equilibrium.

From the first-order conditions, equilibrium non-resident tax rates under IE are:²⁴

$$t^* = T^* = \frac{\tau(1-2p(1-\mu))}{2(1-p(1-\mu))}, \quad \text{where } p < \frac{1}{2(1-\mu)}. \quad (8)$$

As under W—and for the same reason—they are thus independent of country size. Now, however—in contrast to the W case above—they are affected by the extent of revenue sharing. To see why, note that the non-resident tax it charges affects a country's revenue in two ways: through the payment it receives from all non-resident investors (in the case of the large country, this is $nT\hat{s}$) and from the additional revenue it receives in respect of those non-resident investors that it reveals to their home country (which is $(1-\mu)n\hat{s}(\tau-T)$). The extent of revenue sharing affects the latter but not the former, and so shapes the trade-off to be faced in setting the non-resident tax rate. From (8), the way in which revenue sharing affects tax rates through these routes is clear-cut:

PROPOSITION 2: Under IE, equilibrium tax rates are higher the greater is the proportion of the additional revenue collected from information exchange that is retained by the residence country (that is, the higher is μ).

Proof: From (8), $dt^*/d\mu = dT^*/d\mu = \frac{p}{2(1-p(1-\mu))^2} > 0 \quad \forall p \in (0, 1/(2(1-\mu)))$. \square

Revenue sharing thus has a clear strategic effect under IE, with any reallocation of revenue toward the country that provides the information tending to lower tax rates. Intuitively, when $1 - \mu$ is large (so that a substantial part of the revenue is reallocated in this way) there is a double benefit from attracting non-resident investors: not only do they all pay the non-resident tax, but those unlucky enough to be identified to the foreign tax authorities will also generate revenue through the sharing of the additional tax they have to pay in their home country. The incentive to attract non-residents by setting a low non-resident tax rate is thus greater the lower is μ : revenue sharing in this way makes tax competition more aggressive.

Proposition 2 leads one to expect that an increase in μ would also increase the total revenue collected by the two countries combined. This is verified in:

PROPOSITION 3: Under IE, aggregate revenue—meaning the sum of revenues across the two countries—is higher the greater is the proportion of revenue collected from information exchange that is retained by the residence country.

²⁴ If $\mu = 0$ then $p < 1/2$ whereas if $\mu \rightarrow 1$ then p can take on larger values (including unity).

Proof: Noting from (5) and (8) that in equilibrium the proportion of the residents of each country that save abroad is:

$$\hat{s} = \hat{S} = \frac{(1-p)\tau}{2\delta(1-p(1-\mu))}, \quad (9)$$

summing (6) and (7), one finds after simplification, using (8) and (9), that

$$\frac{r+R}{n+N} = \tau - \frac{1}{4\delta} \left(\frac{(1-p)\tau}{1-p(1-\mu)} \right)^2, \quad (10)$$

which is increasing in μ . \square

But the revenue-sharing parameter also, of course, has potentially powerful effects on the allocation of revenues across the two countries. And here, although tax rates themselves are symmetric, there is clearly a potential asymmetry of interest between small and large countries arising simply from the difference in the numbers from each that will invest in the other. The strategic effect of increasing tax rates consequent on an increase in μ will tend to benefit both countries. For the small country, however, the increased share of the revenues recovered from its own residents who have invested abroad will be less than the revenue it loses from the reduction in its share of the revenues obtained from residents of the large country who had invested abroad—simply because the latter are more numerous than the former. Thus the beneficial strategic effect must be balanced against an adverse distributional effect. For the large country, on the other hand, this latter distributional effect from increasing μ will reinforce the beneficial strategic effect. This creates a potential conflict of interest between small and large countries in relation to revenue sharing under IE, which is characterized in:

PROPOSITION 4: *Under IE:*

(a) *Revenue in the large country is strictly increasing in μ ;*

(b) *Revenue in the small country is:*

- (i) *Everywhere strictly decreasing in μ if $\theta < 1/3$;*
- (ii) *Maximized at $\mu^* = (1-p)(3\theta-1)/(p(1-\theta)) \in [0,1]$ if $\theta \in [1/3, 1/(3-2p)]$; and*
- (iii) *Everywhere strictly increasing in μ iff $\theta > 1/(3-2p)$.*

Proof: Consider first the small country. Using (8) and (9) in (6), equilibrium revenue can be shown, after considerable simplification, to be

$$\frac{r(\mu)}{N} = \theta\tau + \left(\frac{(1-p)\tau^2}{4\delta} \right) k(\mu), \quad (11)$$

where

$$k(\mu) \equiv \frac{(1-\theta)(1-p(1-\mu)) - \theta(1-p)}{(1-p(1-\mu))^2}. \quad (12)$$

The derivative $r'(\mu)$ thus has the same sign as

$$\pi(\mu) \equiv (1-p)(3\theta-1) - (1-\theta)p\mu. \quad (13)$$

Part (iii) then follows on noting that, since $\mu \leq 1$ and $\theta \leq 1$, $\pi > 0$ for any $\theta > 1/(3-2p)$; and part (i) on noting that since $\mu \geq 0$, $\pi < 0$ for any $\theta < 1/3$. For part (ii), setting $\pi(\mu) = 0$ gives $\mu^* = (1-p)(3\theta-1)/(p(1-\theta))$. Since, $\pi' < 0$, this is a unique local maximum; and it lies in the feasible range $[0,1]$ whenever $\theta \in [1/3, 1/(3-2p)]$.

For the large country, $R(\mu)$ has the same form as in (11)-(13) but with θ replaced throughout by $1/\theta$. Thus $R'(\mu)$ has the same sign as

$$\Pi(\mu) \equiv \frac{1}{\theta}((1-p)(3-\theta) + (1-\theta)p\mu) > 0, \quad (14)$$

which is everywhere increasing in μ . \square

Thus the large country, as the discussion above leads one to expect, always prefers simple IE to any form of revenue sharing. If the small country is large enough (θ greater than $1/(3-2p)$), it finds that the strategic effect always dominates the adverse distributional effect, so that it too prefers $\mu = 1$. In this case, Pareto efficiency under IE requires giving all the revenue that it generates to the residence country, as is the norm in practice. Otherwise, however, there is a real conflict of interest. When the difference in size is sufficiently great, the distributional effect is so strongly adverse that the small country prefers that some revenue gained from information exchange be transferred to the country that provided it (that is, the source country); indeed if it is small enough (θ less than one-third) it is harmed by any allocation of these revenues to the residence country.

The implication that information exchange—with all revenue generated allocated to the residence country—is likely to be sought by large and resisted by very small countries clearly captures an important aspect of the policy debates and initiatives referred to in the Introduction.

III. COMPARING OUTCOMES WITH AND WITHOUT INFORMATION EXCHANGE

This section compares the outcomes under W and IE just described. Does either Pareto dominate the other? Or can it be made to, by appropriate choice of revenue-sharing parameter?

Note first, comparing (4) and (8), that equilibrium non-resident tax rates are unambiguously lower under IE than under W, with equality only under simple IE. This does not imply, however, that aggregate revenues are always lower under information exchange: for whereas the non-resident tax is the only payment made by those who save abroad under W, under IE some of them will also be brought into tax by their home country. Indeed, the following establishes the striking result that this additional payment under information exchange is always enough—for any non-zero value of the revenue-sharing parameter—to ensure that,

although tax rates are always lower, aggregate tax revenue is always higher under IE than under W:

PROPOSITION 5: *For any μ and λ , tax rates are lower under IE than under W, but aggregate revenue is higher, (with equality, in each case, iff $\mu = 0$).*

Proof: To compare aggregate revenues, note first that substituting (4) into (1) gives, for the non-cooperative equilibrium under withholding:

$$\hat{s} = \hat{S} = \tau/2\delta. \quad (15)$$

Making use of this in (2) and (3), aggregate revenue is then:

$$\frac{r + R}{n + N} = \tau - \frac{\tau^2}{4\delta}, \quad (16)$$

and the result follows on comparing this with (10). \square

If lump-sum transfers could be made between the two countries, each could thus be made better off under IE than under W. This, however, would require some means of making such transfers that did not affect countries' choices of non-resident tax rates—but, as we have seen, the sharing of revenues collected as a result of information exchange does affect those choices. The more pertinent question is thus whether, for any allocation of revenues under W, there exists some way of sharing revenues under IE such that both countries are better off under the latter.

The question is most conveniently addressed diagrammatically. For this, one further preliminary observation is helpful: revenue in each country is the same under simple withholding as under IE with $\mu = 0$. This follows from noting first that Propositions 1 and 4 imply aggregate revenue to be the same in the two cases and then using (4) and (15) into (2) to find that equilibrium revenue in the small country in the simple W regime is

$$\frac{r}{N} = \theta\tau + \frac{\tau^2}{4\delta}(1 - 2\theta), \quad (17)$$

which is the same as is obtained by setting $\mu = 0$ in (11) and (12). The (loose) explanation is that when $\mu = 0$ all the revenue that arises from non-resident savings accrues to the source country, just as under simple withholding.

Combining this observation with Propositions 1 and 4, the revenue possibility curves (RPCs) under the W and IE regimes—tracked out by varying λ or μ , as appropriate—have the general form shown in Figure 1. That under W has slope -1 , since aggregate revenue is independent of λ . Those for IE start, as a consequence of the preceding observation, at the highest point on the RPC for W (point A in the Figure), corresponding to simple withholding, and then—by Proposition 4—have the three possible shapes shown.

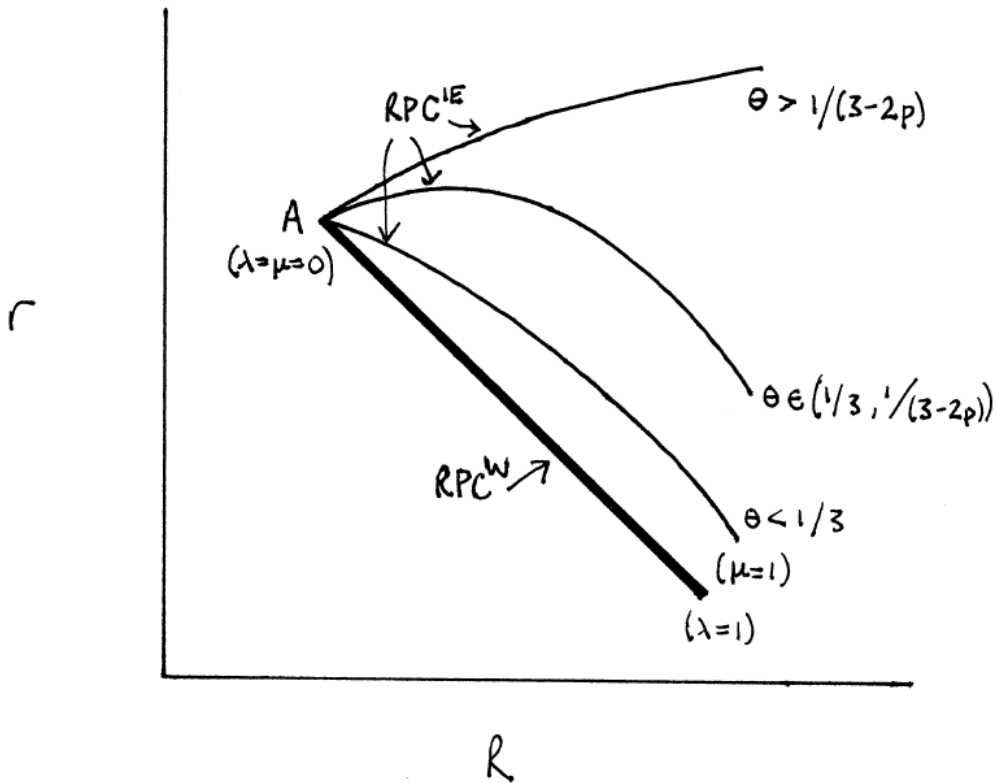


Figure 1 : Revenue Possibility Curves

One observation follows immediately:

PROPOSITION 6: *Any W regime with $\lambda \geq 0$ is weakly Pareto dominated by IE for some choice of revenue-sharing parameter μ .*

This is quite a strong dominance result: it implies, for instance, that even an EU-type withholding scheme can be Pareto improved by allowing information exchange—but only so long, in general, as there is some sharing of the revenues collected from that exchange.

One case of particular interest is that of simple withholding (point A in the figure), since it is this—outside the EU proposal—that is the norm. Proposition 6 implies that simple IE combined with appropriate revenue sharing weakly dominates simple withholding. The question then is precisely how much revenue needs to be shared in this case.

Proposition 4 and the observation above suggest that there are in this case three possibilities of interest, corresponding to distinct ranges of values of θ . For $\theta < 1/3$, it follows from Proposition 4(b.i) that the RPC under IE is downward sloping where it meets the withholding

RPC. There is therefore no way of sharing revenues from IE in such a way as to persuade the small country to prefer this to simple W. As θ rises above $1/3$, however, Proposition 4(b.ii) implies that the information exchange RPC becomes upward sloping at A, and peaks at some $\mu < 1$. Initially, one would expect, the peak lies close to A, so that although revenue in the small country is higher at its preferred level of μ than under simple withholding (with $\lambda = 0$) it is lower than the latter where $\mu = 1$. In this case, the small country can be better off under IE than under simple W only if some of the additional revenue is transferred to the source country. As θ increases further, the information exchange RPC continues to shift up until eventually—once θ exceeds $1/(3-p)$, it turns out—revenue in the small country is higher at $\mu = 1$ than under simple withholding (even though, until θ rises above $1/(3-2p)$, it would be even higher at some intermediate value of μ).

All this is summarized in:

PROPOSITION 7: *Compared to simple withholding:*

(a) *The large country strictly prefers IE with any $\mu \in (0,1]$;*

(b) *For the small country, IE is*

(i) *Always less attractive if $\theta < 1/3$;*

(ii) *More attractive, if $\theta \in [1/3, 1/(3-p)]$, only for $\mu \leq \bar{\mu}$, with $\bar{\mu} \in (0,1)$; and*

(iii) *Always more attractive if $\theta > 1/(3-p)$.*

Proof: Parts (a) and (b.i) are immediate from parts (a) and (b.i) of Proposition 4 together with the observation that the RPCs meet where $\lambda = \mu = 0$.

For part (b.ii), Proposition 4(b.ii) and the same observation imply—recalling too from the proof of Proposition 4 that $r(\mu)$ is concave—that revenue in the small country is higher under IE than under simple W:

$$\frac{r^{IE}}{N} - \frac{r^W}{N} = \frac{\tau^2}{16\delta\theta} \left[(1-\theta)^2 - 4\theta(1-2\theta) \right] > 0, \quad (18)$$

for all μ less than or equal to some $\bar{\mu} \in (0,1)$ whenever $\theta > 1/3$. For part (b.iii), when $\mu = 1$ using Proposition 4(b.iii) and (11)-(13) one finds revenue to be

$$\frac{r^{IE}}{N} = \theta\tau + \frac{\tau^2}{4\delta} (1-p)(1-2\theta + \theta p), \quad (19)$$

which, comparing with (17) is higher than under simple W iff $\theta > 1/(3-p)$. \square

The implications are clear-cut. When the difference in size between the two countries is very pronounced, even sharing the extra revenue that information exchange generates cannot induce the small country to switch voluntarily to a regime of information exchange. If their sizes are sufficiently close, on the other hand, then the small country will prefer information exchange even if all the additional revenue it generates is retained by the residence country. In intermediate cases, however, the small country prefers information exchange only if it receives a sufficiently large share of the associated revenue. In such cases, large countries

that wish to induce smaller countries to exchange information may need to be willing to forgo some of the additional revenue that this would enable them to collect.

V. CONCLUSIONS

The simple model explored here proves rich in further understanding the incentive effects of tax information exchange between countries, the potential conflicts of interest to which they give rise, and, especially, on whether and how they might be overcome by innovative revenue-sharing schemes. The starkness of the results naturally reflects the simplicity of the model, but they nevertheless shed some light on issues that are likely to become increasingly important in the coming years.

Take first the comparison between simple withholding and simple information exchange (the ‘normal’ cases, that is—at least until the recent EU initiative—in which all revenues are simply retained by whichever country collects them). For this one finds:

- Simple information exchange is more efficient than simple withholding, in the sense of generating larger revenues for the two countries combined. But while
- The large (high-tax) country always prefers simple information exchange,
- The small (low-tax) country, if small enough, may prefer simple withholding.

Thus it is not necessarily in each country’s interest to adopt the collectively efficient regime. The EU’s innovative transfer scheme for withholding tax revenues, requiring those member states that will not exchange information to transfer to the residence country 75 percent of the revenue collected in withholding taxes is presumably in part intended to make information exchange more attractive to low-tax countries than it otherwise would be. That is not necessarily the case, however, since such transfers might in principle have strategic effects on the equilibrium under withholding taxation, which makes it more attractive to the lower tax country. Here we have seen that a scheme of the EU type has no strategic effect: it is indeed tantamount to lump-sum redistribution from the low-tax to the high-tax country.

Another way to make information exchange more attractive to low-tax countries, however, would be to allocate to some part of the revenue that is recovered by the resident country as a result of information received. This then naturally leads one to consider revenue sharing of this rather different kind: though not observed in practice, the informational barriers to such a scheme seem no greater than that to sharing of withholding tax revenues (which itself was not observed in practice until the recent EU directive). The implications of such revenue sharing prove less straightforward than those of schemes for sharing the revenue from withholding taxes, affecting not only the allocation of revenues across countries but also the aggregate amount of such revenues. In particular, it has been seen that:

- Efficiency requires that all the additional revenue generated by information exchange be retained by the residence country: the strategic effect of allocating any part of the revenue from information exchange to the source country is adverse, leading to lower

tax rates rather than higher (because, simply put, it makes it more rather than less attractive to attract foreign savings). In this sense, the results are supportive of the traditional allocation of revenue from information exchange. Moreover,

- It is always possible to find a way of sharing revenues under information exchange so as to make both countries better off than they would be under any a system of withholding taxes (that is, irrespective of how revenues from withholding taxes are shared).
- As a consequence, it may be in the interests of the large country to share some of its proceeds from information exchange with the small country in order to ensure that the latter gains from, and hence will voluntarily engage in, the exchange of information. This is the case, in particular, when the small country is not ‘too’ small: such sharing dilutes the collective gain, but can ensure that the small country will also gain from information exchange.

There are of course many aspects of the information exchange issue that have not been addressed here, such as the complications posed by the existence of third countries not party to any information exchange and by the possibility that countries may adopt mixed regimes in equilibrium.²⁵ It would be useful too to model in a more compelling way the simultaneous determination of tax rates applied to residents and non-residents. A better understanding of incentives to exchange information, and finding ways to improve them, may do much to develop policy in this increasingly important area of international tax policy.

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²⁵ Both issues are considered, in their different setting, by Huizinga and Nielsen (2003).

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