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9 Integration of International Capital Markets: The Size of Government and Tax Coordination

Assaf Razin and Efraim Sadka

International capital market integration has become the subject of major theoretical and practical interest in recent times. Policymakers are becoming more and more aware of the potential benefits accruing from such integration, which allows more efficient allocations of investment and saving between the domestic and the foreign market. In particular, with the prospective comprehensive integration of capital markets in Europe in 1992, some key policy issues arise.[1]

The financial, monetary, and exchange rate management policy implications of capital market integration have been widely discussed in the context of the European Monetary System (EMS) (see, e.g., the survey in Micossi 1988). However, capital market integration also has profound effects on the fiscal branch of each country separately and on the scope of tax coordination among them. These issues have not been dealt with extensively so far. The present paper attempts to contribute to the economic analysis in this area.[2]

The opening up of an economy to international capital movements affects, as expected, the size and the structure of the fiscal branch of its government. Capital flows influence both the optimal structure of taxes, on domestic and foreign-source income, and the welfare cost of taxation. As a result, the optimal size of government (the optimal provision of public goods) and the magnitude of its redistribution (transfer) policies are affected as well. In this context, the paper analyzes the effects of relaxing restrictions on the international flow of capital on the fiscal branch of government.

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The optimal size of government, or, more precisely, the optimal provision of public goods, must be determined by an appropriate cost-benefit analysis. Such an analysis implies that the marginal cost of public funds must be equated to the marginal utility from public goods. Accordingly, in order to find the effect of liberalization in the international capital markets on the optimal quantity of public goods, we study here the effect of such a liberalization on the cost of public funds. This is done in section 9.4, in which we also distinguish between constant and variable internal terms of trade associated with nontradables.

In calculating the cost of public funds, one must take into account the optimal response of the structure of taxation (on incomes from all sources) to the liberalization policy because the cost of public funds is derived from a process of tax optimization. Therefore, we also analyze the effect of liberalization on the structure of taxation. Of course, entangled with the structure of taxation is also the issue of the optimal size of income redistribution. For this reason, we also analyze in section 9.5 the effect of international capital market liberalization on the optimal redistribution (transfer) policy of the government.

Finally, integration of capital markets brings up the issue of international tax coordination. It turns out that perfect mobility of capital necessitates some minimal degree of coordination among the tax authorities. This is discussed in section 9.6.

We present in section 9.1 the analytical framework for our analysis. Sections 9.2 and 9.3 discuss alternative regimes of international capital mobility. Concluding remarks are included in the final section.

9.1 The Analytical Framework

Consider a stylized two-period model of a small open economy with one composite good, serving both for private and public consumption and for investment. In the first period, the economy possesses an initial endowment of the composite good. Individuals can decide how much of their initial endowments to consume in the first period and how much to save. Saving is allocated to either domestic investment or foreign investment. In the second period, output (produced by capital and labor) and income from foreign investment are allocated between private and public consumption. For the sake of simplicity, we assume that the government is active only in the second period. The government employs taxes on labor, taxes on income from domestic investment, and taxes on income from investment abroad in order to finance optimally (taking into account both efficiency and equity considerations) both its (public) consumption and a (uniform lump-sum) subsidy for redistribution purposes.

For simpiicity, while still capturing real-world basic features, we assume that government spending on public goods does not affect individual demand patterns for private goods or the supply of labor. That is, only the taxes that are needed to finance these expenditures affect individual demands and supplies, but not the expenditures themselves. Formally, this feature is obtained by assuming that the utility function is weakly separable between private goods and services, on the one hand, and public goods and services, on the other. That is, individual h's utility is

$$U^h(c_{1h}, c_{2h}, L_h, G) = u^h(c_{1h}, c_{2h}, L_h) + m^h(G), \tag{1}$$

where u^h and m^h are the private and public components of the utility function, respectively; c_{1h}, c_{2h}, and L_h are first-period consumption, second-period consumption, and second-period labor supply, respectively; and G is (second-period) public consumption.[3]

Denote saving in the form of domestic capital by K_h and saving in the form of foreign capital by B_h. The aggregate saving in the form of domestic capital is equal to the stock of capital in the second period since we assume for concreteness, without affecting the results of the paper, that the patterns of capital flows are such that the country is a capital exporter (i.e., $\Sigma_h B_h \geq O$). Hence, the budget constraints of individual h are

$$c_{1h} + K_h + B_h = I_h, \tag{2}$$

$$c_{2h} = K_h[1 + r(1 - t)] + B_h[1 + r^*(1 - t')] + (1 - \theta)wL + S', \tag{3}$$

where:

t = tax on capital income from domestic sources;
t' = tax on capital income from foreign sources;
θ = tax on labor income;
S' = lump-sum subsidy;
r = domestic rate of interest
r^* = foreign rate of interest (net of taxes levied abroad);
w = wage rate; and
I_h = initial (first-period) endowment.

Obviously, in the absence of quantity restrictions on capital flows, individuals must earn the same net return on both forms of investments, that is, $r(1 - t) = r^*(1 - t')$. With restrictions on capital flows, the latter equality does not have to hold. In such a case, there is an inframarginal profit on foreign investment, resulting from the net interest differential. (This differential is equal to the capital export tax rate, which is equivalent to the quota on capital exports.) One possibility is for this profit to accrue to the individual investors. Another possibility is for the government to tax away this profit fully. (This is the equivalent capital-export tax version of the capital-export quota.) We adopt the second possibility, namely, that the government chooses the level of the tax on income from foreign investments (t') so as to eliminate any inframarginal profits. This implies that, whether or not there are restrictions on foreign investment, the government chooses t' so as to maintain the equality $r(1 - t) = r^*(1 - t')$. That is, the rate of tax on income from foreign investment is equal to[4]

$$t' = \frac{r^* - r(1 - t)}{r^*}.$$

Under this tax scheme, the individual is indifferent between investing at home (K_h) or abroad (B_h), caring only about the level of total investment ($K_h + B_h$). Thus, at equilibrium, the size of the aggregate domestic capital is determined by the demand for capital by domestic firms. The latter is determined by the standard equalization of the marginal product of capital to the domestic rate of interest, r.

We can consolidate the two budget constraints into a single (present-value) constraint:

$$c_{1h} + q_2 c_{2h} = I_h + q_L L_h + S, \tag{4}$$

where

$$q_2 = [1 + (1 - t)r]^{-1} \tag{5}$$

is the consumer (after-tax) price of second-period consumption,

$$q_L = (1 - \theta)w[1 + (1 - t)r]^{-1} \tag{6}$$

is the consumer price of labor, and $S = q_2 S'$ is the present value of the subsidy. Maximization of the utility function u^h, subject to the budget constraint (4), yields the consumption demand functions

$$c_{ih} = c_{ih}(q_2, q_L; I_h + S), \quad i = 1, 2, \tag{7}$$

the labor supply function

$$L_h = L_h(q_2, q_L; I_h + S), \tag{8}$$

and the utility obtained from these demand and supply functions, namely, the indirect utility function:

$$v^h = v^h(q_2, q_L\, I^h + S). \tag{9}$$

Domestic output (Y) is produced in the second period by capital and labor, according to a constant-returns-to-scale production function

$$Y = F(K, L), \tag{10}$$

where $K = \Sigma_h K_h$ is the stock of domestic capital, and $L = \Sigma_h L_h$ is the aggregate supply of labor.

The resource constraints of this economy require that

$$I = c_1 + B + K \tag{11a}$$

and

(11b) $$Y + (1 + r^*)B + K = c_2 + G,$$

where $I = \Sigma_h I_h$ is aggregate first-period endowment, $B = \Sigma_h B_h$ is aggregate investment abroad, $c_1 = \Sigma_h c_{1h}$ is aggregate consumption in the first period, and $c_2 = \Sigma_h c_{2h}$ is aggregate consumption in the second period.

Substituting (2), (7), (8), (10), and the first-period resource constraint (11a) into the second-period resource constraint (11b) yields the equilibrium condition:

(12) $$\begin{aligned} &F[I - C_1(q_2, q_L; I_1 + S, \ldots, I_H + S) \\ &- B, L(q_2, q_L; I_1 + S, \ldots, I_H + S)] + (1 + r^*)B \\ &+ [I - C_1(q_2, q_L; I_1 + S, \ldots, I_H + S) - B] \\ &- C_2(q_2, q_L; I_1 + S, \ldots, I_H + S) - G = 0. \end{aligned}$$

Observe that aggregate consumptions, C_1 and C_2, depend not only on aggregate income but also on its distribution.

9.2 International Capital Flows: Alternative Regimes

We consider two alternative regimes. In the first regime, the government sets quantity restrictions on capital exports. In the second regime, there are no restrictions on capital exports, and B is thus determined by market clearance.

The optimal tax/transfer policy and provision of public goods are obtained as a solution to the program of maximizing the indirect social welfare function

(13) $$\begin{aligned} W(q_2, q_L; I_1 + S, \ldots, I_H + S) &= \Sigma_h \gamma_h v^h(q_2, q_L; I_h + S) \\ &+ \Sigma_h \gamma_h m^h(G), \end{aligned}$$

subject to the resource constraint (12). In this setup, common in the public finance literature, the government operates directly, not on private-sector quantities, but rather on prices (through taxes) that affect these quantities. The government tax policy focuses on q_2, q_L, and S as the control variables. In the first regime, we treat B as a parameter. In the second regime, B is also a control endogenous variable. Notice, however, that this does not mean that the government directly determines the level of investment abroad; rather, the government, through its tax policy, affects total savings ($K + B$) and domestic investment (K), and B is determined as a residual (the difference between total savings and domestic investment).

Notice that, by Walras law, the government budget constraint is satisfied. Also, the wage rate (w) and the domestic rate of interest (r) are determined by the standard marginal productivity conditions: $F_1 = r$ and $F_2 = w$. Given q_2 and q_L, we can solve for the tax rates, t and θ, by using (5) and (6).

9.3 Efficient Capital Flows

Since there are distortionary taxes as part of the optimal program, obviously the resource allocation is not Pareto efficient: the intertemporal allocation of consumption, the leisure-consumption choice, and the private-public consumption trade-offs are all distorted. Nevertheless, the fully optimal program (namely, the second regime, where no restrictions on B exist) requires an efficient allocation of capital between investment at home and abroad, so that $F_1 = r^*$. That is, the marginal product of domestic capital must be equated to the foreign rate of return on capital (net of foreign taxes).

To see this, observe that the endogenous variable B does not appear in the objective function (13), so that the first-order conditions for optimality require that the derivative of the resource constraint (12) with respect to B, that is, $-F_1 + (1 + r^*) - 1$, be equal to zero. Hence, $F_1 = r^*$. Evidently, this is an open economy variant of the aggregate efficiency theorem in optimal tax theory (see Diamond and Mirrlees 1971; Sadka 1977; and Dixit 1985).

Notice also that this production-efficiency result also implies that there should be no differential tax treatment of foreign and domestic sources of income, namely:

$$t = t'.$$

It might be argued that our investment efficiency result (i.e., equating the return on capital at home to the return on capital abroad by means of free international capital flows) is not valid when the government is concerned about financing its debt. Because, the opening of an economy to international capital flows will raise the domestic interest rate (r) to the world rate (r^*). In such a case, a government that is burdened by an ongoing deficit incurs a higher interest cost of financing this deficit. In fact, it loses some of its monopsony power in the domestic capital market. It can then be argued in this case that the government may not wish to allow residents to invest abroad. To analyze this issue, we extend our model in Appendix A in order to incorporate a meaningful role for a government debt in a non-Ricardian framework. We show that the investment efficiency result is still valid nevertheless. This is because the government can offset the cost of losing its monopsony power by an appropriate tax policy.

However, in the presence of restrictions on capital exports, the production efficiency result does not necessarily hold: the return to capital at home may be lower than the net (after foreign taxes) return on investment abroad. Nevertheless, a small relaxation of this restriction will improve welfare.

We turn next to the study of the effects on the fiscal branch of relaxing the restrictions on investment abroad.

9.4 The Cost of Public Funds in an Open Economy

In the presence of distortionary taxes, the social cost of an additional dollar raised by taxes (namely, the marginal cost of public funds) may exceed one dollar owing to the existence of excess burden (deadweight loss) of taxation. The optimal provision of public goods is determined by equating their marginal benefit with the marginal cost of public funds. In this section, we directly examine the effect of relaxing the restrictions on B on the optimal level of G. Since we have assumed that the marginal benefit from G is diminishing (a concave m), it follows that the optimal G increases if and only if the marginal cost of public funds declines. In this way we indirectly analyze the effect of a liberalization of the international capital markets on the marginal cost of public funds.

For this purpose, we treat B as a parameter and examine the effect of changing B on the optimal quantity of the public good. Specifically, the optimal level of the public good is a function of B, denoted by $\bar{G}(B)$. We then look for the sign of $d\bar{G}/dB$ in the region where $F_1 = r < r^*$, so that increasing B enhances production efficiency and, thus, social welfare.

We proceed as follows. For given levels of G and B, let us maximize the private component of W in (13) (namely, $\Sigma_h \gamma_h v_h[q_2, q_L; I_h + S]$), subject to the resource constraint (12). Denote the value of the maximand by $N(B, G)$. Then, for a given B, the optimal G is determined by solving

$$\max_G \{N(B, G) + M(G)\}, \tag{14}$$

where $M(G) = \Sigma_h \gamma_h m^h(G)$.

The first-order condition is

$$N_2 + M' = 0, \tag{15}$$

and the second-order condition is

$$N_{22} + M'' \leq 0. \tag{16}$$

Totally differentiating (15) with respect to B yields

$$\frac{d\bar{G}}{dB} = \frac{N_{12}}{-(N_{22} + M'')}. \tag{17}$$

By (16), the denominator in (17) is positive. Hence,

$$\text{Sign}\left(\frac{dG}{dB}\right) = \text{Sign}(N_{12}). \tag{18}$$

To proceed further, at this point, we first abstract from redistribution considerations.

9.4.1 Efficiency Considerations

Suppose that all individuals are alike so that we may consider a single representative individual and drop the index h. (Alternatively, we may assume that redistribution can be done by nondistortionary means.) Alleviating the constraint on foreign lending affects the optimal size of government through two channels. First, increasing B generates an additional source of revenues for the government, thereby allowing lower taxes on existing sources. This tends to lower the marginal cost of public funds (and raise the size of government). Second, increasing B may adversely affect the internal terms of trade (associated with nontradable factors or goods) for government expenditures. This effect can raise the marginal cost of public funds (and lower the size of government). To highlight these two effects, we consider first in the next subsection the pure income effect.

Constant Internal Terms of Trade

Assume a linear production function, yielding constant real factor prices: $\bar{r}(\leq r^*)$ and $\bar{w}$, for capital and labor, respectively. In this case, we can unambiguously show that $N_{12} > 0$ and, consequently, that $d\bar{G}/dB > 0$.

The function $N(B, G)$ is defined in this case by

$$(19) \qquad N(B, G) = \max_{\{q_2, q_L, S\}} v(q_2, q_L; I + S)$$

subject to

$$\begin{aligned}\bar{r}[I &- C_1(q_2, q_L; I + S) - B] + \bar{w}L(q_2, q_L; I + S) \\ &+ [I - C_1(q_2, q_L; I + S) - B] + (1 + r^*)B \\ &- C_2(q_2, q_L; I + S) - G = 0.\end{aligned}$$

Hence, by the envelope theorem, we obtain

$$(20) \qquad N_2(B, G) = -\lambda(B, G) \leq 0,$$

where $\lambda(B, G) \geq 0$ is the Lagrange multiplier associated with the constraint in (19). From (20),

$$(21) \qquad N_{21}(B, G) = -\lambda_1(B, G).$$

Similarly, equation (19) (using the envelope theorem) yields

$$(22) \qquad N_1(B, G) = \lambda(B, G)(r^* - \bar{r}) \geq 0.$$

Therefore,

$$(23) \qquad N_{11}(B, G) = \lambda_1(B, G)(r^* - \bar{r}).$$

One can show (see App. B) that $N(\cdot, \cdot)$ is concave. Hence, $N_{11} < 0$, and it follows from (23) that $\lambda_1 < 0$. Thus, (21) implies that $N_{21} > 0$. Therefore, $d\bar{G}/dB > 0$. That is, the relaxation of international capital controls, in the absence of adjustment in the internal terms of trade, lowers the marginal cost of public funds and increases the optimal size of government.

Variable Internal Terms of Trade

To analyze the effect of variable internal terms of trade on government's expenditures in a simple manner, we assume that labor, the nontradable factor of production, exhibits diminishing marginal productivity and that government's expenditures are used entirely to hire labor. Specifically, we continue to assume constant internal intertemporal terms of trade, that is, that r is constant (at the level $\bar{r}$). However, in the second period, consumption can be provided (in addition to being transferred from the first period) by a concave production function, $f(L)$, using labor alone. The rent (pure profit) generated by such a technology is assumed to be fully taxed by the government. The government hires L_G units of labor in the second period at the prevailing wage, $w = f'$; the government does not purchase any quantity of the consumption good. We thus replace G by L_G.

In this case, the function $N(B, L_G)$ is defined by

(19a) $$N(B, L_G) = \max_{\{q_2, q_L, S\}} v(q_2, q_L; I + S)$$

subject to

$$\begin{aligned} &\bar{r}\,[I - C_1(q_2, q_L; I + S) - B] + f\,[L(q_2, q_L; I + S) - L_G] \\ &\quad + I - C_1(q_2, q_L; I + S) - B \\ &\quad + (1 + \bar{r})(B - C_2(q_2, q_L; I + S) = 0. \end{aligned}$$

Following the same procedure as in the preceding subsection, we conclude that

(21a) $$N_{21}(B, L_G) = -\lambda_1(B, L_G)w - \lambda(B, L_G)\frac{dw}{dB}.$$

The first term in the expression for N_{21} is similar to (21). As before, it is straightforward to show that $\lambda_1 < 0$, so that this term contributes toward making N_{21} positive, that is, toward increasing the size of government in response to alleviating controls on foreign lending (see eq. [17]). However, the second term may work in the opposite direction: the pure income effect of raising B tends to increase the consumption of leisure, thereby increasing the cost of labor that the government hires. Thus, the optimal L_G (namely, the real magnitude of government's consumption) may at the end decline in response to a liberalization of the international capital market. Note, however, that if capital and labor are substitutes in production, capital exports tend to lower the wage rate and thus lower the cost of public funds.

9.4.2 Redistribution Considerations

Now, let us return to the framework of the first subsection of 9.4.1 and reintroduce the redistribution motive.

To simplify the exposition, suppose that the economy consists of two individuals (or two classes of individuals), denoted by indices A and B. We further simplify the analysis by assuming a fixed labor supply (and dropping it altogether from the model). Thus, we are left only with intertemporal decisions and tax-induced intertemporal distortions. Still, to proceed further, we employ a log-linear utility function, in order to keep the analysis tractable.

To emphasize the equity issues, we consider the extreme case of a max-min social welfare criterion; that is, we assume for the social welfare function in (13) that $\gamma_B = 0$ and $\gamma_A = 1$ (where $I_A < I_B$). The function N, the maximized value of the private component in the social welfare function W, is defined in this case by

$$N(B, G) = \max_{t,S}\{\alpha \log[\alpha(I_A + S)] + (1 - \alpha)\log [(1 - \alpha)(I_A + S)(1 + \bar{r}(1 - t))]\} \tag{24}$$

subject to

$$(1 + \bar{r})[(I_A + I_B)(1 - \alpha) - 2\alpha S] - (1 - \alpha)[1 + \bar{r}(1 - t)](I_A + I_B + 2S) + (r^* - \bar{r})B - G = 0,$$

where the log-linear individual utility function is given by

$$u(c_1, c_2) = \alpha \log c_1 + (1 - \alpha)\log c_2. \tag{25}$$

Employing the constraint to eliminate S, we can reduce (24) to

$$\begin{aligned} N(B, G) &= \operatorname*{Max}_{t}\{\log[2I_A(1 + \bar{r}) + t(1 - \alpha)\bar{r}(I_B - I_A) \\ &\quad + (r^* - \bar{r})B - G] - \log[1 + \bar{r}(1 - (1 - \alpha)t)] \\ &\quad + (1 - \alpha)\log[1 + \bar{r}(1 - t)] + \text{constant}\} \\ &= \max_{t} H(t, B, G). \end{aligned} \tag{26}$$

The first-order condition for t is

$$H_1(t, B, G) = 0, \tag{27}$$

while the second-order condition is

$$H_{11}(t, B, G) \leq 0. \tag{28}$$

By the envelope theorem,

$$N_1(B, G) = H_2(t, B, G);$$

hence,

$$N_{12} = H_{21}\frac{\partial t}{\partial G} + H_{23}. \tag{29}$$

Total differentiation of (27) with respect to B yields

$$\frac{\partial t}{\partial G} = -\frac{H_{13}}{H_{11}}. \tag{30}$$

Hence, from (29) and (30), we obtain the expression for N_{12} as follows:

$$N_{12} = \frac{H_{12}H_{13} - H_{23}H_{11}}{-H_{11}}. \tag{31}$$

Since $H_{11} < 0$ (by [28]), it follows that

$$\text{Sign}(N_{12}) = \text{Sign}(H_{12}H_{13} - H_{23}H_{11}). \tag{32}$$

Using the definition of H (namely, eq. [26]) to find the partial derivatives H_{ij}, we substitute these derivatives into (32). This substitution yields

$$\text{Sign}(H_{12}H_{13} - H_{23}H_{11}) = \text{Sign}\left\{\frac{1}{[1 + \bar{r}(1 - t)]^2} - \frac{(1 - \alpha)}{[1 + \bar{r}(1 - (1 - \alpha)t)]^2}\right\} \tag{33}$$

(see App. C).

Since $0 < 1 - \alpha < 1$, it follows that (33) is positive and hence that $d\bar{G}/dB > 0$.[5]

9.5 Tax Structure and Redistribution in an Open Economy

In this section, we examine the effects of relaxing some of the controls on international capital flows on the structure of taxation and the size of redistribution. We continue to adopt the simplified framework of subsection 9.4.2. Assume further that the public component in the utility function $m^A(G)$ is equal to $\delta \log G$. In this case, the optimal policy is the solution to the following problem:

$$\max_{\{t,G\}}\{H(t, B, G) + \delta \log G\}, \tag{34}$$

where $H(\cdot)$ is defined in (26).

As before, B is a parameter, and we consider the relations between this parameter and the optimal values of t and G (denoted by $\bar{t}[B]$ and $\bar{G}[B]$, respectively). In doing so, we also find the effect of changing B on t' and S, as will be shown later.

The first-order conditions are

$$H_1(t, B, G) = 0, \tag{35}$$

$$H_3(t, B, G) + \frac{\delta}{G} = 0. \tag{36}$$

Total differentiation of (35)–(36) with respect to B yields

$$\frac{d\bar{t}}{dB} = \frac{1}{\Delta}(-H_{12}H_{33} + H_{13}H_{23} + H_{12}\delta/G^2), \tag{37}$$

where Δ is positive by the second-order conditions for the solution to (34).[6] In Appendix C, we show that

$$-H_{12}H_{33} + H_{13}H_{23} = 0 \tag{38}$$

and

$$H_{12} < 0. \tag{39}$$

Hence, $d\bar{t}/dB < 0$.

Thus, relaxing the controls on investments abroad reduces the optimal rate of tax on income from domestic investment. This is a natural result in view of the fact that relaxing the controls improves welfare. Since $t' = [r^* - (1 - t)\bar{r}]/r^*$, it follows that t' should be lowered too. That is, the optimal response to relaxing the restrictions on investments abroad is to lower the tax on income from such investments.

To find $d\bar{S}/dB$, recall that the constraint in (24) was employed in order to solve for S in terms of t, B, and G:

$$S = \frac{\bar{r}t(1 - \alpha)(I_A + I_B) + (r^* - \bar{r})B - G}{2\{1 + \bar{r}[1 - (1 - \alpha)t]\}}. \tag{40}$$

We have already concluded that an increase in B raises G and lowers t. These changes have conflicting effects on S, as can be seen from (40). We employed numerical calculations to demonstrate the effect of raising B on the optimal S. These calculations suggest that raising B increases the size of the demogrant S. Again, this result is natural in view of the fact that relaxing the restrictions on international capital flows improves the efficiency of total investment, thereby enabling the economy to devote more resources for redistribution of income. (Note that, if the government does not tax away the inframarginal profits arising from the quota due to the budget constraint, S must decline when G rises and t falls.)

The results of the numerical calculations are given in table 9.1.

9.6 Capital Mobility and International Tax Coordination

Capital market integration between two large countries brings out the issue of tax coordination between them. When residents of one country invest in the other country, one must reckon with the possibility of tax arbitrage that may undermine the feasibility of integration. It is quite obvious that some coordination between countries may in general improve the welfare of both countries. In the case of tax coordination, however, we show that coordination is essential for a sensible world equilibrium (with nonzero interest rates) to exit at all.

Table 9.1 **The Effect of Capital Controls on the Optimal Supply of the Public Good (G), on the Tax Rates (t and t'), and on the Demogrant (S)**

B	G	t	t'	S
0	.191	1.399[a]	1.266[a]	.381
.25	.193	1.391[a]	1.261[a]	.402

Note: Parameter values: $\alpha = 0.6$, $\delta = 0.05$, $\bar{r} = 0.50$, $r^* = 0.75$, $I_A = 1.0$, $I_B = 3.0$, $W = U^A = \alpha\log + C_1^A + (1 - \alpha)\log C_2^A + \delta \log G$.

[a]Note that physical investment and foreign lending are the only forms of transferring resources from the present to the future. Hence, t and t' may well exceed one, as long as $1 + (1 - t)\bar{r}$ and $1 + (1 - t')r^*$ are still positive.

To highlight this issue, consider a two-country world with perfect capital mobility. Denote the interest rates in the home country and the foreign country by r and r^*, respectively. In principle, the home country may have three different tax rates applying to interest income:

i. t_{RD} = the tax rate levied on domestic residents on their domestic-source income;
ii. t_{RF} = the tax rate levied on domestic residents on their foreign-source income; and
iii. t_{NRD} = the tax rate levied on nonresidents on their interest income in the home country.

The foreign country may correspondingly have three tax rates, which we denote by t^*_{RD}, t^*_{RF}, and t^*_{NRD}. Furthermore, let us assume that these rates apply symmetrically for both interest earned and interest paid (i.e., full deductibility of interest expenses, including tax rebates).

A complete integration of the capital markets between the two countries (including the possibility of borrowing in one country in order to invest in the other country) requires, owing to arbitrage possibilities, the fulfillment of the following conditions:

$$r(1 - t_{\mathrm{RD}}) = r^*(1 - t^*_{\mathrm{NRD}})(1 - t_{\mathrm{RF}}) \tag{41}$$

and

$$r(1 - t_{\mathrm{NRD}})(1 - t^*_{\mathrm{RF}}) = r^*(1 - t^*_{\mathrm{RD}}). \tag{42}$$

The first condition applies to the residents of the home country, and it requires that they be indifferent between investing at home or abroad. Otherwise, they can borrow an infinite amount in the low (net of tax) interest rate country in order to invest an infinite amount in the high (net of tax) interest rate country. The second condition similarly applies to the residents of the foreign country.

Notice that, unless

$$(1 - t_{\mathrm{RD}})(1 - t^*_{\mathrm{RD}}) = (1 - t_{\mathrm{NRD}})(1 - t^*_{\mathrm{RF}})(1 - t^*_{\mathrm{NRD}})(1 - t_{\mathrm{RF}}), \tag{43}$$

the only solution to the linear system of equations (41)–(42) is a zero rate of interest in each country:

$$r = r^* = 0.$$

Since this is impossible, some international tax coordination is needed in order to satisfy (43) and yield a sensible world equilibrium.

Somewhat surprisingly, the two most common polar schemes of source-based or origin-based taxation are examples of workable tax coordinations (although by no means globally efficient arrangements), even when the two countries do not adopt the same scheme. Consider first the case in which both countries adopt the source-based tax scheme. In this case, income is taxed according to its source, regardless of the origin of the taxpayer. This implies that

$$\text{(44)} \qquad t_{\mathrm{RD}} = t_{\mathrm{NRD}}, \quad t^*_{\mathrm{RD}} = t^*_{\mathrm{NRD}}, \quad t_{\mathrm{RF}} = t^*_{\mathrm{RF}} = 0,$$

so that (43) is satisfied and we can have a world equilibrium with positive rates of interest.

Similarly, consider the case in which both countries adopt the origin-based tax scheme: income is taxed according to the origin of the taxpayer, regardless of its source. This implies that

$$\text{(45)} \qquad t_{\mathrm{RD}} = t_{\mathrm{RF}}, \quad t^*_{\mathrm{RD}} = t^*_{\mathrm{RF}}, \quad t_{\mathrm{NRD}} = t^*_{\mathrm{NRD}} = 0,$$

so that, again, (43) is satisfied.

Next, consider the case in which one country adopts one tax scheme while the other adopts another one. Suppose, for instance, that the home country adopts the origin-based tax scheme while the foreign county adopts the source-based tax scheme. In this case, we have

$$\text{(46)} \qquad \begin{aligned} t_{\mathrm{RD}} &= t_{\mathrm{RF}}, \quad t_{\mathrm{NRD}} = 0, \\ t^*_{\mathrm{RD}} &= t^*_{\mathrm{NRD}}, \quad t^*_{\mathrm{RF}} = 0, \end{aligned}$$

and, again, (43) is satisfied.

However, if the two countries do not stick to one or the other of the two polar schemes, then (43) need not hold, and no sensible world equilibrium exists. Suppose, for instance, that each country levies the same tax rate on its residents (irrespective of the source of their income) and also on all nonresidents investing in that country. In this case, we have

$$\text{(47)} \qquad t_{\mathrm{RD}} = t_{\mathrm{RF}} = t_{\mathrm{NRD}}, \quad t^*_{\mathrm{RD}} = t^*_{\mathrm{RF}} = t^*_{\mathrm{NRD}}.$$

Hence, unless $(1 - t_{\mathrm{NRD}})(1 - t^*_{\mathrm{NRD}}) = 1$, which is just a sheer coincidence, condition (43) is violated.

Thus, some tax coordination is essential for a full capital market integration. Any mutually beneficial tax coordination must satisfy the tax arbitrage condition (43). In Razin and Sadka (1989b) we found that tax competition among countries leads to each one adapting the residence principle of income taxation.

9.7 Conclusion

In this paper, we analyzed the policy implications of the integration of the international capital markets. Special attention was paid to the effects on the marginal cost of public funds, a crucial factor in the determination of the optimal size of government and the magnitude of income redistribution. Inherent in the determination of the cost of public funds is the design of the structure of taxation (on labor income, domestic-source capital income, and foreign-source capital income).

We show that it is not efficient to impose restrictions on capital exports and that every incremental move toward a more liberalized policy concerning the international flows of capital is welfare improving. This result depends crucially, however, on the assumption that the government can effectively tax foreign-source income. In Razin and Sadka (1989a,b), we consider the case in which the government cannot effectively tax capital income from foreign sources.

In the context of a world economy with integrated capital markets, there arises the issue of international tax coordination. This issue has two aspects. First is the elementary problem of what international tax arrangements are at all viable in the wake of capital market arbitrage possibilities. This issue was dealt with in this paper. A second aspect (dealt with in Razin and Sadka 1989b) is the determination of mutually beneficial international tax arrangements from the set of viable arrangements.

Appendix A

In this appendix, we prove that $N(B, G)$ is concave. Recall that $N(B, G)$ is defined by (19). Since there is only one individual and a lump-sum tax/subsidy is allowed, it follows that the government can choose any bundle (C_1, C_2, L) that is feasible (i.e., that satisfies the resource constraint in [19]). Thus, N may be equivalently defined by

$$\text{(A1)} \qquad N(B, G) = \max_{C_1, C_2, L} u(C_1, C_2, L)$$

subject to

$$\bar{r}(I - C_1 - B) + \bar{w}L + I - C_1 + r^*B - C_2 - G \geq 0.$$

We have to show that

$$N[aB' + (1 - a)B'', aG' + (1 - a)G''] \geq aN(B', G') + (1 - a)N(B'', G'')$$

for all (B′, G′), (B″, G″), and $0 \leq a \leq 1$.

Suppose that the bundle (C'_1, C'_2, L') is a solution to (A1) for $(B, G) =$

(B', G') and that the bundle (C''_1, C''_2, L'') is a solution to (A1) for $(B, G) = (B'', G'')$, namely, $N(B', G') = u(C'_1, C'_2, L')$ and $N(B'', G'') = u(C''_1, C''_2, L'')$.

By being solutions to optimum problems, the bundles (C'_1, C'_2, L') and (C''_1, C''_2, L'') satisfy the constraint in (A1), namely,

$$\text{(A2)} \quad \bar{r}(I - C'_1 - B') + \bar{w}L' + I - C'_1 + r^*B' - C'_2 - G' \geq 0$$

and

$$\text{(A3)} \quad \bar{r}(I - C''_1 - B'') + \bar{w}L'' + I - C''_1 + r^*B'' - C''_2 - G'' \geq 0.$$

Hence, on multiplying (A2) by the factor a and (A3) by the factor $(1 - a)$ and adding them together, it follows that

$$\begin{aligned} \text{(A4)} \qquad & \bar{r}\{I - [aC'_1 + (1 - a)c''_1] - [aB' + (1 - a)B'']\} \\ & + \bar{\omega}[aL' + (1 - a)L''] + I - [aC'_1 + (1 - a)C''_1] \\ & + r^*[aB' + (1 - a)B''] - [aC'_2 + (1 - aC''_2] \\ & - [aG' + (1 - a)G''] \geq 0. \end{aligned}$$

Thus, the bundle $[aC'_1 + (1 - a) C''_1, aC'_2 + (1 - c)C''_2, aL' + (1 - a)L'']$ is feasible for $(B, G) = [aB' + (1 - a)B'', aG' + (1 - a)G'']$. Therefore,

$$\begin{aligned} \text{(A5)} \qquad & N[aB' + (1 - a)B'', aG' + (1 - a)G''] \\ & \geq u[aC'_1 + (1 - a)C''_1, aC'_2 + (1 - a)C''_2, aL' + (1 - a)L''] \\ & \geq au(C'_1, C'_2, L') + (1 - a)u(C''_1, C''_2, L'') \\ & = aN(B', G') + (1 - a)N(B'', G''), \end{aligned}$$

where the first inequality in (A5) follows from the definition of $N(\cdot, \cdot)$ as the value of the maximand in (A1), and the second inequality follows from the concavity of u. This completes the proof of the concavity of N.

Appendix B

In this appendix we verify the expressions of (33) and (38)–(39). The function H (see [26]) is given by

$$\begin{aligned} \text{(B1)} \qquad H(t, B, G) = {} & \log[2I_A(1 + \bar{r}) + t(1 - \alpha)\bar{r}(I_B - I_A) \\ & + (r^* - \bar{r})B - G] - \log(1 + \bar{r}[1 - (1 - \alpha)t]) \\ & + (1 - \alpha)\log[1 + \bar{r}(1 - t)]. \end{aligned}$$

The first-order derivatives are

$$\begin{aligned} \text{(B2)} \qquad H_1 = {} & [2I_A(1 + \bar{r}) + t(1 - \alpha)\bar{r}(I_B - I_A) \\ & + (r^* - \bar{r})B - G](1 - \alpha)\bar{r}(I_B - I_A) \\ & + \{1 + \bar{r}[1 - (1 - \alpha)t]\}^{-1}\bar{r}(1 - \alpha) \\ & - \bar{r}(1 - \alpha)[(1 + \bar{r}(1 - t)]^{-1}, \end{aligned}$$

(B3)
$$H_2 = [2I_A(1 + \bar{r}) + t(1 - \alpha)\bar{r}(I_B - I_A) + (r^* - \bar{r})B - G]^{-1}(r^* - \bar{r}),$$

and

(B4)
$$H_3 = -\frac{H_2}{r^* - \bar{r}} \cdot$$

The second-order derivatives are:

(B5)
$$H_{11} = -(1 - \alpha)^2\bar{r}^2(I_B - I_A)^2[2I_A(1 + \bar{r}) + t(1 - \alpha)\bar{r}(I_B - I_A) + (r^* - \bar{r})B - G]^{-2} + \bar{r}^2(1 - \alpha)^2\{1 + \bar{r}[1 - (1 - \alpha)t]\}^2 - \bar{r}^2(1 - \alpha)[1 + \bar{r}(1 - t)]^{-2},$$

(B6)
$$H_{12} = \bullet(r^* - \bar{r})[2I_A(a + \bar{r}) + t(1 - \alpha)\bar{r}(I_B - I_A) + (r^* - \bar{r})B - G]^{-2}\bullet(1 - \alpha)\bar{r}(I_B - I_A),$$

(B7)
$$H_{13} = \frac{-H_{12}}{r^* - \bar{r}},$$

(B8)
$$H_{22} = \frac{H_{12}(r^* - \bar{r})}{(1 - \alpha)\bar{r}(I_B I_A)},$$

(B9)
$$H_{23} = \frac{-H_{12}}{(1 - \alpha)\bar{r}(I_B - I_A)},$$

and

(B10)
$$H_{33} = \frac{H_{12}}{(r^* - \bar{r})(1 - \alpha)\bar{r}(I_B - I_B)}.$$

Hence,

$$H_{12}, H_{13} - H_{11}, H_{33}$$
$$= \left(\frac{1}{[1 + \bar{r}(1 - t)]^2} - \frac{(1 - \alpha)}{\{1 + \bar{r}[1 - (1 - \alpha)t]\}^2}\right)(r^* - \bar{r})\bar{r}^2(1 - \alpha)\bullet$$
$$\frac{1}{[2I_A(1 + \bar{r}) + t(1 - \alpha)\bar{r}(I_B - I_A) + (r^* - \bar{r})B - G]^2}.$$

This completes the proof of (33).

Next we prove (38) and (39). Employing (B6), (B7), (B9), and (B10), we find that

$$-H_{12}H_{33} + H_{13}H_{23} = \frac{-(H_{12})^2}{(r^* - \bar{r})(1 - \alpha)\bar{r}(I_B - I_A)} + \frac{(H_{12})^2}{(r^* - \bar{r})(1 - \alpha)\bar{r}(I_B - I_A)} = 0,$$

which proves (38). From (B6), we observe that $H_{12} < 0$, which proves (39).

Notes

1. In a recent paper, Micossi (1988) provides a succinct survey of the proposed institutional arrangements for the 1992 European integration. He writes, "The European integration entails the elimination of restrictions and discriminatory regulations and administrative practices concerning: (i) the right of establishment and acquisition of participations by foreign institutions in domestic financial markets; (ii) permitted operations of foreign-controlled financial institutions; (iii) cross-border transactions in financial services. The first two items basically involve the freedom to supply services in EC national markets, the third, the freedom to move capital throughout the Community."

2. For an earlier discussion of the interaction among taxes, government consumption, and international capital flows, see Razin and Svensson (1983).

3. To ensure diminishing marginal rates of substitution between private and public commodities, we assume, as usual, that u^h and m^h are strictly concave.

4. An equivalent policy to taxing away the inframarginal profits (resulting from the net interest differential) is to auction off the quotas on investment abroad.

5. The reader who is familiar with the optimal income tax literature may realize that the issue of the sign of $d\bar{G}/dB$ is related to the issue of the concavity of the maximized (reduced-form) social welfare function with respect to tax revenues (see Balcer and Sadka 1982; and Stiglitz 1982).

6. The derivative $d\bar{G}/dB$ is negative, as shown in sec. 9.4.2.

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Comment

Jack M. Mintz

The paper by Assaf Razin and Efraim Sadka raises an interesting issue for countries that relax capital controls. What effect do such policies have on the optimal fiscal decisions of a benevolent government? Their main result is that a government may reduce the capital income tax rate and, under certain circumstances, expand government expenditures if capital controls are relaxed. With respect to the latter, relaxing capital controls on exported savings reduces the marginal cost of public revenues, thus allowing government expenditure to increase, but it may increase the price of nontraded goods (i.e., labor) used in public production and hence, possibly reduce the expansion of the government sector.

The above results are not intuitively obvious, at least to me, at first glance. In these remarks, I will offer an alternative explanation of the Razin-Sadka results in a simpler version of their model. Despite the simplicity of my own model, I will be able to derive similar efficiency results but with an interpretation that varies from that offered by the authors. Of course, the model can be extended in other ways, as suggested by Razin and Sadka.

In my discussion below, I will also raise a number of other points that are important in determining the effect of capital controls on the fiscal decisions of open economies. Although I agree with the Razin-Sadka analysis, I find that it neglects several important issues that are of interest to policymakers. In particular, they examine a capital exporting country that finances a public consumption good using labor and capital income taxes on residents. No interaction effects with other countries are considered. Savings are invested in domestic and foreign assets that are perfect substitutes, and the international interest rate on foreign assets is exogenous to the small open economy. I wish to extend the Razin-Sadka analysis to consider the effect of the capital controls on fiscal decisions in the following contexts: (i) countries are capital importers as well as exporters, (ii) capital income taxes apply at the firm level and are imposed on nonresidents, and (iii) tax and regulatory policies affect not only the welfare of the country imposing the tax or regulation but also the welfare of other countries. The latter topic may be important for considering the fiscal effect of capital market integration in the European Economic Community.

Capital Importing versus Capital Exporting Considerations

Fiscal decisions often differ considerably for capital exporting and capital importing nations. If the Razin-Sadka analysis is extended to a capital

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importing framework, what would be the optimal tax decisions, and how would a government react if capital restrictions on imports are relaxed?

To answer these questions, I will consider a simpler form of the Razin-Sadka model. In particular, I shall assume that labor is fixed in supply (so a wage tax is a lump-sum tax). I will also assume that all individuals are identical in the country and that utility is an additive function defined over first- and second-period consumption goods and the public good. In addition, utility is linear in second-period consumption goods (so there are no income effects on savings). I also assume that the capital income tax on foreign and domestic savings is identical, which is a special case of the Razin and Sadka model.

Following the Razin-Sadka analysis, consider an economy that may be (i) a capital exporter facing restrictions on capital exports, $\bar{B}$, or (ii a capital importer facing restrictions on capital imports, $\underline{B}$. Let I denote the endowment of wealth in the first period, c_1 and c_2 first- and second-period consumption, respectively, G consumption of the public good, K domestic capital stock, B net foreign assets ($B = A - c_1 - K$), r^* the international interest rate, t the capital income tax rate, and τ lump-sum taxes. The market equilibrium for the economy can be described as solutions to the following problem:

$$\max_{\{c_1, c_2, K, B\}} U(c_1) + c_2 + g(G),$$

subject to

$$\begin{aligned} c_2 = K + (1 - t)f(K) + [1 + r^*(1 - t)]B - \tau, \\ B = I - c_1 - K \leq \bar{B}, \\ B = I - c_1 - K \geq \underline{B}. \end{aligned}$$

The first-order conditions for this problem yield the familiar results that the marginal rate of substitution would be equal to, less than, or greater than $[1 + r^*(1 - t)]$ for the cases of $\bar{B} < B^* < \underline{B}$ (unconstrained capital importer or exporter), $B = \bar{B}$ (constrained capital exporter), and $B = \underline{B}$ (constrained capital importer), respectively. The firm's capital stock decision would be governed by the condition that the marginal productivity of capital, f', equals the (gross of personal tax) "domestic" interest rate, r (which, net of personal taxes, is equal to the time preference rate). In the unconstrained case, this implies $r = r^*$, given the same tax rate imposed on domestic and foreign capital income. For the constrained capital exporter, $r < r^*$ (as suggested by Razin and Sadka), and, for the constrained capital importer, $r > r^*$.

What are the optimal fiscal decisions for the government given the capital controls on net foreign assets B? To obtain the optimal fiscal decisions, t^*, G^*, and τ^*, the government maximizes the indirect utility function, $V(t, \tau, G)$ subject to the second-period budget constraint, $G = t[F(K) + r^* B] + \tau$. The private-sector choices of savings and capital investment depend only on the capital income tax given the absence of income effects. If the country is unconstrained, the capital income tax rate has no effect on the investment decision, K. Only savings and net foreign assets are affected. If the country is a constrained capital exporter, the capital income tax reduces domestic savings and, subsequently, investment. Net foreign assets remain fixed. Finally, if the country is a constrained capital importer, the capital income tax reduces savings and the domestic capital investment since capital imports are fixed (i.e., $\partial c_1/\partial t = \partial K/\partial t$ when B is restricted). Note that, in this formulation, interest on foreign borrowings is fully deducted from the income tax.

The solution for the optimal capital tax rate for this problem is the following:

(i)
$$t^* = \frac{[f(K) + r^*B^*](1 - \lambda/\phi)}{-\partial K/\partial t}$$

for $B^* = \bar{B}$ or $\underline{B}$ with

$$\lambda = 1$$

and

$$\phi = 1 + (r - r^*)(1 - t)\partial c_1/\partial t - (f' - r^*)(1 - t)\partial K/\partial t;$$

(ii)
$$t^* = 0 \text{ for } \underline{B} < B^* < B.$$

Note that λ is the marginal utility of the second-period good valued by the private sector and that ϕ is the social marginal value of tax revenue (used to finance public goods in the second period). Conditions (i) and (ii) are readily interpreted by considering the effect of a tax on savings on the allocation of capital in the economy.

The optimal capital income tax rate for the unconstrained economy is zero (given market equilibrium conditions $r = r^*$ and $f' = r^*$ so that $\phi = \lambda$, yielding the result in [ii]). This is quite sensible since a capital income tax is distortionary and only lump-sum taxes should be imposed.

When the economies are constrained by capital controls, then the capital income tax reduces savings and, therefore, investments in domestic assets since net foreign assets are constrained either at $\bar{B}$ or $\underline{B}$. For the constrained capital exporter, this implies that the social value of public revenue is at least as great as the private value $\phi \geq \lambda$ since $r < r^*$ and $f' < r^*$. Thus, given $\partial K/\partial t < 0$, the optimal tax rate is positive. For the capital importing country, the optimal capital tax rate is negative.

Intuitively, these results can be explained as follows (see figs. C9.1 and C9.2). If the country is a capital exporter, capital controls subsidize domestic investment by forcing domestic savings into the domestic asset, causing the gross-of-tax domestic interest to fall. To counteract this effect, a capital income tax can be imposed on savings that causes the gross-of-tax domestic

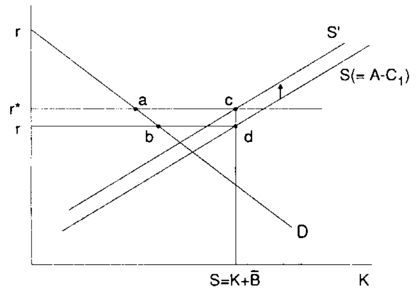

Fig. C9.1 Capital exporting country

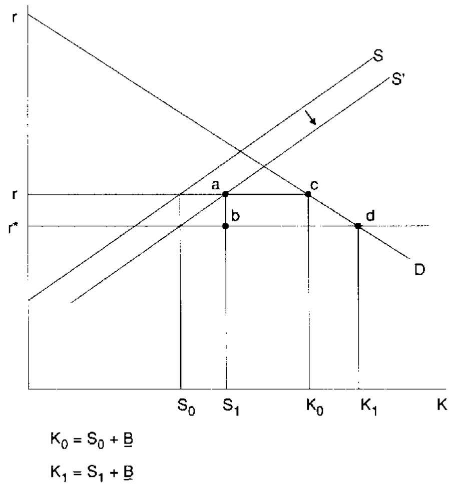

Fig. C9.2 Capital importing country

interest rate to rise, subsequently reducing domestic investment. This tax causes inframarginal returns on capital investment to decline by the area *r*rba* in figure C9.1. However, the tax raises revenue equal to *r*rdc*, yielding a net gain in welfare indicated by the area *abdc*. In principle, the capital income tax rate, in this model, can be raised until $r = r^*$, which would lead to second-best efficiency.

For a capital importing country, the opposite results hold. Domestic capital investment is discouraged since capital controls cause the domestic interest to rise above the world interest rate. Instead of taxing capital, savings are subsidized since the domestic gross-of-tax interest rate is too high. As shown in figure C9.2, the gain in rents to capital is *r*rcd*, and the cost of the subsidy is *rr*ba*, yielding a net welfare gain of *abcd*.

This model, although somewhat special, does illustrate the efficiency results obtained in the Razin-Sadka paper. A reduction in capital controls (through a higher $\bar{B}$ in the case of capital exporting country or lower $\underline{B}$ in the case of capital importing country) lowers the optimal corporate tax rate. This can be easily demonstrated by noting that the domestic interest rate, r, moves closer to the international interest rate r^* (in both eq. [i] and [ii] and in the corresponding figures). However, the intuition provided here is different from that explained by Razin and Sadka. In the above model, government expenditures need not be affected by the capital controls (only lump-sum taxes may change). Capital income taxes, however, are imposed since they correct for imperfections caused by capital controls. This is true even though the tax system would otherwise be nondistortionary. In fact, this model would lead to a corner solution—the optimal tax rate is set until $r = f' = r^*$ (this would not necessarily be the case in the Razin-Sadka model).

The above illustrates two issues that would be of interest to explore that are not discussed in Razin and Sadka. The first is that capital controls for a capital importing country imply that a country would subsidize savings and labor if a lump-sum tax could be imposed. The second is that it may be possible for regimes to change in that the use of the fiscal system may move a country from a constrained to an unconstrained equilibrium in capital markets. This could be efficient, suggesting the possibility that the tax system might make capital controls ineffective.

The Role of Corporate and Withholding Taxes

In the Razin and Sadka model, and the one discussed above, the capital income tax can be viewed as personal tax on domestic and foreign-source income. When a personal income tax is imposed in a capital exporting country and net exports of capital are constrained, domestic savings fall, and, as a result of rising interest rates, domestic capital investment also declines. If a corporate tax is imposed on domestic investment of firms (and leaves net foreign assets of households free of tax), domestic investment declines. The demand for foreign assets increases, but households are restricted from purchasing foreign assets. Their consumption of the first-period good thus increases, causing savings to decline and the interest rate to rise. A similar story holds for the capital importing country in that personal and corporate tax/subsidies have a similar effect on the equilibrium. These results suggest that aggregate effects of corporate and personal tax policies in a small open economy can be equivalent when capital controls are binding.

The above result, obtained in the Razin-Sadka paper, is quite interesting since it is well known that the effects of corporate and personal tax policies in a small open economy are not equivalent when there are no capital controls (see Boadway, Bruce, and Mintz 1984; and Bovenberg et al. in this volume). A personal tax on capital income causes domestic savings to decline, but not investment. For a capital exporting country, net foreign assets held by the economy decline, and, for a capital importing country, net foreign borrowings rise. If a corporate tax is imposed, the result is different. A corporate tax causes capital investment to decline, but not domestic savings. A capital exporting country increases its net foreign assets, and a capital importing country reduces its net foreign borrowings. In the presence of lump-sum taxes, neither tax is optimal. A small open economy would "shoot itself in the foot" by taxing capital income either at the corporate or at the personal level. Without lump-sum taxes, a personal tax on capital income may be optimal, but not a corporate tax, since productive efficiency is maintained, a familiar point made by Razin and Sadka in their paper.

The Razin-Sadka model does not address the implications of nonresident withholding taxes imposed by capital importing countries when fiscal decisions are made in the presence of capital controls. This is somewhat unfortunate since withholding taxes may offset the gains that arise from capital taxation when capital controls are imposed. A withholding tax paid by lenders to foreign countries is usually credited against home tax liabilities, which implies that the combined domestic and foreign tax on foreign-source income is equal to the domestic tax on domestic-source income. As a result, the household faces the same budget constraint when withholding taxes are imposed, but the government faces a different budget constraint since savings in foreign assets yield less domestic tax. In terms of national income, savings in foreign assets are of less value than savings in domestic assets for the capital exporting country. This implies that it may not be optimal to impose capital income taxes on savings since the gain in tax revenue may not be sufficient to offset the loss of inframarginal rents earned by domestic capital investments. Thus, capital taxation may not be desirable for the capital exporting country. Similarly, for the capital importing country that taxes interest earned by foreigners, a subsidy for domestic savings may not be desirable.

Capital Controls and Fiscal Policy Coordination

The Razin-Sadka model is a special one in the context of analyzing capital market integration and tax harmonization since tax and regulatory competition problems are not particularly important in their model. Since each country is assumed to be small, they face a perfectly elastic supply of capital from international markets. As a result, fiscal and regulatory policies chosen by one government have no effect on the decisions of others.

This can be explained as follows. Consider capital controls imposed by a capital exporting economy. With no other countries involved, a capital importing economy is also constrained by the capital regulations imposed by the capital exporting country. However, in the small open economy context, the constraint is avoided by the capital importing country since it can obtain capital from other countries at the same interest rate. Thus, capital regulations in one country cannot affect the welfare of the other, and no regulatory competition problem exists between the countries. With capital tax policies, the same argument arises. One country's fiscal regime cannot affect the other since capital can be obtained from international markets without affecting the international cost of funds. Capital tax competition is not a problem either.

If all the above is true, then why should the European nations be at all concerned with regulatory and capital income tax harmonization? Clearly, it is in the best interest of each country to avoid regulatory constraints and choose optimal taxes. Otherwise, they only make themselves worse off. Thus, countries pursuing self-interest would not impose capital taxes or controls anyway. It seems to me that the small open economy assumed by Razin and Sadka may not be a useful characterization of the issues faced by the European Economic Community.

I can think of two cases in which fiscal and regulatory policy competition matters in the sense that one country's action directly affects the interests of another country. The first case is an obvious one: instead of assuming "smallness," one can assume that economies are large relative to each other. In this case, a country that restricts the exportation of capital causes the international interest rate to rise, making its own residents better off but making residents in capital importing countries worse off. Similarly, a capital importing country that restricts the importation of capital forces the world interest down, making the capital exporting countries worse off. Thus, both tax and regulatory competition lead to nonoptimal policies from a worldwide efficiency point of view. It would be interesting to know what type of coordination is needed in this context. If countries only agree to eliminate capital controls, then to what extent would fiscal policies be used to restrict capital imports? As Razin and Sadka note, a country could tax foreign-source income earned by residents as an alternative to capital regulations.

A second source of capital tax competition arises in the context of withholding taxes. As Razin and Sadka implicitly note, withholding taxes imposed by countries are not easy to incorporate in their model. As they show, equilibrium in capital markets holds only if all countries use source-based taxes (taxes imposed on capital income generated at source with foreign-source income of residents exempt from tax) or residence-based taxes (capital income accruing to nonresidents' taxes is exempt, and both domestic and foreign-source income is taxed). Razin and Sadka emphasize the need for harmonization of capital income taxes to ensure the existence of a capital market equilibrium.

Tax competition and harmonization problems, however, are not well understood using models that assume that domestic and foreign assets are perfect substitutes for each country's investors. Instead, tax competition problems would be more interesting if it were assumed that domestic and foreign assets are not perfect substitutes. This would allow for a financial equilibrium in which income generated in different jurisdictions and earned by different investors would be taxed at different rates. For example, many empirical studies suggest that risk is country-specific so that domestic and foreign assets are not perfect substitutes (for an examination of tax policy in this context, see Gordon and Varian 1986). With imperfect substitutability, capital income taxes and capital controls imposed by a country affect the rates of return on individual assets and make savers better off and borrowers worse off.

When assets are not perfect substitutes, withholding taxes, such as nonresident taxes on dividends and interest and corporate income taxes, add another element of tax competition since the tax is paid by nonresident investors or, in the case of crediting, foreign governments. When there is crediting, a capital importing country may obtain a "free lunch" by imposing a withholding tax on nonresidents. This "free lunch" occurs because the capital importing country is able to impose a tax that transfers income from the foreign government treasuries without affect foreign savings. Thus, capital importing countries find it in their favor to export taxes by taxing nonresidents' income particularly if the tax has no distortionary effects. One would find in this type of model that the harmonization of tax bases is important if countries are to reduce the exportation of taxes on nonresidents. This problem goes well beyond the issues of harmonization discussed by Razin and Sadka.

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