

CAPITAL MOBILITY, DISTRIBUTIVE CONFLICT AND INTERNATIONAL TAX COORDINATION¹

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Abstract

Basic economic theory identifies a number of efficiency gains that derive from international capital mobility. But just as with free trade in goods, there is no guarantee that capital mobility makes everyone better off. Consequently, capital mobility may be politically unsustainable even though it enhances efficiency. This paper discusses how such a dilemma might arise, and suggests that international tax coordination might serve as a way out under some circumstances.

Basic economic theory identifies a number of efficiency gains that derive from international capital mobility. Free trade in capital allows a superior utilization of resources, the spreading of risk, and ultimately a higher rate of economic growth through the adoption of higher-yield, higher-risk activities (Obstfeld 1994). But just as with free trade in goods, there is no guarantee that capital mobility makes everyone better off. Consequently, capital mobility may be politically unsustainable even though it enhances efficiency. This paper discusses how such a dilemma might arise, and suggests that international tax coordination might serve as a way out under some circumstances.

We focus on a framework with symmetric countries, where the benefits from capital mobility arise from the ability of capital-owners to diversify country-specific risk. As long as shocks to domestic returns to capital are not perfectly correlated across countries, risk-averse capitalists unambiguously benefit from international capital mobility. Risk-averse workers lose, however, since the movement of capital in response to shocks induces fluctuations in real wages and creates a source of risk for labor income. In other words, capital mobility entails a negative externality for workers (Rodrik 1997, chap. 4). Reaping the efficiency gains of capital mobility, therefore, may require finding ways of sharing the benefits with workers.

There is some evidence that national governments, particularly of the left-leaning kind, have recognized the potential adverse effects of capital mobility on workers and have tried to offset it. Focusing on 15 advanced industrial countries over the 1967-90 period, Garrett (1995) finds that governments that have removed controls on capital flows are likely to spend a higher share of GDP, especially if they are run by parties of the left. Higher volumes of trade, reflecting in part greater possibilities of outsourcing, are also correlated with larger public spending -including compensatory transfers- in a broad sample of countries (Rodrik 1998).

A subsidy for workers financed by a tax on capital income is the obvious

remedy for redistributing the gains from international capital mobility. But a high level of international capital mobility poses a problem for such a policy insofar as it enables domestic capitalists to evade the tax imposed on them. Domestic fiscal policy will be generally inadequate to undo the costs imposed on workers by capital mobility. Therefore, to the extent that workers' support is needed for major policy changes, capital mobility may not be politically sustainable when tax policy is determined at the national level and unilaterally. The solution is tax coordination at the international level. We show that, in the symmetric cases we focus on, there always exists a coordinated tax regime which is Pareto-superior, and hence politically sustainable.

The idea that a decentralized (Nash) equilibrium in taxes is suboptimal in a world of capital mobility is well recognized. In particular, tax competition is generally expected to drive tax rates down to inefficiently low levels. Our contribution to this literature is twofold. First, as a normative matter, we make the point that tax competition becomes a more serious problem than is usually recognized when one takes into account some of the redistributive effects of capital mobility. As we show in our model, Pareto-optimality requires that capital mobility be matched with an *increase* in the tax on capital (and not simply with the maintenance of the tax at a pre-existing level). Capital mobility requires compensatory transfers that, thanks to mobility, are now harder to finance. Second, as a positive matter, we argue that capital mobility may not be a political equilibrium when workers are sufficiently influential in the political sphere and taxes are not coordinated internationally.

Our argument for international tax coordination as a mechanism for getting out of a political impasse - reaping the benefits of capital mobility while compensating the losers- has, to our knowledge, not been developed in the academic literature. The discussion on tax coordination typically focuses on the question of the extent to which capital mobility drives national tax

rates down, and on issues of institutional design regarding the selection of a cooperative tax rate at the international level (see for example Gordon 1992 and Razin and Sadka 1991; Persson and Tabellini 1995 provide a nice survey).

A paper by Persson and Tabellini (1992) is noteworthy in that it does make the connection with domestic politics. This paper analyzes how national tax rates are determined in a model of a representative democracy where voters take into account the constraint imposed by capital mobility. They show that the downward pressure on tax rates can be ameliorated by voters electing governments with a stronger preference for taxes. Hence domestic politics partially offsets the inefficiency of Nash-Cournot behavior at the international level. Our logic differs from Persson and Tabellini (1992) in one key respect: we require that no significant group (i.e., labor) be a net loser. This constraint raises the possibility that the compensatory adjustments in national tax rates may not be feasible in the absence of explicit coordination.

1 The model

We will use a very simple model to capture the intuition described in the introduction. We assume a world with two symmetric countries, home and foreign. Both countries produce and trade an identical consumption good. This good is produced under constant returns to scale and through a combination of capital and labor. Each country is affected by a particular productivity shock, ε and ε^* whose joint distribution has a mean $(\bar{\varepsilon}, \bar{\varepsilon}^*)$ and a variance-covariance matrix¹

$$\begin{pmatrix} \sigma^2 & \mu \\ \mu & \sigma^2 \end{pmatrix}.$$

¹We denote with a star (*) all the foreign variables. Unless required otherwise, we describe functions and variables only for the home country.

Let the production function be described by

$$F(K, L) = L(f(k) + \varepsilon k),$$

with the usual regularity conditions: $F_K > 0$, $F_L > 0$, $F_{KK} < 0$, $F_{LL} < 0$ and $F_{KL} > 0$. and where $k \equiv \frac{K}{L}$. If we normalize the consumption price to one, factor remunerations are defined by:

$$r = f' + \varepsilon \text{ and } w = f - kf'.$$

The demand for capital is given by

$$k = f'^{-1}(r - \varepsilon) \tag{1}$$

with $k' = \frac{1}{f''}$.

The population of each country is assumed to be divided into two groups: workers and capital owners. Both types are risk averse and share the same indirect utility function; $V(I)$ where I is the disposable income and $V' > 0$ and $V'' < 0$. The groups only differ in their factor endowment. Workers own one unit of labor and capital owners one unit of capital. Factors of production are inelastically supplied. Each country is endowed with \bar{L} units of labor and \bar{K} units of capital. Therefore, the net income of a capital owner and a worker are respectively given by

$$I^k = r - T \text{ and } I^l = w + T\bar{k} \tag{2}$$

where T is the source based² per unit capital income tax at home, $\bar{k} = \frac{\bar{K}}{\bar{L}}$ and the l (k) superscript denotes a worker (capital owner) variable.

The sequence of events is the following:

- (1) Workers and capital owners in each country decide between two regimes:
 - (a) a status-quo regime with no international capital mobility in which

²By a source based tax, we mean a tax that is levied at the source of the income. This is in opposition to a residency based tax that is levied at the residence of the recipient of the income.

the redistributive capital tax is set equal to zero; and **(b)** an alternative regime in which international capital mobility is allowed and as a quid pro quo the government selects a redistributive capital tax to maximize workers' expected welfare. The second regime is adopted only if both groups prefer it to the status-quo. Otherwise the status-quo regime is maintained.³

- (2) Capital taxes are selected simultaneously and independently in each country.
- (3) Productivity shocks unfold.
- (4) Equilibrium levels of remuneration and of capital allocation between the two countries are determined.

We first describe the welfare of each type of agents under the two regimes. We then solve the two-stage game backward. We define the optimal fiscal policies with and without liberalization, and then show that there are cases where liberalization would not pass. We then show that, under a modified version of this game which allows for fiscal coordination, liberalization will always pass.

1.1 Welfare effect of shocks when capital is immobile

Because the decision on the liberalization of the capital market is taken before the productivity shock unfolds, we consider the expected welfare of each type of agent. When the capital market is not liberalized, equilibrium values depend, in each country, only on the local productivity shock. Taking the Taylor expansion of the utility function $V(I)$ around $\bar{\epsilon}$, expected utility

³In principle, the decisions with regard to capital mobility may differ in the two countries. But since our model is symmetric, with two identical countries, we will focus on equilibria where either both countries choose to liberalize, or neither country does.

can be approximated in the following way:⁴

$$\begin{aligned}
\widehat{EV} &= E[V + \frac{dV}{d\varepsilon}(\varepsilon - \bar{\varepsilon}) + \frac{1}{2} \frac{d^2V}{d\varepsilon^2}(\varepsilon - \bar{\varepsilon})^2] \\
&= V + \frac{1}{2} \frac{d^2V}{d\varepsilon^2} \sigma^2 \\
&= V + \frac{1}{2} \sigma^2 (I_\varepsilon^2 V'' + I_\varepsilon I_{\varepsilon\varepsilon} V')
\end{aligned} \tag{3}$$

where V stands for $V(I(\bar{\varepsilon}, T))$, I_ε for $\frac{\partial I}{\partial \varepsilon}$ and $I_{\varepsilon\varepsilon}$ for $\frac{\partial^2 I}{\partial \varepsilon^2}$. The remuneration of productive factors depends only on the national productivity shocks. Differentiating the agents' income described in (2) with respect to the shock;

$$I_\varepsilon^k = 1 \text{ and } I_{\varepsilon\varepsilon}^k = 0$$

and

$$I_\varepsilon^l = 0 \text{ and } I_{\varepsilon\varepsilon}^l = 0$$

Thus

$$\widehat{EV}^k(T) = V^k(T) + \frac{1}{2} \sigma^2 V^{k''}(T) \text{ and } \widehat{EV}^l(T) = V^l(T). \tag{4}$$

where we introduce the T dependent variable for later use. Because of the production function we use, capital owners are the only ones affected by the productivity shock. The larger the variance of the shock, the lower the welfare of the capital owners. The invariance of workers' welfare to the productivity shock under no capital mobility is a useful simplification; we shall briefly consider the implications of alteration in this result later on.

1.2 Welfare effect of shocks when capital is perfectly mobile

In our model, the liberalization of the capital market reallocates the distribution of risk among the two classes of agents. When national productivity shocks are idiosyncratic, capital mobility enables capital owners to diversify their risks, and it is therefore welfare-improving for them. For workers, on

⁴In this section, all functions, except when mentioned, are evaluated at $\bar{\varepsilon}$.

the other hand, capital mobility results in exposure to income risk. A negative (positive) productivity shock at home induces a capital outflow (inflow) and a reduction (increase) in wages. Moreover, workers are now also affected by shocks in the foreign country, as domestic and foreign capital respond to changes in productivity abroad.

Let us see formally how this takes place in our model. The expected welfare of each class of agent now depends on the shocks in both countries. We approximate expected welfare as before via a Taylor expansion around $(\bar{\varepsilon}, \bar{\varepsilon}^*)$:

$$EV(T, T^*) = V(T, T^*) + \frac{1}{2}(I_{\varepsilon\varepsilon}\sigma^2 + I_{\varepsilon^*\varepsilon^*}\sigma^2 + 2I_{\varepsilon^*\varepsilon}\mu)V'(T, T^*) + \frac{1}{2}(I_{\varepsilon}^2\sigma^2 + I_{\varepsilon^*}^2\sigma^2 + 2I_{\varepsilon^*}I_{\varepsilon}\mu)V''(T, T^*) \quad (5)$$

where $EV(T, T^*)$ and $V(T, T^*)$ stand for $V(I(\bar{\varepsilon}, \bar{\varepsilon}^*, T, T^*))$ and $V(I(\bar{\varepsilon}, \bar{\varepsilon}^*, T, T^*))$.

Perfect capital mobility and the source based nature of the capital tax induce the following arbitrage conditions:

$$f' + \varepsilon - T = f'^* + \varepsilon^* - T^* = \rho$$

where ρ is the international remuneration of capital. Moreover the capital market clearing condition implicitly defines $\rho(T, T^*, \varepsilon, \varepsilon^*)$ as the solution of the following equality

$$k(\rho, T, \varepsilon) + k^*(\rho, T^*, \varepsilon^*) = 2\frac{\bar{K}}{\bar{L}} = 2\bar{k}$$

where $k(\rho, T, \varepsilon)$ and $k^*(\rho, T^*, \varepsilon^*)$ are the demand for capital defined by (1). A positive productivity shock increases the demand for capital and therefore ρ has to adjust upward. Formally, $\rho_{\varepsilon} = \frac{k'}{k' + k^{*'}} > 0$ and if, for the ease of computation, we assume that $f''' = 0^5$, then

$$\rho_{\varepsilon\varepsilon} = 0 \text{ and } \rho_{\varepsilon\varepsilon^*} = 0$$

⁵This simplifying assumption helps us to assess neatly the effect of the capital mobility on the welfare of each type of agent. Indeed, the sign of f''' would influence the sign of the V' coefficient in (5). For instance, this coefficient is positive for the capital owners when f''' is positive. This means that when f''' is too negative, capital mobility could become detrimental to the capital owners.

For use below, let us compute the following derivatives:

$$\frac{dk}{d\varepsilon} = (\rho_\varepsilon - 1)k' = -\frac{k^{*'}k'}{k' + k^{*'}} = -\frac{dk^*}{d\varepsilon} > 0 \text{ and } \frac{d^2k}{d\varepsilon^2} = 0.$$

Moreover, fiscal policies influence the international remuneration of capital in the following way: $\rho_T = -\frac{k'}{k' + k^{*'}} < 0$.

1.2.1 The expected welfare of capital owners

Taking the Taylor expansion of the utility function developed in (5), expected welfare is given by

$$EV^k(T, T^*) = V^k(T, T^*) + \frac{1}{2(k' + k^{*'})^2}(k'^2\sigma^2 + k^{*'}\sigma^2 + 2k'k^{*'}\mu)V^{k''}(T, T^*)$$

Since we assume that the countries are symmetric, the tax levels in the presence of capital mobility are equal. Therefore, for these particular tax levels, $k' = k^{*'}$.⁶ This allows us to rewrite expected welfare as follows:

$$EV^k(T, T^*) = V^k(T, T^*) + \frac{(\sigma^2 + \mu)}{4}V^{k''}(T, T^*)$$

Comparing, for a given capital tax, the expected welfare of capital owners when capital is mobile and immobile, we get

$$EV^k(T, T) - \widehat{EV^k}(T) = \frac{1}{4}(\mu - \sigma^2)V^{k''}(T, T).$$

This means that as long as shocks are not perfectly positively correlated (i.e. $\mu < \sigma^2$), for a given capital tax, the liberalization of the capital market enables the capitalists to diversify their risk and is therefore welfare improving.

1.2.2 The expected welfare of workers

Let us now turn to the effect on workers' expected welfare. The net income of a worker is his gross wage plus direct subsidy.

$$I^l = w + Tk$$

⁶Remember that the functions are evaluated at $(\bar{\varepsilon}, \bar{\varepsilon}^*)$.

where k depends on the amount of capital invested at home. As we saw in the case of no capital mobility, the productivity shock does not directly affect the wage. Indeed it is through capital movements that workers are affected. Moreover, workers are affected by the productivity shock in both countries. A positive shock at home (abroad) induces, for home, a capital inflow (outflow) and therefore an increase (decrease) of the gross wage and, given the capital tax level, an increase (decrease) in the transfer. It is important to note that tax rates are decided *ex-ante*. Formally,

$$I_{\varepsilon}^l = \frac{dw}{d\varepsilon} + T \frac{dk}{d\varepsilon} = -\frac{k^{*'}}{k' + k^{*'}}(Tk' - k) = -I_{\varepsilon^*}^l > 0$$

Taking the second derivatives we get

$$I_{\varepsilon\varepsilon}^l = \frac{k'k^{*'}{}^2}{(k^{*'} + k')^2} = I_{\varepsilon^*\varepsilon^*}^l = -I_{\varepsilon\varepsilon^*}^l$$

This gives us an expected welfare

$$EV^l(T, T^*) = V^l(T, T^*) + \frac{1}{8}(\sigma^2 - \mu)(V''(T, T^*)k' + V'''(T, T^*)(k'T - k)^2) \quad (6)$$

as $k^{*'} = k'$.

Comparing this value to the expected welfare of the workers when capital is immobile, we get

$$EV^l(T, T) - \widehat{EV}^l(T) = \frac{1}{8}(\sigma^2 - \mu)(V''(T, T)k' + V'''(T, T)(k'T - k)^2) < 0$$

when $T^* = T$.

Workers are therefore hurt by capital mobility (as long as $\sigma^2 > \mu$) and need compensation to accept capital market liberalization.

1.3 The liberalization game

Whether liberalization takes place or not is the result of a two stage game. In the first stage there is a decision by unanimity whether to go forward on capital market liberalization and in the second a redistributive capital tax is decided by each country independently. We solve this game backward.

1.3.1 Fiscal policy

The fiscal decision differs greatly whether the capital market is liberalized or not.

No liberalization. If liberalization is not allowed, the pre-existing level of the capital tax remains in force. In order to make the liberalization decision as attractive as possible for the workers, we shall assume that without capital liberalization, the redistributive capital tax is equal to zero under the status quo ante. Therefore the expected welfare of the workers and capital owners are respectively given by

$$\widehat{EV}^l(0) \text{ and } \widehat{EV}^k(0).$$

Fiscal competition. If the capital market is liberalized, governments are assumed to maximize the expected utility of the workers. The idea underlying this assumption is that as a quid pro quo, capital owners offer the workers the opportunity to choose the capital tax that maximizes their well-being. This ensures that the liberalization decision is as attractive as possible for workers. The analysis is of interest as we show that there are cases where, even with this compensation rule, workers prefer not to liberalize.

As capital taxes influence the international allocation of capital and as we assume that no fiscal coordination takes place, governments decide capital taxes non-cooperatively; there is fiscal competition. This second stage of the liberalization game is described as a non-cooperative game between the two countries whose players are the governments, where strategies are the capital taxes, and where payoffs are the workers' expected utility:

$$\Pi(T, T^*) = EV^l(T, T^*) \tag{7}$$

at home and,

$$\Pi^*(T, T^*) = EV^{l^*}(T, T^*) \tag{8}$$

abroad.

Best reply functions of the home and the foreign government, respectively $T(T^*)$ and $T^*(T)$, are implicitly defined by the f.o.c. of each government maximization program.

At home,

$$\frac{dEV}{dT} = \frac{dEV}{dI^l} \frac{dI^l}{dT} + \frac{1}{8}(\sigma^2 - \mu)(V'''(T, T^*)2(k'T - k)(k' - k')$$

The last expression cancels out as $k' = k'$. This yields:

$$\frac{dEV^l(T, T^*)}{dT} = \frac{dEV}{dI^l} \frac{dI^l}{dT}$$

Therefore, the expected utility of a worker is maximised when the worker's expected income is at its maximum. The same applies abroad.

Therefore $T(T^*)$ and $T^*(T)$ are implicitly defined by

$$\frac{dI^l}{dT} = k'(\rho_T + 1)T - k\rho_T = 0$$

$$\frac{dI^{l*}}{dT^*} = k^{*'}(\rho_{T^*} + 1)T^* - k^*\rho_{T^*} = 0$$

Second order conditions are satisfied as $k'(1 - \rho_T^2) < 0$ and $k^{*'}(1 - \rho_{T^*}^2) < 0$.

Because $k'' = k^{*''} = 0$, best reply functions are linear and fiscal policies are strategic complements:

$$\frac{dT(T^*)}{dT^*} = \frac{\rho_T \rho_{T^*}}{(1 - \rho_T^2)} > 0 \text{ and } \frac{dT^*(T)}{dT} = \frac{\rho_T \rho_{T^*}}{(1 - \rho_{T^*}^2)} > 0.$$

Proposition 1 *There exists a unique symmetric equilibrium (\tilde{T}, \tilde{T}) where $\tilde{T} = -\frac{\bar{k}}{\bar{k}'}$.*

This means that workers and capital owners, when voting in the first stage, anticipate that if capital market liberalization passes in both countries, the capital taxes that are going to be levied are (\tilde{T}, \tilde{T}) .

1.3.2 The liberalization decision

In this model, liberalization takes place only if capital owners and workers agree on it in both countries. This means that each agent has a veto power on this decision.

At the first stage of the game, agents anticipate what their welfare is going to be under both alternatives. If the liberalization passes, the welfare of workers and capital owners is given by

$$EV^l(\tilde{T}, \tilde{T}) \text{ and } EV^k(\tilde{T}, \tilde{T})$$

If liberalization doesn't pass it is given by

$$\widehat{EV}^l(0) > 0 \text{ and } \widehat{EV}^k(0) > 0$$

All agents favor the liberalization when two conditions hold:

$$EV^l(\tilde{T}, \tilde{T}) - \widehat{EV}^l(0) > 0 \text{ and } EV^k(\tilde{T}, \tilde{T}) - \widehat{EV}^k(0) > 0$$

i.e. the workers and the capital owners both gain from the capital market liberalization.⁷ Our focus is on the cases where the capital market liberalization is rejected by workers. We show that if no fiscal coordination takes place, fiscal competition could be so fierce that even if the governments try to maximize the welfare of the workers, they are unable to compensate workers for the increased risk they face because of the capital market liberalization.⁸

Workers Workers reject the liberalization when the welfare cost linked to the increased risk they face because of the free trade in capital is too high. This welfare loss is an increasing function of the risk aversion of the workers

⁷Obviously the same conditions should hold abroad. As countries are symmetric and as the fiscal competition equilibrium is also symmetric, conditions are identical.

⁸There are also cases where capital owners would refuse the capital market liberalization (when \tilde{T} is high). This is a consequence of the type of objective function we selected for the government in case of fiscal competition.

and a decreasing function of the correlation between the country-specific shocks. Formally workers reject the liberalization when

$$EV^l(\tilde{T}, \tilde{T}) - \widehat{EV^l}(0) < 0$$

which is equivalent to

$$\sigma^2 - \mu \geq \frac{V^l(0) - V^l(\tilde{T}, \tilde{T})}{V^u(\tilde{T}, \tilde{T})k' + 4\bar{k}^2 V^u(\tilde{T}, \tilde{T})} > 0.$$

This means that workers will veto capital market liberalization when the variance of the shocks is large, when the shocks are highly negatively correlated, and/or when workers are highly risk averse. A specific numerical example is presented in the appendix.

1.3.3 Fiscal coordination

We showed above that the equilibrium to the non-cooperative fiscal game between the two countries could lead to a low capital tax, and therefore, without coordination, profitable capital market liberalization could be rejected.

Would tax coordination improve the situation?

Coordination would take the following form in our model. We introduce a stage 0 in our game. In this stage agents have the choice between going directly to stage 1 or bargaining with the other country over a coordinated capital tax level. As before, it is assumed that each agent has a veto power on the liberalization decision and bargaining takes place between the workers and capital owners of both countries. Once a coordinated tax rate is selected, each country gives up its power to change it unilaterally.

As bargaining solutions have to be efficient *ex-ante* and as no deadweight loss is incurred by either economy when capital taxes are symmetric, we restrict ourselves to symmetric taxation. Let us define \underline{T} as the capital tax that would just compensate workers in both countries and \bar{T} the maximum capital tax that capital owners could accept. As free trade in capital is

potentially Pareto improving in each country, there exist symmetric pairs of taxes that fulfill workers' and capital owners welfare constraint and are preferred to the case of no capital mobility. The equilibrium of our multi-stage game would be to always coordinate fiscal policies. Fiscal coordination takes the form of an harmonization of capital tax levels. When $\tilde{T} \geq \underline{T}$, the capital market liberalization would pass even without coordination. The exit option for the negotiator is therefore fiscal competition that leads to a capital tax \tilde{T} . The harmonized capital tax is therefore \tilde{T} . When $\tilde{T} < \underline{T}$, the exit option of the negotiator is no capital market liberalization. Therefore the harmonized capital tax lies in the interval $[\underline{T}, \bar{T}]$. The larger the bargaining power of the workers, the closer is the harmonized tax to \bar{T} .

These harmonized capital taxes maximize the joint welfare of the capital owners and the workers in both countries.

Proposition 2 *When agents are very risk averse and when productivity shocks are highly negatively correlated, fiscal coordination is a necessary condition for capital market liberalization to be politically sustainable. Moreover, there always exists a coordinated tax regime which is Pareto-superior, and hence politically sustainable.*

This proposition emphasizes the need for fiscal coordination to enable capital market liberalization. In this model, fiscal coordination enables capitalists to commit to redistribution and therefore allows the workers to accept the liberalization of capital markets.

2 Generalization

The model we have considered so far is highly stylized. We have chosen assumptions that enable us to make our point as cleanly as possible. In this section we discuss a number of generalizations, and suggest that relaxing our particular assumptions would not alter the substance of our conclusions (while they would greatly complicate the algebra).

The type of shocks. Our productivity shocks take the linear-additive form and their direct effect is limited to the returns on capital. This specification has the advantage that it allows us to isolate the effect of capital market integration on the risk exposure of workers. It renders transparent the transfer of risk from capital owners to workers as capital mobility increases. However, the point that risk-averse workers may lose from capital-market liberalization is more general. Assuming that labor is inelastically supplied, workers end up facing additional income risk whenever the movement of capital in response to idiosyncratic country shocks induces additional fluctuations in real wages. Standard production theory suggests that the demand for any factor (labor) becomes more variable when the supply of other factors (capital) is more responsive to changes in the economic environment.

To see this, express the marginal revenue product of labor as $R(K, L, \theta)$, with K and L standing for the capital and labor endowments and θ for an exogenous productivity shock. Let θ be a positive shock, such that $R_\theta(\cdot) > 0$. Further, $R_K(\cdot) > 0$. Equilibrium in the labor market requires $w = R(K, L, \theta)$. With labor inelastically supplied ($dL = 0$), we get

$$\frac{dw}{d\theta} = R_\theta + R_k \frac{dK}{d\theta}$$

It is natural to assume that positive (negative) shocks result in a capital inflow (outflow) in a world with capital mobility: $\frac{dK}{d\theta} > 0$. It is evident from this expression that capital mobility increases the amplitude of fluctuations in wages for a broad range of shocks, including changes in economy-wide productivity or the terms of trade. The more general case is developed in Rodrik (1997, Appendix A). Hence, the idea that capital mobility imposes a negative risk-exposure externality on workers will survive many plausible extensions of the model outlined above.

The tax instrument. The model could be extended to more sophisticated tax instruments. In this paper, we consider unconditional source based capital taxation. Allowing for an efficient residency based capital tax would, as

in most of the literature on fiscal competition, suppress the need for coordination. Unfortunately, this type of tax system is difficult to monitor and therefore leads to tax evasion. Hence, the use of source based taxation can be justified by practical considerations.

Still, a more sophisticated source-based capital tax conditional on the realization of the shock could be more efficient. This type of fiscal instrument would entail a negative capital tax when a positive shock occurs and a positive one in the case of a negative shock. However, the logic of our argument would not change. What is important is that with free trade in capital, the need for redistribution increases in tandem with the cost of levying taxes (absent tax coordination). The possibility that compensatory adjustments in national tax rates may not be feasible in the absence of explicit coordination would continue to exist.

The political mechanism. The social choice mechanism we use serves to highlight the potential conflict of interest between workers and capitalists on account of risk exposure where capital mobility is concerned. It has the peculiarity that each type of agent has a veto power and that if liberalization is accepted the government is bound to impose capital tax maximizing the workers expected welfare. Our result would go through with the government bound to maximize any objective function that is less pro-worker. This would obviously change the equilibrium level of capital taxation in the case of liberalization. But it would not alter the fact that workers may prefer to avoid capital-market liberalization in anticipation of becoming worse off, as indeed they would be in a non-cooperative equilibrium where the level of transfers needed to compensate them is sufficiently high. The same logic would also apply in a median-voter model where the median voter is a "worker" or an individual with a capital-labor endowment lower than the economy-wide average.

Other social choice mechanisms can yield different outcomes. If decisions are made by a utilitarian social planner, capital market liberalization will

always be a winner in a symmetric set up. More generally, when the political system behaves as if it maximizes a weighted average of the expected utilities of the two groups, liberalization will emerge as the equilibrium outcome (even absent tax coordination) as long as the implicit weight on labor is not too large.

The all-or-nothing regime with regard to capital mobility. In this paper, we either have full liberalization with no cost of mobility for capital or no mobility at all. Obviously, capital market liberalization could be a slow process where the costs of capital mobility go down over time. Introducing a mobility cost would alleviate the fiscal competition, and reduce the gains from capital mobility. It is easy to see that the lower the cost of capital mobility, the larger the need for redistribution and the greater the difficulty in levying taxes. Our result would therefore be that when the cost of capital mobility goes below a certain threshold, the process of capital market liberalization would need fiscal coordination in order to continue.

Capital accumulation. Our model is static, with a fixed endowment of capital in the world economy as a whole. In a dynamic model, the possibility of capital accumulation as well as of a richer set of strategic interactions between national fiscal authorities can complicate the picture significantly. While we expect the conflict of interest we have identified here to survive in a dynamic setting, there is one ameliorating factor that is worth pointing out. Since capital mobility allows capitalists to reduce their exposure to risk (partly by shifting it on to workers), it may also enhance the rate of capital accumulation. This would have a beneficial effect on workers in all countries, as it would increase the rate of growth of real wages. Consequently, it is possible that a higher growth trend in real wages would more than make up for the increased risk that workers bear.

Structure of the economy. In our economy there is a single good produced in both countries. This allows us to establish, in the simplest possible framework, a positive relationship between the capital stock employed in the

economy and the level of real wages. One can imagine alternative settings where the real wage is independent of the capital stock. For example, in a model with two traded goods and assuming incomplete specialization, the real wage would be pinned down by relative goods prices, and the domestic capital stock would influence real wages only to the extent that product prices are affected. To the extent that a capital outflow does not affect domestic labor adversely, our results would not go through. This is a matter that can only be settled empirically. But a model in which real wages are positively related to the capital stock does not strike us as being unreasonable (or too restrictive) for purposes of policy analysis.

3 Conclusion

We have identified in this paper a source of political tension in capital market liberalization. Capital market liberalization calls for more redistribution while making this redistribution difficult. We showed that when the transfer required to compensate workers is large enough, capital market liberalization, while efficient, is not politically sustainable without fiscal coordination. Fiscal coordination acts as a commitment device for the capitalists to pay their tax following capital market liberalization.

In reality, liberalization decisions are not so abrupt. Capital movements are impeded not only by legal barriers, but also by other limitations, like differences in legal systems, language or cultural habits, or even by technological problems. What our paper argues is that the long process necessary for perfect capital mobility could be interrupted if international fiscal coordination does not take place.

The form that the coordination should take is another question. In this paper, coordination is done through full harmonization. The feasibility of such harmonization drastically depends on the assumption we made about the symmetry between the two countries. With a larger number of countries or in the presence of asymmetries, it is likely that the desirable coordination

mechanism would look quite different.⁹

⁹See van Ypersele (1998) for a related discussion.

4 Appendix

The distribution of the productivity shock has a mean $\bar{\varepsilon} = \bar{\varepsilon}^* = 0$ and a variance covariance matrix

$$\begin{pmatrix} \sigma^2 & \mu \\ \mu & \sigma^2 \end{pmatrix}.$$

The production function in intensive form is given by

$$F(K, L) = L((12 - k)k + \varepsilon k),$$

Therefore the remuneration of factors is given by

$$r = 12 - 2k \text{ and } w = k^2$$

Countries are assumed to be endowed with one unit of capital ($\bar{K} = \bar{K}^* = 1$) and one unit of labor ($\bar{L} = \bar{L}^* = 1$).

The welfare of an agent with an income I is given by

$$V[I] = \log[I]$$

Without capital market liberalisation the expected welfare of a worker is given by

$$\widehat{EV}^l(0) = \log[1] = 0$$

If capital market is liberalised, as $k' = -\frac{1}{2}$, fiscal competition leads the per-unit capital taxes to (\tilde{T}, \tilde{T}) with $\tilde{T} = 2$ (i.e. a 20% capital tax).

Therefore the expected welfare of a worker when capital market is liberalised is given by

$$EV^l(2, 2) = \log[3] - \frac{1}{12}(\sigma^2 - \mu)$$

Therefore when

$$(\sigma^2 - \mu) > 12 \log[3]$$

capital market is blocked by the workers.

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