WHEN DOES INTERNATIONAL CAPITAL MOBILITY REQUIRE TAX COORDINATION?

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Abstract

Basic economic theory identi…es a number of e¢ciency 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 o¤. Consequently, capital mobility may be politically unsustainable even though it enhances e¢ciency. 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 identi…es a number of e¢ciency 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 o¤. Consequently, capital mobility may be politically unsustainable even though it enhances e¢ciency. 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 bene…ts from capital mobility arise from the ability of capital-owners to diversify country-speci…c risk. As long as shocks to domestic returns to capital are not perfectly correlated across countries, risk-averse capitalists unambiguously bene…t from international capital mobility. Risk-averse workers lose, however, since the movement of capital in response to shocks induces ‡uctuations 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 e¢ciency gains of capital mobility, therefore, may require …nding ways of sharing the bene…ts with workers.

There is some evidence that national governments, particularly of the left-leaning kind, have recognized the potential adverse e¤ects of capital mobility on workers and have tried to o¤set it. Focusing on 15 advanced industrial countries over the 1967-90 period, Garrett (1995) …nds that governments that have removed controls on capital ‡ows are likely to spend a higher share of GDP, especially if they are run by parties of the left. Higher volumes of trade, re‡ecting in part greater possibilities of outsourcing, are also correlated with larger public spending in a broad sample of countries (Rodrik 1998).

A subsidy for workers …nanced 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 …scal 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.

Our argument for international tax coordination as a mechanism for getting out of a political impasse-reaping the bene…ts 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 stronger preference for taxes. Hence domestic politics partially o¤sets the ine¢ciency of Nash-Cournot behavior at the international level. While the underlying economic setup in our model is quite di¤erent, our logic di¤ers from Persson and Tabellini (1992) in one key respect: we require that no signi…cant 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 two symmetric country world in which countries produce and trade a single consumption good. This good is produced under constant returns to scale and through combination of capital and labor. Each country, a and b; is a¤ected by a particular productivity shock, ε_i whose joint distribution has a mean $(\bar{\varepsilon}_a; \bar{\varepsilon}_b)$ and a variance-covariance matrix

$$\begin{pmatrix} \sigma_a^2 & \sigma_{ba} \\ \sigma_{ab} & \sigma_b^2 \end{pmatrix}.$$

Let the production function in intensive form 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 $F_{KL} > 0$: If we nomalize the consumption price to one, factor remunerations are de…ned by:

$$r_i = f_i' + \varepsilon_i \text{ and } w_i = f_i - k_i f_i'$$

with $i = a; b$: The demand for capital; is given by

$$k_i = f_i'^{-1}(r_i + \varepsilon_i)$$

with $k_i^0 = \frac{1}{f''}$:

The population of each country is assumed to be divided in two groups: Workers and Capital Owners. Both types are risk averse and share the same indirect utility function; $V(I)$ with I the disposable income and $V' > 0$ and $V'' < 0$. They only di¤er in their factor endowment.

Consider the following problem. Both countries have to decide whether to liberalize or not their capital market. By capital market liberalization, we mean full mobility of capital among countries.

The sequence of events is the following:

(1) The capital owners propose a tax scheme to the workers in exchange of capital market liberalization, in both countries simultaneously.

(2) Productivity shocks unfold

(3) Equilibrium investment and remuneration are determined

To asses the level of compensation needed to compensate workers from the increased risk they face, we compute the welfare of each type of agent with and without capital movement. We then check if this transfer level is sustainable, i.e. that the pair of capital taxes is a Nash equilibrium of the game played between the capitalist of both countries.

1.1 Welfare e¤ect of shocks when capital is immobile

As the decision about the liberalization of the capital market is taken before the productivity shock unfold, we consider the expected welfare of each type of agent. When 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 $V_i(I)$ around $\bar{\theta}_i$; the expected utility can be approximated in the following way:

$$\begin{aligned} EV_i(I) &= E[V(\bar{\theta}_i) + \frac{dV}{d\theta_i}(\theta_i - \bar{\theta}_i) \frac{1}{2}\frac{d^2V}{d\theta_i^2}(\theta_i - \bar{\theta}_i)^2] \qquad (1) \\ &= V(\bar{\theta}_i) + \frac{1}{2}\frac{d^2V}{d\theta_i^2}\sigma_i^2 \\ &= V(I(\bar{\theta}_i) + \frac{1}{2}\sigma_i^2(I_{\theta_i}^2 V'' + I_{\theta_i\theta_i} V') \end{aligned}$$

The remuneration of production factors depends only of the national productivity shocks. Respectively, the net income of a capital owner and a worker in country i; are given by

$$I^{ik} = r_i - T_i \text{ and } I^{il} = w + T_i\bar{k}_i$$

where T_i is the capital income tax. Di¤erentiating these expressions with respect to the shock;

$$I^{ik}_{"_i} = 1 \text{ and } I^{ik}_{"_i"_i} = 0$$

and

$$I^{il}_{"_i} = 0 \text{ and } I^{il}_{"_i"_i} = 0$$

Thus

$$EV^k = V^k(\text{¯}_a; T_a) + \frac{1}{2}¾^2_a V^{00k} \text{ and } EV^l = V^l(\text{¯}_a; T_a)$$

Because of the production function we use, the capital owners are the only ones a¤ected by the productivity shock. The larger its variance, the lower the welfare of the capital owners. It is this relation that is important for our result. Note also that the independence of the worker's welfare to the shock is useful to make our results clear.

1.2 Welfare e¤ect of shocks when the capital is perfectly mobile

The liberalization of the capital market completely reallocates the distribution of risk among the two classes of agents. When shocks are negatively correlated, capital mobility enables capital owners to diversify their risk, it is therefore welfare improving. For workers, capital market liberalization increases the risk they face. Here their own productivity shock a¤ects their welfare: they pro…t (lose) from a positive (negative) productivity shock as it induces in‡ow (out‡ow) of capital and therefore an increase of the labor remuneration. Moreover, they are also a¤ected by the productivity shocks in the other country, a positive (negative) foreign shock induces a capital out‡ow (in‡ow) and therefore a loss (gain) on the worker point of view.

Let us see formally how this takes place in our model. Now the expected welfare of each class of agent depends on the shocks of both countries. We approximate the expected welfare via a Taylor expansion around $(\text{¯}_a; \text{¯}_b)$:

$$EV(I) = V(I(\text{¯}_a; \text{¯}_b)) + \frac{1}{2}(I_{"_a"_a}¾^2_a + I_{"_b"_b}¾^2_b + 2I_{"_b"_a}¾_{ba})V^0 + \frac{1}{2}(I^2_{"_a}¾^2_a + I^2_{"_b}¾^2_b + 2I_{"_b}I_{"_a}¾_{ba})V^{00} \quad (2)$$

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

$$f^{0a}_k + "_a \, ¡ \, T_a = f^{0b}_k + "_b \, ¡ \, T_b = ½$$

where ½ is the international remuneration of capital. Moreover the capital market clearing condition implicitly de…nes $\frac{1}{2}(T_a; T_b; "_a; "_b)$

$$k_a(\frac{1}{2} + T_a \text{ ¡ } "_a) + k_b(\frac{1}{2} + T_b \text{ ¡ } "_b) = \overline{K}_a + \overline{K}_b$$

A positive productivity shock increases the demand for capital and therefore ½ has to adjust upward. Formally, $\frac{1}{2}_{"_i} = \frac{k_i^0}{k_a^0 + k_b^0} > 0$ and if, for the ease of computation, we assume that $f^{000} = 0$; then

$$\frac{1}{2}_{"_i "_i} = 0 \text{ and } \frac{1}{2}_{"_i "_j} = 0$$

For further use let us compute the following derivatives:

$$\frac{dk_i}{d"_i} = (\frac{1}{2}_{"_i} \text{ ¡ } 1)k_i^0 = \text{ ¡ } \frac{k_j^0 k_i^0}{k_b^0 + k_a^0} = \text{ ¡ } \frac{dk_j}{d"_i} > 0 \text{ and } \frac{d^2 k_i}{d"_i^2} = 0:$$

Moreover, …scal policies in‡uence the international remuneration of capital in negative way: $\frac{1}{2}_{T_i} = \text{ ¡ } \frac{k_i^0}{k_a^0 + k_b^0} < 0$:

1.2.1 The expected welfare of capital owners

Taking the Taylor expansion of the utility function developed in (2), the expected welfare is given by

$$EV^{ki} = V(I("_a; "_b)) + \frac{1}{2(k_a^0 + k_b^0)^2}(k_a^{0 2}¾_a^2 + k_b^{0 2}¾_b^2 + 2k_a^0 k_b^0 ¾_{ba})V^{00}$$

As we assume that countries are perfectly symmetric, $¾_a^2 = ¾_b^2$; $"_a = "_b$ and the tax levels without capital movement are equal, therefore, for these particular tax levels, $k_a^0 = k_b^{0 1}$. We rewrite the expected welfare as follows:

$$EV^{ki} = V(I("_a; "_b; T_a; T_b)) + \frac{(¾_a^2 + ¾_{ba})}{4}V^{00}$$

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

$$EV^k \text{ ¡ } EV_{im}^k = \frac{1}{4}(¾_{ba} \text{ ¡ } ¾_a^2)V^{00}$$

for $T_a = T_b$: This means that as long as shocks are not perfectly positively correlated, the liberalization of the capital market enables the capitalists to diversify their risk and is therefore welfare improving.

[1] Remember here that k_i^0 is here a function evaluated at $("_a; "_b)$:

1.2.2 The expected welfare of workers

Let us now turn to the e¤ect on the worker's expected welfare. The net income of a worker is its gross wage plus direct subsidy.

$$I^{Ii} = w_i + T_i k_i$$

where k_i is the amount of capital invested in country i. As we saw in the case of no capital mobility, the productivity shock does not directly a¤ect the wage. Indeed it is through the capital movement that workers are a¤ected. Moreover, the workers are a¤ected by the productivity shock of both countries. A positive shock at home (abroad) induces a capital in‡ow (out‡ow) and therefore an increase (decrease) of the gross wage and also, given the capital tax level, an increase (decrease) of the transfer. It is important to note that transfers are decided ex-ante. Formally,

$$I^{Ii}_{"_i} = \frac{dw_i}{d"_i} + T_i\frac{dk_i}{d"_i} = \frac{k^0_j}{k^0_j + k^0_i}(T_i k^0_i - k_i) = - I^{Ii}_{"_j} > 0$$

Taking the second derivatives w.r.t. $"_a$ and $"_b$; we get

$$I^{Ii}_{"_i"_i} = \frac{k^0_i k^{02}_j}{(k^0_j + k^0_i)^2} = I^{iI}_{"_j"_j} = - I^{iI}_{"_i"_j}$$

This give us an expected welfare

$$EV^{Ia} = V(\bar{"}_a; \bar{"}_b; T_a; T_b) + \frac{1}{2}(¾^2_a - ¾_{ba})\frac{k^{02}_j}{(k^0_j + k^0_i)^2}(V^0 k^0_i + V^{00}(k^0_i T_i - k_i)^2)$$

Taking values at the symmetric equilibrium,

$$EV^{Ia} = V(\bar{"}_a; \bar{"}_b; T_a; T_b) + \frac{1}{2}(¾^2_a - ¾_{ba})(V^0 k^0_i + V^{00}(k^0 T - k)^2)$$

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

$$EV^I - EV^I_{im} = \frac{1}{2}(¾^2_a - ¾_{ba})(V^0 k^0 + V^{00}(k^0 T - k)^2) < 0$$

for a given capital tax level.

Workers are therefore hurt by this capital market liberalization and need a compensation to accept capital market liberalization. Let $T^¤_i(T_j)$ be the tax that exactly compensates the workers of country i, given the tax decided in the other country. It is implicitly de…ned by

$$V(\bar{"}_a; \bar{"}_b; T_a; T_b) + \frac{1}{2}(¾^2_a - ¾_{ba})\frac{k^{02}_j}{(k^0_j + k^0_i)^2}(V^0 k^0_i + V^{00}(k^0_i T_i - k_i)^2) = \overline{EV^I_{im}} \tag{3}$$

with $\overline{EV_{im}^{I}}$ the equilibrium expected welfare of workers when capital is immobile.

The more negative the correlation between the shocks, the larger the required transfer.

1.3 The …scal policy

Up to now we have considered the level of the transfer needed to compensate the workers but we have not yet described how the …scal decisions are made. It is assumed in this paper that a liberalization decision is going to be politically feasible if no group lose from it. Formally it takes the following form: Capital owners make a "take it or leave it" o¤er to the workers consisting in a level of transfer (more precisely a source based capital income tax) and a liberalization proposition. Workers accept it if the transfer compensates the welfare loss they incure because of the risk they are exposed to. We know that, when shocks are not perfectly correlated, there is an aggregate gain from the liberalization. Capital owners are willing to compensate the workers.

Nevertheless, if countries decide not to coordinate, capital owners when making their o¤ers have to take into account the …scal decision of the other country. As it has been showed in the former section, the level of capital tax needed to compensate the workers depends on the tax imposed in the other country. In the following sections, we show that when taxes are decided non cooperatively, there are cases where it does not exist a capital tax level that induces the workers to accept the capital market liberalization.The paradox is that even if they are willing to pay the transfers to succed in the liberalisation of the capital market, capital owners are not able to commit themselve to do it. Moreover, there is a competition between the two countries to attract the capital. Given the tax level of the other country, it could be pro…table to both the capital owners and the workers to decrease their tax level. Capital owners get a higher net remuneration. For the workers, the loss of revenue from tax on the already invested capital can be more than compensated by the increase of the tax base and the evaluation of the wages.

We later show that, if there is …scal coordination, capital market liberalization will always be approved.

1.3.1 Fiscal competition

In a …rst stage, we shall assume that countries decide their …scal policy non cooperatively. There is therefore a game which strategies are the capital income taxes and the payo¤s the welfare of the capital owners given that workers welfare is at least as large than under autraki. In this paper, we limit the strategy space to pure strategies.

Let us focus on one of the possible non-cooperative equilibria, the symmetric one. This symmetric equilibrium is the smallest pair of taxes $(T^{¤}; T^{¤})$ that solves (3) for the two countries. The smallest pair as the welfare of capital owners is a decreasing function of taxes.

Such a symmetric pair of tax satis…es the workers welfare constraint in both countries. To be a non-cooperative equilibrium, it should be that there do not exist pro…table deviations(i.e. tax undercutting). This deviation pleases the capitalist as it increases ½: It is therefore pro…table if it does not violate the workers welfare constraint. It is easy to show that when $T^{¤}$ is large enough, the income of a worker increases when T_i decreases.

$$\frac{dI^{il}}{dT_i} = k_i^{0}(½_{T_i} + 1)T^{¤} ¡ k_i ½_{T_i} \; \mathbf{?} \; 0 \; ( ) \; T^{¤} \; \mathbf{?} \; \frac{k_i ½_{T_i}}{k_i^{0}(½_{T_i} + 1)} = ¡ \frac{k_i}{k_j^{0}}$$

The intuition is the following; a decrease of T_i increases the level of capital investment in the country, therefore increases the remuneration of workers and the tax base. When $T^{¤}$ is large, these two e¤ects more than compensate the decrease in the tax level.

Therefore, under no coordination, when the transfer required to compensate the workers is large, i.e. when agents are highly risk averse or when shocks have a large variance and are highly negatively correlated, the symmetric taxation is not an equilibrium.

Would an other equilibrium exist? To the unilateral deviation of one country, the other responds either by increasing its capital tax or by undercutting the other country tax level. The status quo is not acceptable as at that point the workers welfare constraint is not anymore ful…lled in both countries. An increase of the tax level would not rebalance the worker welfare constraint for the reason evoked to make the …rst deviation profitable. The only solution to balance the worker constraint is to undercut the other country tax level. A a new symmetric taxation would not ful…ll the constraint as $(T^{¤}; T^{¤})$ is the lowest symmetric taxation that ful…lled both countries constraint. No asymmetric equilibrium is going to come out of this as, for each equilibrium, at least one of the country does not ful…ll its workers welfare constraint. No symmetric equilibrium is going to emerge as the only candidate was destroyed.

Therefore, there do not exist other asymmetric equilibria with capital mobility. We can conclude that in this case, if there is no coordination of capital tax, full capital mobility is not going to be allowed.

Nevertheless, when $T^{¤}$ is not too large, the symmetric candidate is an equilibrium. In this case, there could also be some asymmetric equilibria. These asymmetric equilibria would be dominated by the symmetric one because capital allocation is ine¢cient in case of asymmetric equilibria. It is therefore natural to concentrate only on the symmetric equilibrium.

1.3.2 Fiscal coordination

We showed in the last paragraph that there does not always exists an equilibrium to the non-cooperative …scal game between the two countries, and therefore, without coordination, pro…table capital market liberalization could be rejected.

Would then tax coordination enhance the situation?

In case of coordination, we assume that there is a bargaining among two countries' capital owners in order to decide at which level the capital taxes should be set. As bargaining solutions have to be e¢cient ex-ante we restrict ourself to symmetric taxation. The bargaining outcome is then the $(T^{¤}; T^{¤})$ tax levels that we described in the former paragraph. This solution maximizes the joint welfare of the capital owners given the workers welfare constraint.

Proposition 1 When agents are highly risk averse and when productivity shocks are negatively correlated, …scal coordination is a necessary condition for capital market liberalisaton to be politically sustainable. Moreover, there always exists a coordinated tax regime which is Pareto-superior, and hence politically sustainable.

This proposition emphasises the need for …scal coordination to enable the completion of the capital market liberalisation. In this model, the pros …scal coordination are the capital owners as it enables them to commit to redistribution and therefore to have the workers accepting the liberalisation of the capital market.

2 Conclusion

In this paper, we identi…ed a tension existing when capital market liberalization is considered. Capital market liberalization calls for more redistribution while making this redistribution more di¢cult. We showed that when the transfer required to compensate the workers is large enough, without …scal coordination, capital market liberalization is not politically sustainable while e¢cient. Fiscal coordination plays as a commitment device for the capitalist to pay their tax after the capital market liberalization.

Obviously, liberalization decisions are not so abrupt. Capital movements are impeded not only by legal barrier but also by other limitations, like the di¤erence in the legal system, in the language or in the cultural habits or even technological problems. The perfect mobility of capital is going to be the result of a long process. What our paper argues, is that this process could be interrupted if no …scal coordination take place. The form that the coordination should take is an other question. In this paper, coordination take the form of full harmonization. This result drastically depends on

assumption we made about the symmetry between the two countries. Would the number of countries be larger or the countries asymmetric, it is likely that the coordination mechanism would be di¤erent. It could be that, like in van Ypersele (1998), a more elaborate coordination system is needed.

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