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QUID PRO QUO FOREIGN INVESTMENT AND WELFARE

A Political-Economy-Theoretic Model

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The classic paper by Brecher and Diaz-Alejandro (1977) analyzed the implications of 'tariff-jumping' direct foreign investment (DFI) induced by the imposition of an import tariff. We analyze a new type of DFI where it occurs with a view to *defusing*, not circumventing, protection or rather the threat of protection by the host country. An example is the DFI by Japan in the United States. The decision about the level of foreign investment is taken in the first of a two-period horizon period. This, together with the level of exports in the first period, determines the probability of a quota on exports being imposed in the second period. Policy makers aware of the effects of the first-period decisions on the second period will impose *an* optimal tariff and *an* optimal tax (subsidy) on capital exports.

1. Introduction

Economists are familiar with the phenomenon of 'tariff-jumping' direct foreign investment (DFI). The implications of such DFI have been thoroughly explored, chiefly by Brecher and Diaz-Alejandro (1977), Uzawa (1969), Hamada (1974) and others.[1] But recently, we have witnessed an interesting

*In view of Carlos F. Diaz-Alejandro's seminal contributions to the analysis of direct foreign investment, his interest in political economy, and his eagerness to embrace new ideas, we hope that this paper will be a fitting tribute to his memory. An earlier version of the paper entitled 'Quid Pro Quo Foreign Investment and Optimal Policy Intervention' appeared as Columbia University Discussion Paper no. 323, February, 1986.

[1]There is a voluminous analytical literature by now on this subject; e.g., Brecher and Findlay (1983). The policy relevance of the main Brecher–Alejandro–Uzawa findings (i.e., that tariff-jumping capital importation will necessarily immiserize the host country if the country continues to import the capital-intensive good) for explaining the lacklustre performance of the import-substituting strategy of development has been noted by Bhagwati (1978).

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new type of DFI where it occurs with a view to *defusing*, not circumventing, protection or rather the threat of protection by the host country. This seems to be the case with a significant amount of current DFI from Japan into the United States. Often, the protectionist threat may even have been designed precisely to induce such DFI from the successful exporting country [Bhagwati (1980)]. Foreign investment, so induced, is properly christened quid pro quo DFI [Bhagwati (1985)].

How does DFI defuse the protectionist threat? Chiefly, this can occur because DFI is regarded, and can be exploited by lobbies in behalf of the exporting country, as a helpful phenomenon that 'saves jobs' in the importing country whereas the imports are 'costing jobs' instead. Such 'image building' can influence Congress to withstand the protectionist pressures from the import-competing industry. But it also can reduce that pressure itself by co-opting the protectionist lobbies themselves. An excellent example is provided by 'the GM–Toyota deal in the United States apparently prompted by the threat of domestic-content protection... The quid pro quo for Toyota in this deal, which benefits GM and creates jobs for the United Auto Workers (UAW) Union, is evidently the conversion of GM to a free trader stance in local U.S. politics: this is manifest from the fact that GM alone among the U.S. automakers has been arguing against the extension of the auto VERs [Bhagwati (1985, p. 31)]. Again, unions are increasingly seeing DFI by the foreign exporter as a preferable job-saving alternative to protection.[2]

The novel phenomenon of quid pro quo DFI, or what might equally be described as 'tariff-threat-defusing' DFI to contrast with the 'tariff-jumping' DFI, may be a generic phenomenon, as when all Japanese DFI is seen as defusing the *overall* threat of protection against Japan. But it can also be an industry-specific phenomenon as when DFI in a specific industry, as in autos for example, helps to defuse the threat of VERs on autos. In either case, the optimal policy of the exporting country is influenced and must be analyzed.

In the present paper, we analyze the generic case. A useful simplification then is to treat DFI as synonymous with international capital mobility, and to work with the conventional trade-theoretic model where factors are mobile intersectorally and perfect competition prevails. The key idea on which we focus is that capital inflow from the exporting country will dampen the probability of protection being invoked against the exporting country later.

This two-period approach has been taken earlier by Bhagwati and Srinivasan (1976) who explored a similar 'market-disruption' problem where

[2]See the detailed discussion of these questions, and the impact on the political economy of protection, in Bhagwati (1986).

the export level in the first period influenced the probability of protection in the second period. Since this linkage is evidently of importance as well, our model below will essentially add the new linkage to theirs: between capital inflows from the exporting country now and the probability of protection later.

The analysis could be extended to the industry-specific version of quid pro quo DFI. This raises interesting questions as well. For example, if Toyota restrains first-period exports and invests in the United States, Honda can be a free rider in two ways: it will profit from the protection-threat-dampening quid pro quo DFI of Toyota without having had to undertake such DFI itself; and if some protection materializes as VERs, which are generally allocated according to trade shares, Toyota's first-period export restraint will yield Honda a larger share of the restricted second-period market! The analysis of such issues is, however, precluded by our approach in the present paper.

Section 2 states the model and the problem. Section 3 provides the analysis. Concluding remarks are made in section 4.

2. The problem and the model

The problem we analyze is the following: what is the optimal policy for a country in regard to its trade and its DFI abroad if its export level *and* its DFI volume now will affect the probability of trade restrictions being invoked later by the other country in a two-country international economy? This problem, in a $2\times2\times2$ framework and with single-period myopic behaviour, reduces of course to the well-known problem of optimal policy intervention by a country in the presence of international capital mobility, analyzed in classic contributions by Kemp (1966) and Jones (1967) and in a recent paper by Brecher (1983). Our analysis below therefore can be seen also as a generalization of this analysis to the case where such myopic policy intervention must be modified to take into account later-period effects of first-period decisions on trade and DFI levels. Symmetrically, our results below can be reduced to the Kemp–Jones results by simply putting the second-period effects to zero.

As with the Bhagwati–Srinivasan (1976) analysis, we will assume a two-period model, making it therefore a $2\times2\times2\times2$ model focusing only on one country's welfare. The (home) country will choose its optimal policies in regard to its trade and its DFI abroad, assuming the other (foreign) country to be passive in period I but reacting in period II to the first-period trade and DFI levels in the sense that these affect the probability of restrictions being invoked in the foreign country. At no stage, therefore, does the foreign country engage in optimal behaviour, in contrast to the home country.

The home country's optimizing behaviour, in turn, can be viewed as involving optimization of trade and DFI levels in period I by taking into account also the repercussions of these on period II. As for period II, the home country is assumed to fix its trade level optimally, but we will assume DFI to be fixed where it was in period I.[3]

The model is now simply stated, using two goods, X and Y, two factors of production, K and L, two periods, I and II, and two countries, home and foreign. Utility, U, will be defined on consumption levels, C_x and C_y, of the two goods. The factor endowments of each country are given throughout the analysis, except for the capital flow between them. Variables for the foreign country will be marked by asterisks. Superscripts will refer to the period and subscripts x and y to the commodity and 1, 2 and 3 to the partial derivatives with respect to the number of the argument of the function.

The home-country production-possibility function, identical for both periods, is

$$Q_x = \hat{F}(Q_y, \bar{K} - K, \bar{L})$$

$$\equiv F(Q_y, K), \qquad (1)$$

omitting endowments $\bar{K}$ and $\bar{L}$ since they are constant; the foreign-country production-possibility function similarly can be written as

$$Q_x^* = \hat{F}^*(Q_y^*, \bar{K}^* + K, \bar{L}^*)$$

$$\equiv F^*(Q_y^*, K), \qquad (2)$$

omitting again $\bar{K}^*$ and $\bar{L}^*$; and the foreign transformation or reciprocal-demand function facing the home country is

$$M_x = \hat{\phi}(E_y, \bar{K}^* + K, \bar{L}^*)$$

$$\equiv \phi(E_y, K), \qquad (3)$$

where

Q_x = home production of good X, the home-importable,
Q_y = home production of good Y, the home-exportable,
M_x = home imports of good X,
E_y = home exports of good Y, and
K = home capital (DFI) in the foreign country, and the asterisks denote of course the corresponding variables and functions for the foreign country.

[3]This asymmetry may be justified by the relative difficulty of reversing DFI decisions once they have been implemented. In any case, the essence of our analysis would not be affected by complicating things to have also the trade level in period II constrained not to exceed the level chosen in period I.

Let $U(C_x, C_y)$ be the standard social utility function defined in terms of the consumption of C_i of good i $(i = \mathrm{x}, \mathrm{y})$. Given the offer curve, eq. (3), the home-country consumption levels of X and Y can then be written as

$$C_x = Q_x + \phi(E_y, K), \quad C_y = Q_y - E_y.$$

Next, note also that the ϕ function relates to *total* imports to exports and home capital abroad. Thus M_x includes imports financed by rental earnings on capital exports and hence M_x/E_y is not the terms of trade. In fig. 1, AB is the foreign country's production-possibility curve defined on $\bar{K}^*$ and $\bar{L}^*$ alone, and π is the terms of trade. (Q_x^*, Q_y^*) represents the production vector for the production possibility curve defined on $\bar{K}^* + K$ and $\bar{L}^*$, chosen competitively at π. The consumption vector for the foreign country, however, reflects only *national* income [OG in terms of the X-good for reasons suggested by Bhagwati and Brecher (1980)] and is at (C_x^*, C_y^*). E_y and M_x are then as illustrated: the difference between (C_x^*, C_y^*) and (Q_x^*, Q_y^*). GH represents

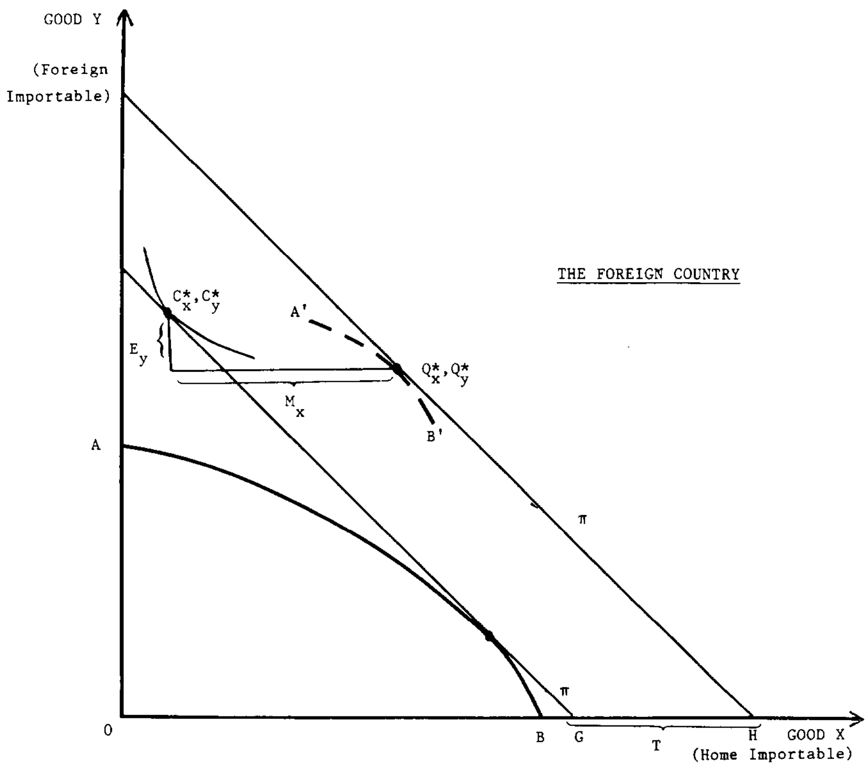

Fig. 1

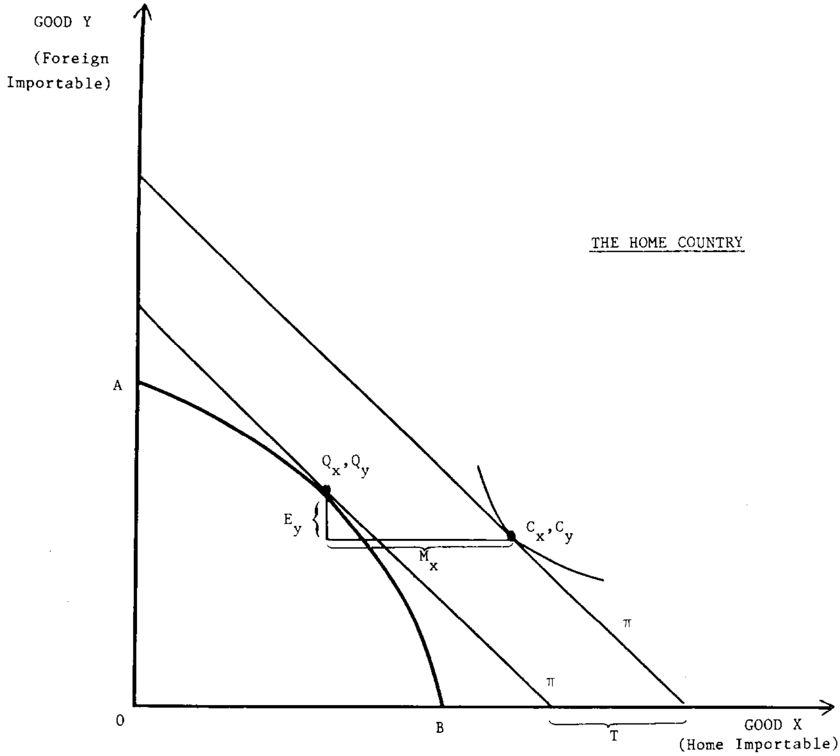

Fig. 2

the interest income, essentially a 'transfer payment' T to the home country, equalling γ^*K where γ^* is the foreign rental rate in terms of good X.[4]

We will next assume that the level of exports (E_y) in period I will affect positively the probability of a trade restriction being invoked by the foreign country in period II, whereas the level of DFI(K) in period I will affect this probability negatively. Thus, we have the probability function

$$G = G(E_y^I, K^I), \tag{4}$$

where $G_1 > 0$, $G_2 < 0$, with E_y^I being the period-I exports and K^I the period-I DFI by the home country.

3. The analysis

By assumption, then, it is known at the beginning of period II whether the trade restriction, in the form of a VER or import quota as $\bar{E}_y^{II}$, has been

[4]The corresponding equilibrium for the home country is illustrated in fig. 2, which is self-explanatory.

imposed by the foreign country or not. Thus, the policy of the home country in period II will be to maximize U subject to its production-possibility function and to the foreign transformation function, if no quota is imposed, and the added constraint $E_y^{II} \leqq \bar{E}_y^{II}$ if the quota is imposed. The foreign country therefore is confined to trade quotas as its only policy instrument.

In addition, we may now distinguish between two cases: (i) where the home country is constrained to keep its DFI frozen at its period-I level (which seems realistic since it is difficult to imagine DFI affecting the probability of trade restrictions being invoked by the host–foreign country if it is to be withdrawn right thereafter);[5] and (ii) where DFI in period II is varied at will and as necessary to optimize home-country welfare. Only the former case is considered here, though the analysis can be readily extended to accommodate the latter case.

We may then examine first the optimal policy-mix for the home country in period II, given these features of the model and then period-I optimal policies which must take into account also the period-II effects.

3.1. Period-II optimal policy-mix

Let the maximal welfare with and without the quota, $\bar{E}_y^{II}$, be $\underline{U}^{II}$ and $\bar{U}^{II}$, respectively. We can then characterize the optimal policy-mix in both cases, and show that $\underline{U}^{II} < \bar{U}^{II}$, for the cases where $K^{II} = K^{I}$.

Quota imposed. If the foreign country invokes trade restrictions, then home exports and imports are restrained to $\bar{E}_y^{II}$ and $\bar{M}_x^{II}$.

The optimizing solution for the home country then will yield $\underline{U}^{II}$, where

$$\underline{U}^{II} = \max U^{II}(C_x^{II}, C_y^{II}),$$

subject to

$$C_x^{II} = Q_x^{II} + \phi(\bar{E}_y^{II}, K^{I}), \quad C_y^{II} = Q_y^{II} - \bar{E}_y^{II} \quad \text{and} \quad Q_x^{II} = F(Q_y^{II}, K^{I}).$$

We then get the first-order condition,

$$\frac{U_2^{II}}{U_1^{II}} = -F_1, \tag{5}$$

i.e., that the optimal policy for the home country is to equate the marginal domestic rate of substitution in consumption (DRS) with the marginal domestic rate of transformation in production (DRT). Hence, the import restriction abroad, say a VER, implies that the optimal policy response is to

[5] Although the same could be said about the volume of trade in good Y, recall footnote 3.

accommodate it by a home import restriction or tariff which generates the required trade volume and does not drive a wedge between DRT and DRS. Given $\bar{E}_y^{II}$ (and K^I), the question of equating DRT with FRT at some E_y on the foreign offer curve defined by the ϕ function is moot.[6]

Now, since period-I DFI, K^I, will have to be chosen, taking into account its impact on period-II utility, we need to investigate $\partial \underline{U}^{II}/\partial K^I$, keeping in view period-I optimization later in the paper. Thus, it is evident that $\underline{U}^{II} = \underline{U}^{II}(K^I, \bar{E}_y^{II})$. Then, we have

$$\frac{\partial \underline{U}^{II}}{\partial K^I} = U_1^{II} \frac{\partial C_x^{II}}{\partial K^I} + U_2^{II} \frac{\partial C_y^{II}}{\partial K^I}.$$

Noting that

$$\frac{\partial Q_x^{II}}{\partial K^I} = \left(F_1 \frac{\partial Q_y^{II}}{\partial K^I} + F_2 \right) \quad \text{and} \quad F_2 = -\gamma^{II} = F_2(Q_y^{II}, K^I),$$

we have, using (5) and

$$\frac{\partial Q_y^{II}}{\partial K^I} = \frac{\partial C_y^{II}}{\partial K^I}, \quad \frac{\partial Q_x^{II}}{\partial K^I} + \phi_2 = \frac{\partial C_x}{\partial K^I},$$

$$\frac{\partial \underline{U}^{II}}{\partial K^I} = U_1^{II}[\phi_2 - \underline{\gamma}^{II}]. \tag{6}$$

Quota not imposed. If, however, in period II, the trade restrictions are not imposed, optimization by the home country in period II is now subject to unconstrained trade level (but given K^I). The optimum solution will then yield $\bar{U}^{II}$, where

$$\bar{U}^{II} = \max U^{II}(C_x^{II}, C_y^{II}),$$

Subject to

$$C_x^{II} = Q_x^{II} + \phi(E_y^{II}, K^I), \quad C_y^{II} = Q_y^{II} - E_y^{II}, \quad \text{and} \quad Q_x^{II} = F(Q_y^{II}, K^I).$$

The first-order conditions then are

$$\frac{U_2^{II}}{U_1^{II}} = -F_1, \tag{7}$$

$$\frac{U_2^{II}}{U_1^{II}} = \phi_1, \tag{8}$$

[6] We assume, of course, that $\bar{E}_y^{II}$ is a binding constraint.

i.e., the optimal policy-mix requires again an optimal tariff or quota that equates DRS with DRT but also now with FRT (ϕ_1) in turn.

Note again that we now have $\bar{U}^{II}=\bar{U}^{II}(K^I)$ and that we can derive

$$\frac{\mathrm{d}\bar{U}^{II}}{\mathrm{d}K^I}=U_1^{II}[\phi_2-\bar{\gamma}^{II}]. \tag{9}$$

It is also evident that $\bar{U}^{II}>\underline{U}^{II}$, the latter representing an optimal-equilibrium value with an added binding constraint ($\bar{E}_y^{II}$).

3.2. Period-I optimal policy intervention

We are now in a position to examine the optimal policy of the home country in period I, for that must be determined with a view towards the period-II effects of its period-I decisions.

More exactly, we can now write the home country's objective function in period I as

$$\psi=U^I(C_x^I,C_y^I)+\rho[\underline{U}^{II}G+\bar{U}^{II}(1-G)], \tag{10}$$

where U^I is the first-period utility and ρ is the discount factor applied to the expected utility in period II where the two outcomes, $\bar{U}^{II}$ and $\underline{U}^{II}$, are weighted by their probabilities. The optimization problem then is

$$\max \psi,$$

subject to

$$C_x^I=Q_x^I+\phi(E_y^I,K^I),\quad C_y^I=Q_y^I-E_y^I\quad \text{and}\quad Q_x^I=F(Q_y^I,K^I).$$

Maximizing with respect to C_x^I, C_y^I, Q_x^I, Q_y^I, E_y^I and K^I, with λ_i representing the Lagrangean multiplier of the ith constraint, we then get the first-order conditions for an interior maximum,

$$\frac{\partial\psi}{\partial C_x^I}=U_1^I-\lambda_1=0, \tag{11}$$

$$\frac{\partial\psi}{\partial C_y^I}=U_2^I-\lambda_2=0, \tag{12}$$

$$\frac{\partial\psi}{\partial Q_x^I}=\lambda_1-\lambda_3=0, \tag{13}$$

$$\frac{\partial\psi}{\partial Q_y^I}=\lambda_2+\lambda_3F_1=0, \tag{14}$$

$$\frac{\partial\psi}{\partial E_y^I}=\rho(\underline{U}^{II}-\bar{U}^{II})G_1+\lambda_1\phi_1-\lambda_2=0, \tag{15}$$

$$\frac{\partial\psi}{\partial K^I}=\rho\left[(\underline{U}^{II}-\bar{U}^{II})G_2+G\frac{\partial\underline{U}^{II}}{\partial K^I}+(1-G)\frac{\mathrm{d}\bar{U}^{II}}{\mathrm{d}K^I}\right]+\lambda_1\phi_2+\lambda_3F_2=0. \tag{16}$$

These imply that

$$\frac{\lambda_2}{\lambda_1}=\frac{U_2^I}{U_1^I}=-F_1 \tag{17}$$

$$=\phi_1-\frac{\rho(\bar{U}^{II}-\underline{U}^{II})}{U_1^I}G_1 \tag{18}$$

and

$$\gamma^I(\equiv -F_2)=\phi_2+\frac{\rho}{U_1^I}\left[(\underline{U}^{II}-\bar{U}^{II})G_2+\left\{G\frac{\partial\underline{U}^{II}}{\partial K^I}+(1-G)\frac{\mathrm{d}\bar{U}^{II}}{\mathrm{d}K^I}\right\}\right]. \tag{19}$$

The interpretation of these first-order conditions is fairly straightforward. First, (17) implies that DRS and DRT should be equated.

At the same time, (18) implies that an optimal tariff should be imposed, containing the two terms familiar from Bhagwati and Srinivasan (1976): the standard optimal tariff (which equates DRT to FRT, ϕ_1)[7] and an added tariff resulting from the marginal change in expected utility in period II (duly discounted) that follows from a change in period-I exports [given by the second term of R.H.S. of (18)].

Finally, (19) implies that the quid pro quo DFI results in a capital-export tax-cum-subsidy reflecting two terms: the standard optimal capital-export tax (equating γ^I to ϕ_2 and reflecting the Kemp–Jones results for myopic maximization);[8] and an added term due to the change in expected utility in period II [the square-bracketed expression on R.H.S. of (19)] resulting from a marginal change in capital inflow into the foreign country. The sign of ϕ_2, the first R.H.S. term in (19), is readily seen to be an indicator of how the import volume is affected by the capital outflow at the margin. This might be termed the *capital-trade complementary/substitution* effect and will reflect,

[7]For well known reasons this tariff is positive in the Bhagwati and Srinivasan (1976) case where $K\equiv 0$. With $K>0$, as is the present case, however, the sign of this tariff is ambiguous as we know from Kemp (1966) and Jones (1967).

[8]As these results show, the optimal foreign-investment tax and the corresponding optimal tariff are ambiguous in sign, but both cannot be negative simultaneously.

among other things, the relative capital-intensities of the two commodities abroad.[9]

Coming finally to the second, bracketed R.H.S. effect on expected period-II utility, we see that in turn it is composed of two effects. The first term, since $\bar{U}^{II} > \underline{U}^{II}$ and $G_2 < 0$, implies a subsidy on capital outflow: the quid pro quo effect is directly reflected here. As for the second, inner-bracketed effect, the change in the probability-weighted utility outcome in period II as period-I capital outflow is varied, this reflects (6) and (9), and can be negative, positive or zero.

Note finally that the Kemp–Jones analysis emerges as a special case by simply putting period-II effects in (18) and (19) to zero.

4. Concluding remarks

The foregoing analysis has formalized quid pro quo DFI within the framework of the two-period analysis of threatened trade restrictions that was introduced by Bhagwati and Srinivasan (1976). It has indirectly served also to generalize the well-known one-period, myopic-optimization analysis by Kemp (1966) and Jones (1967) of optimal policy intervention in an open economy with capital mobility.

[9] Several important papers have recently analyzed the issue of such complementarity between capital flows and trade volumes. See Markusen and Svensson (1985) and Wong (1986), in particular. Wong also contains a useful analysis of several alternative ways in which such complementarity has been defined.

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