1970

Tariffs, Subsidies, International Investment and Optimal Policy

Raveendra Batra

Gerald W. Scully

20347

RESEARCH REPORT 7029

TARIFFS, SUBSIDIES, INTERNATIONAL INVESTMENT AND OPTIMAL POLICY

by

Raveendra Batra*

and

Gerald W. Scully

*The authors are respectively Assistant Professors of Economics at the University of Western Ontario and Southern Illinois University.

Tariffs, Subsidies, International Investment, and Optimal Policy

by Raveendra Batra and Gerald W. Scully*

1. Kemp [6, 7] has demonstrated, within the framework of a two-country, two-commodity, two-factor model, that, when the home country enjoys natural monopoly power in trade, an optimal degree of trade restriction (tariff) cannot be achieved without recognition of the mutual interdependence of trade and investment policies.[1] Both the gain from trade and the optimal tariff may be affected by international capital movements. Thus, a failure to consider the effects of foreign investment may seriously compromise the intended effect of the tariff. Similarly, policies designed to restrict international trade affect the terms of trade and the rates of return on capital in the domestic and foreign countries, and, therefore, may seriously compromise the intended effect of an investment tax. Kemp derives the formulae for an optimal tariff and an optimal tax on foreign earnings in light of this mutual interdependence, and shows that either the optimal tariff or tax, or both, may be positive, negative, or zero. Another attempt at introducing international investment in the traditional trade model has been made by Jones [4]. Jones utilizes Kemp's framework, accepts most of his conclusions, but extends the analysis in several directions which we do not consider here.

2. Bhagwati and Srinivasan [3] consider to what extent the optimality of free trade or the optimal tariff is modified if certain noneconomic objectives are pursued. They develop optimal policy for four noneconomic objectives, but, since we consider only two of them in this paper, we state the conclusions only for them. They conclude that, if a country enjoys a natural monopoly power in trade, the optimal policy, in addition to the optimal tariff designed

to exploit this monopoly power, is (1) to impose a production tax-cum-subsidy on the importable commodity, if the noneconomic objective is to encourage its domestic production, and (2) to impose a tariff, if the objective is to restrict the volume of imports ("self-sufficiency"). If the country in question has no monopoly power in trade, then the pursuit of the two objectives requires, respectively, only the policy of a production tax-cum-subsidy and a tariff.

3. The Bhagwati and Srinivasan conclusions are correct, if investment effects are not considered in the model. In light of Kemp's results, however, these conclusions require some modification. The purpose of this article is twofold: (1) to clarify and to extend some of Kemp's [6] and Jones' [4] results and (2) to derive optimal tariff and optimal tax policies when certain noneconomic objectives are pursued. We will consider optimal intervention policies when the stated noneconomic objectives are (1) a production constraint (the domestic production of the importable commodity is not allowed to fall below a specified level), (2) a reduction of trade or a "self-sufficiency" constraint, and (3) control of international investment. We consider these noneconomic objectives when the foreign country is assumed to be incompletely specialized and when there is complete foreign specialization. While Bhagwati and Srinivasan can ignore the complete foreign specialization case, because it does not alter their conclusions, since our model includes international investment, the conclusions for the most part differ under each assumption.

4. Both Kemp and Jones derive optimal tariff and tax policies when the home country enjoys natural monopoly power in trade. And, in addition, they conclude that, in the case of pure competition and of incomplete foreign specialization, laissez-faire, defined as the policy of non-intervention in the free international flow of commodities and capital, is the optimal policy. However, neither explores the possibility that these results do not hold if pure competition

in trade and complete foreign specialization are assumed. We find that in this case, while nonintervention in commodity markets continues to be optimal, nonintervention in international capital markets leads to less than maximum welfare. We conclude that, in the absence of noneconomic objectives, optimal policy requires the imposition of an optimal tax if maximum welfare is to be achieved.

5. Since two of our noneconomic objectives were explored previously by Bhagwati and Srinivasan, it is of interest to compare conclusions when their model is modified by the explicit introduction of international investment. For the case where the foreign country is not completely specialized in its exportable commodity, and the home country is a large country (that is, the home country has natural monopoly power in trade) we derive the following optimal intervention policies. (1) In the case of Objective 1, the production constraint, maximization of welfare requires (i) an optimal tariff to exploit the monopoly power, (ii) an optimal tax on foreign earnings or on the earnings of foreign capital and (iii) a production tax-cum-subsidy policy on the importable commodity. (2) For objective 2, "self-sufficiency", maximum welfare is achieved with (i) an optimal tariff, (ii) an additional tariff, which may make the "overall" tariff greater or less than the optimal tariff[2], to effect the objective, (iii) an optimal tax, and (iv) an additional tax, which may make the overall tax greater or less than the optimal tax[3], to effect the "self-sufficiency" objective. It will be remembered that, in the absence of international capital movements, Bhagwati and Srinivasan concluded that only an optimal tariff and an additional tariff were required for welfare maximization. We conclude that the circumstance is conceivable, although admittedly paradoxical, where the pursuit of "self-sufficiency" may require a subsidy to imports in order to restrict them and that earnings on foreign capital may also have to be subsidized. (3) Maximization of welfare subject

to the constraint of restrictions on foreign investment requires (i) an optimal tariff, (ii) an optimal tax, and (iii) an additional tax, which may cause the "overall" tax to be greater or less than the optimal tax, to effect the objective.

The conclusions for the incomplete foreign specialization, and small home country (pure competition in international trade), case emerge as special results of the large home country case. Objective 1 requires a policy of non-intervention in both the foreign commodity and capital markets, with a production tax-cum-subsidy to the importable commodity. A tariff and a tax emerge as optimal when "self-sufficiency" is being pursued by the small home country. Finally, regulation by the small home country of its capital movements is optimally achieved through a tax (or subsidy) on foreign earnings.

Our conclusions for the complete foreign specialization and large home country case are as follows. (1) Optimal policy in the light of the constraint of objective 1 in the complete foreign specialization case is identical to the results for the incomplete specialization case, except that the actual rates of the optimal tariff and tax are different. (2) Pursuit of Objective 2 requires, in addition to the optimal tariff and tax, an additional <u>positive</u> tariff, and an additional tax which may be negative or positive. Thus, with respect to the tariff, the difference between the incomplete and complete foreign specialization case is that the "overall" tariff must now be greater than the optimal tariff. In this respect, at least, our results are identical to those of Bhagwati and Srinivasan. (3) The conclusions for Objective 3 are virtually unaltered by changing the assumption to complete foreign specialization.

Finally, in the complete foreign specialization and small home country case optimal policy requires: (1) a production tax-cum-subsidy to the importable commodity and an optimal tax for objective 1; (2) an optimal tariff, an optimal tax, and an additional tax, which is identical to the complete foreign specialization and large home country case for Objective 2; and (3) the same optimal policies as in the large home country case for Objective 3.

6. To begin with, let us state our assumptions and the "rules of the game." We use a two-country (home country and foreign country), two-commodity (X_1 and X_2), two-factor (capital and labor) model to derive our results. The home country exports X_2 and imports X_1. We make the usual competitive imputations for factor and commodity markets. In addition, there is full employment, the absence of savings, and the underlying production functions, which differ internationally, are assumed to be of constant returns to scale, with diminishing returns to factor-proportions. Factors of production are fixed. The social utility function is well behaved and concave. Finally, tariff and tax retaliation by the "other side" is conveniently ignored.

We chose to violate the usual tradition of deriving the optimality condition for the purely competitive case first and then relaxing the assumption to consider the impact of monopoly. We do so for two reasons: (1) A large amount of essentially repetitious argument is eliminated and (2) for the most part, results derived when the home country is small are special cases of the large country results.

The paper begins with a presentation of the basic model followed by a geometric presentation of free trade equilibrium in the presence of international investment. In Section II, incomplete foreign specialization is assumed. The optimality conditions for the large home country case in the absence of noneconomic objectives are first considered and then each of our noneconomic objectives is introduced and the new optimal intervention policies are derived. This order is repeated in Section III, where complete foreign specialization is assumed.

I. The Basic Model

7. Let X_i, $i = 1, 2$, denote the domestic output of the i^{th} commodity and D_i the home country consumption. Consumption of the i^{th} commodity, of course, can exceed its home production by excess demand, E_i. Utility, U, is derived from the consumption of commodities 1 and 2. This utility or social welfare function, viewed as a concave Scitovsky index of the welfare of the home country, is a function of the amounts of X_i consumed by the home country.[4] Thus, we may write

(1) $U = U(D_1, D_2)$, where

(2) $D_1 = X_1 + E_1$ and

(3) $D_2 = X_2 + E_2$.

Let the asterisk denote the symbols for the foreign country. Then international trade market equilibrium requires that

(4) $E_1 + E_1^* = 0$ and

(5) $E_2 + E_2^* = 0$.

The foreign country, furthermore, is subject to the budget constraint

(6) $E_1^* + p^*E^*_2 + r^*K = 0$,

where p* denotes the world price of commodity 2 in terms of commodity 1 or the world terms of trade, r* equals the foreign rate of return on capital (= to the marginal product of capital in terms of commodity 1),[5] and K denotes capital invested abroad by the domestic country. K may be positive or negative depending upon whether the home country is a net creditor or debtor to the foreign country.

From (2), (4), and (6) we write

(2*) $D_1 = X_1 + E_1 = X_1 - E_1^* = X_1 + p^*E_2^* + r^*K$,

and from (3) and (5) we write

(3*) $D_2 = X_2 + E_2 = X_2 - E^*_2$.

Furthermore,

(7) $X_2 = \phi(X_1, K)$, where $\partial \phi/\partial X_1 = -1/p$; $\partial \phi/\partial K = -r/p$.

(8) $E_2^* = E_2^*(p^*, K)$.

(9) $r^* = r^*(p^*, K)$.

Equation (7) is a statement of the production possibilities, that is, the domestic production of X_2 depends upon the domestic production of X_1, and the amount of capital invested in the foreign country. $\partial \phi/\partial X_1$ is the marginal rate of transformation and, hence, equal to the negative of the inverse of the home country terms of trade, $-1/p$, while $\partial \phi/\partial K$ is the marginal productivity of capital in terms of the second commodity and, hence, equal to $-r/p$.[6] In equation (8) we specify the general functional form for the foreign excess demand, E_2^*, as being related to the world terms of trade, p^*, and the level of net international indebtedness, K. Finally, equation (9) posits a general relationship for the foreign rate of return, r^*, as a function of the world terms of trade or net international indebtedness depending on whether the foreign country is completely or incompletely specialized.

8. Given our model and the assumptions, the home country's free trade equilibrium in the presence of international investment is described by Fig. 1. This diagram is a simple extension of the usual free trade diagram drawn in the absence of international investment. In Fig. 1, HH' is the home country's transformation curve,the slope of CD (parallel to AB) equals the world terms of trade (which in free trade equal the home country's terms of trade), P is the production point, C is the consumption point, and the level of welfare is U_K. The home country exports PQ amount of X_2 in exchange for QC amount of X_1 from the foreign country, where RC amount of X_1 represents home country's foreign earnings in terms of the first commodity, and equals r^*K. The description of the model in terms of Fig. 1 serves to show the interdependence of trade and investment policies, because any policy change which changes the

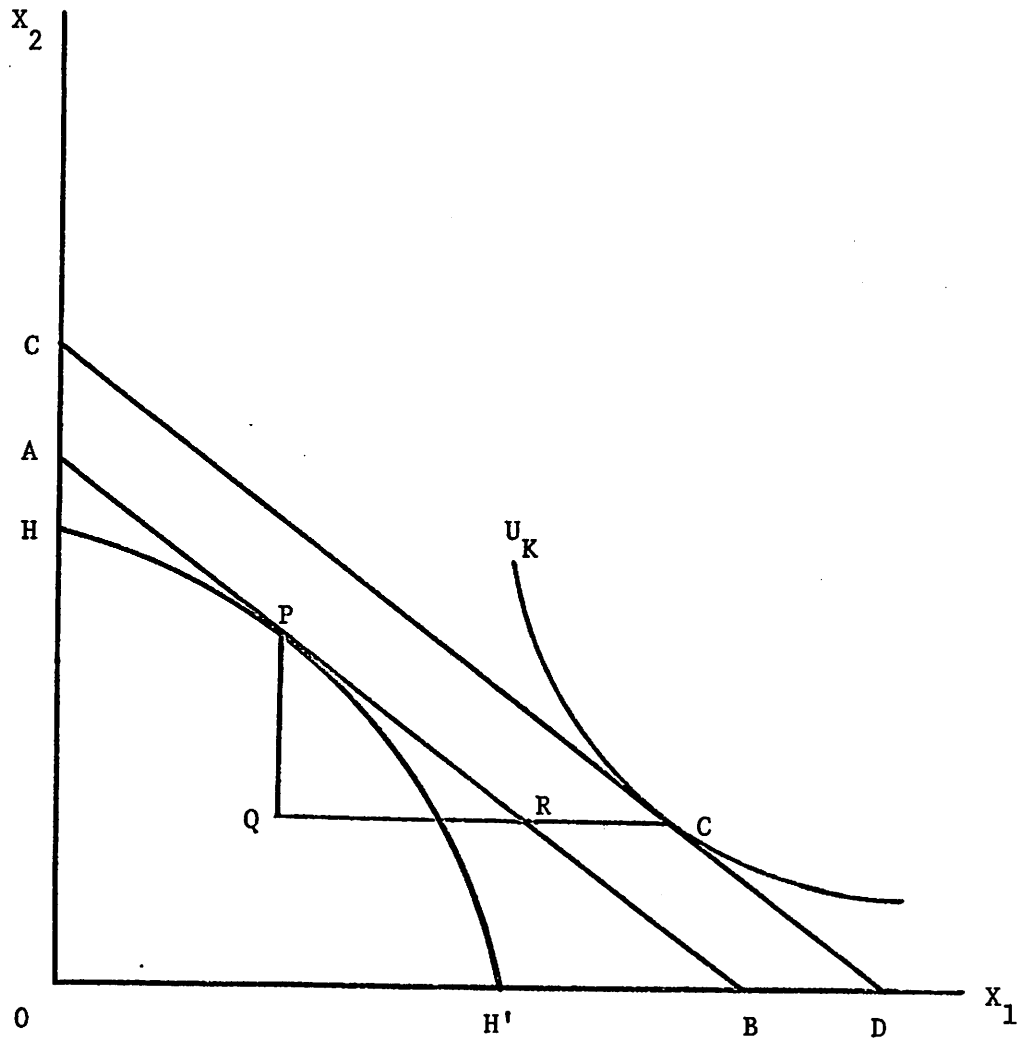

Figure 1

world terms of trade will, by changing the foreign rate of return, also change the length RC which currently equals the home country's foreign earnings. This diagram can be easily adapted to the case in which the home country is a net importer of capital.

9. We start by obtaining Kemp's optimal conditions in the absence of non-economic objectives. Optimality means maximization of the social welfare function subject to any constraints. Up to this point the problem involves maximizing (1) subject to constraints (2*) and (3*) and this is solved in the usual manner by forming the Lagrangean, α:

$$\alpha = U(D_1, D_2) - \lambda_1 [D_1 - (X_1 + p^*E_2^* + r^*K)] - \lambda_2 [D_2 - \phi(X_1, K)],$$

where λ_1 and λ_2 are Lagrangean multipliers (shadow prices for commodities 1 and 2, respectively) associated with the constraints. Maximization of α yields the necessary conditions derived by Kemp for an optimum. These are found by differentiating with respect to D_1, D_2, X_1, E^*_2 and K. Thus,

(10) $\partial\alpha/\partial D_1 = U_1 - \lambda_1 \leqq 0$, with equality if $D_1 > 0$.

(11) $\partial\alpha/\partial D_2 = U_2 - \lambda_2 \leqq 0$, with equality if $D_2 > 0$ where $U_i = \partial U/\partial D_i$.

(12) $\partial\alpha/\partial X_1 = \lambda_1 + \lambda_2(\partial \phi /\partial X_1) \leqq 0$, with equality if $X_1 > 0$.

(13) $\partial\alpha/\partial E^*_2 = \lambda_1[p^* + (\partial p^*/\partial E_2^*) E_2^* + K\, \partial r^*/\partial p^* \cdot \partial p^*/\partial E^*_2] - \lambda_2 = 0.$

(14) $\partial\alpha/\partial K = \lambda_1[p^*(\partial E^*_2/\partial K) + r^* + (K\, \partial r^*/\partial K)] - \lambda_2[-\partial\phi/\partial K + \partial E^*_2/\partial K] = 0.$

II. The Case of Incomplete Foreign Specialization

10. If the foreign country is incompletely specialized, then a change in net foreign investment, K, has no effect on net foreign real income, if commodity prices are kept constant.[7] Changes in net foreign investment do affect E_2^* ($\equiv D_2^* - X_2^*$), but, only through X_2^*: $\partial E^*_2/\partial K = -\partial X_2^*/\partial K$. Similarly, the foreign rate of return, r^*, becomes exclusively a function of p^*.[8] Hence, $\partial r^*/\partial K$ also equals zero. The first order conditions for an interior maximum, therefore, may be written from (10) - (12) and (13) and (14) as

(15) $U_2/U_1 = \lambda_2/\lambda_1 = p$, and

(16) $\partial \phi / \partial X_1 = -\lambda_1/\lambda_2 = -1/p$.

In the incomplete foreign specialization case equation (13) can be written as

(17) $(p^*/\eta^*_2)(1 + \eta^*_2 + \mu^*\gamma^*) = \lambda_2/\lambda_1 = p$,

where $\eta^*_2 = (p^*/E^*_2)\ (\partial E_2^*/\partial p^*)$ is the total price elasticity of foreign import demand, $\gamma^* = (p^*/r^*)\ (\partial r^*/\partial p^*)$ is the elasticity of the foreign rate of return with respect to the foreign terms of trade, and μ^* $(=r^*K/p^*E_2^*)$ is the ratio of earnings on capital invested abroad to the value of exports. It may be noted that η_2^* is negative, whereas μ^* and r^* may have any sign. Equation (14) can be written as

(18) $[p^*\ (\partial \phi / \partial K - r^*/p^*)]/(\partial X_2^*/\partial K - r/p) = \lambda_2/\lambda_1 = p$.

Condition (15), of course, requires that the marginal rate of substitution must be equal to the ratio of the commodity prices, while condition (16) requires that the marginal rate of transformation be equal to the negative of the inverse of the commodity price ratio. Conditions (17) and (18) are less straightforward and are described below.

11. A. The Large Country Case. Condition (17) defines the optimal tariff. If the home country is a large country, the price elasticity of foreign import demand, η_2^*, is less than infinity, so that, as can be seen from (17), p^* must differ from p. The difference between the domestic and world terms of trade will be equal to the optimal tariff rate, i.e., $p^* = p\ (1 + \tau)$, where τ is an *ad valorem* rate of import duty on X_1. The optimum tariff, $\tau_\circ$, is obtained by substituting $p^* = p(1 + \tau)$ into (17). Thus,

(19) $\tau_\circ = -(1 + \mu^*\gamma^*)/(1 + \eta^*_2 + \mu^*\gamma^*)$,

where μ^* and γ^* are as previously defined.

The sign of the optimal tariff rate, $\tau_\circ$, depends upon the signs of μ^* and γ^*. The ratio of earnings on capital to the value of exports, μ^*, is positive or negative, depending on whether K is positive or negative. Similarly, γ^*, the elasticity of the foreign rate of return with respect to the foreign terms of trade, by virtue of the Stolper-Samuelson [14] theorem, may be positive or negative depending on whether the production of X_2 is capital intensive or labor intensive in the foreign country.[9] Since μ^* and γ^* may be of either sign, it follows, therefore, that $\tau_\circ$ may be positive, negative, or even zero.

Now, let $\mu^*\gamma^*$ $[=(K^*/E_2^*)(\partial X_2^*/\partial K^*)] = \varepsilon_2^*$; thus, the product of the ratio of earnings on capital invested abroad to the value of exports and the elasticity of the foreign rate of return with respect to the world terms of trade is the foreign elasticity of import production with respect to the borrowed capital.[10] Therefore, equation (19) may be written as

(20) $\tau_\circ = -(1 + \varepsilon_2^*)/(1 + \eta_2^* + \varepsilon_2^*)$.

It follows that the optimal tariff in the large country case will be zero, if and only if $\varepsilon_2^* = -1$. The necessary condition for this result to hold is that the production of X_2 in the foreign country be labor intensive.[11]

From (20), $\tau_\circ$ can be written as:

(20*) $\tau_\circ = -1/[1 + (\eta_2^*/(1 + \varepsilon_2^*))]$.

The numerator on the r.h.s. of (20*) is negative, so that $\tau_\circ \gtrless 0$ depending on whether the denominator is negative or positive, that is, whether

$1 + \varepsilon_2^* \lessgtr -\eta_2^*$.

It is evident that if the foreign import demand is inelastic, that is, if $\eta_2^* > -1$, then the sufficient condition for $\tau_\circ < 0$ is that $\varepsilon_2^* > 0$. However, if $\eta_2^* < -1$, then $\varepsilon_2^* > 0$ becomes a necessary condition for $\tau_\circ < 0$. Thus, depending on the magnitude of η_2^*, and the sign of ε_2^*, it is possible that it may be optimal to subsidize the imports.

12. Next, we turn to the interpretation of condition (18), which defines the optimal tax. In the case in which $K > 0$, that is, the home country is a net creditor, its foreign earnings per unit of capital equal r^*. Suppose a special income tax equal to 100τ percent is imposed by the home country.

In equilibrium, the rate of return on capital will be equal in both the home and the foreign country; that is, $r = r^*(1 - t)$, where t is the tax rate on foreign earnings. On the other hand, if $K < 0$, that is, the home country is a net debtor, then the tax will be imposed on the earnings of foreign capital invested in the home country, so that $r(1 - t^*) = r^*$, where t^* is the tax rate on the earnings of foreign capital.[12]

The optimal tax rate on foreign earnings, t_o, is obtained by substituting τ_o and $r = r^*(1 - t)$ into equation (18):

(21) $t_o = -[\gamma^*(1 + \mu^*\gamma^*)]/\eta_2^* = -[\gamma^*(1 + \varepsilon_2^*)]/\eta_2^*.$

Similarly, the optimal tax rate on the earnings of foreign capital, t^*_o, is obtained by substituting τ_o and $r(1 - t^*) = r^*$ into condition (18):

(22) $t^*_o = [\gamma^*(1 + \mu^*\gamma^*)]/[\eta_2^* + \gamma^*(1 + \mu^*\gamma^*)] = [\gamma^*(1 + \varepsilon_2^*)]/[\eta_2^* + \gamma^*(1 + \varepsilon_2^*)].$

Since, as we have argued previously, γ^* or ε_2^* may be of either sign, the optimal tax rates, t_o and t_o^*, may be positive, negative, or zero. However, if the optimal tariff is zero owing to $\mu^*\gamma^* = \varepsilon_2^* = -1$, then, as can be seen from (21) and (22), t_o and t_o^*, also must be zero. In other words, when free trade is optimal, nonintervention in international capital movements is also optimal.

13. Up to this point we have done no more than develop Kemp's framework. This framework is needed for consideration of the ways in which the pursuit of certain noneconomic objectives alter the optimal intervention policies, but, we hope that our more explicit development of the optimality conditions in the absence of noneconomic objectives has helped to clarify the framework. We are now in a position to introduce our three noneconomic objectives.

14. Objective 1: Level of Domestic Production, $X_2 \leq \bar{X}_2$. Suppose that the stated noneconomic objective is to encourage the production of the importable commodity, X_1. This objective is equivalent to restricting the production

of the exportable commodity, X_2, to a level such that $X_2 \leq \overline{X}_2$, where $\overline{X}_2$ is the level to which the output is to be restricted. The problem is to find that policy which will maximize utility in light of the added restriction. The solution to the problem becomes one of introducing the stated additional constraint into the model. This may be accomplished as follows:

$$\Theta_1 = \alpha - \beta_1 \, [\phi(X_1, K) - \overline{X}_2], \qquad (\beta_1 > 0).$$

The introduction of the additional constraint alters the first order condition (16) to

$$(23) \quad \partial\phi / \partial X_1 = - \lambda_1/(\lambda_2 - \beta_1),$$

where β_1 is the shadow price of the added constraint and λ_1 and λ_2 are as before. This particular noneconomic constraint can in no way affect conditions (15), (17), and (18); thus, they remain as before. Therefore, the maximization of welfare under the constraint $X_2 \leq \overline{X}_2$ only requires altering the marginal rate of transformation from $-\lambda_1/\lambda_2$, i.e., the negative of the shadow prices of X_1 to X_2, to $-\lambda_1/(\lambda_2 - \beta_1)$. This can be accomplished by either a production tax of β_1 on X_2 and/or a production subsidy to X_1. Since conditions (17) and (18) are unaltered, the optimal policy requires (i) imposing an optimal tariff, $\tau_\circ$, to capture the advantage of natural monopoly in trade, (ii) imposing an optimal tax, $t_\circ$ or $t_\circ^*$, depending upon $K \gtrless 0$, and (iii) imposing a tax-cum-subsidy on the importable commodity. These results should be compared with those of Bhagwati and Srinivasan where, in the absence of international investment, optimal policy requires only imposing a tax-cum-subsidy on the importable commodity and an optimal tariff. Thus, in the large home country case, a failure to introduce international investment into the analysis will result in less than maximum welfare.

15. <u>Objective 2: Reduction of Trade, or "Self-Sufficiency", $E_1 \leq \overline{E}_1$.</u>

Let the stated noneconomic objective be the pursuit of trade reduction such that the importation of commodity 1 is restricted to a certain specified level, i.e., $E_1 \lesseqgtr \overline{E}_1$. In view of (5) and (6), $E_1 = -E_1^* = p^*E^*_2 + r^*K$, and the objective may be stated as

$$p^*E_2^* + r^*K \leq \overline{E}_1.$$

Introducing the constraint, the Lagrangean expression becomes

$$\theta_2 = \alpha - \beta_2 \; [p^*E_2^* + r^*K - \overline{E}_1],$$

where β_2 is the shadow price of the constraint originating from objective 2.

By introducing this additional constraint, conditions (17) and (18) are now altered to

(24) $(p^*/\eta_2^*) \; [(1 + \eta_2^* + \varepsilon_2^*) \; (\lambda_1 - \beta_2)] = \lambda_2$ and

(25) $p^* \; [(\partial X_2^*/\partial K) - (r^*/p)]/[(\partial X_2^*/\partial K) - (r/p)] = \lambda_2/(\lambda_1 - \beta_2)$,

while conditions (15) and (16) remain the same. Thus, in the light of the constraint, maximum welfare can no longer be achieved with the previously derived optimal tariff and tax rates. New formula for the tariff and tax rates which will bring about maximum welfare are required.

Substituting $p^* = p^*(1 + \tau)$ into (24), and remembering that $p = \lambda_2/\lambda_1$, so that $\lambda_2/(\lambda_1 - \beta_2) = p\lambda_1/(\lambda_1 - \beta_2)$, we obtain

(26) $\tau = [(A\eta_2^*)/(1 + \eta_2^* + \varepsilon_2^*)] - [(1 + \varepsilon_2^*)/(1 + \eta_2^* + \varepsilon_2^*)]$,

where $A = \beta_2/(\lambda_1 - \beta_2) > 0$, or, more simply,

(27) $\tau = \tau_\circ[1 - (A\eta_2^*/1 + \varepsilon_2^*)]$.

The optimum tariff, $\tau_\circ$, as before, is equal to the second term on the r.h.s. of (26). Therefore, pursuit of "self-sufficiency" requires the imposition of a tariff in addition to the previously optimal tariff. This "overall" tariff, τ, will also be optimal, but only under the additional constraint $E_1 \lesseqgtr \overline{E}_1$, and so to avoid confusion and maintain generality we have left it nonsubscripted. If ε_2^* is positive, then by virtue of the fact that η_2^* is negative, the bracketed expression on the r.h.s. of (27) must be greater than one. Therefore, the "overall" optimal tariff, τ, will be greater than the optimal tariff, $\tau_\circ$, if $\tau_\circ$ is positive. On the other hand, if $\tau_\circ < 0$, then $-\tau < -\tau_o$. It has been shown, previously, that $\varepsilon_2^* > 0$ is a necessary condition for the optimum tariff to be negative, if $\eta_2^* < -1$. In other words, the paradoxical conclusion is reached that, if the foreign import demand is elastic, it will be necessary to subsidize the imports in order to restrict them, and that this subsidy will be greater than the subsidy required in the absence of the noneconomic objective. The Bhagwati and Srinivasan formula, given this constraint, is a special case of our general formula given in equation (27). If international capital movements are absent, $\varepsilon_2^* = 0$, and (27) reduces to

(28) $\tau = \tau_o [1 - A\eta_2^*]$.

Since the price elasticity of foreign import demand is less than zero, it is evident that the "overall" tariff must be greater than the optimal tariff, i.e., $\tau > \tau_o$.

16. How about the optimal tax? Since condition (18) has been altered by the constraint, the previously optimal tax is no longer optimal. Substituting $p^* = p(1 + \tau)$ and, for $K > 0$, $r^* = r(1 - t)$ into (25) we obtain

(29) $1 - t = B(1 - t_o)$,

where $B = (\lambda_1 - \beta_2)/\lambda_1$ is a positive fraction.[13]

In view of the fact that $B < 1$, as is evident from (29), $(1 - t) < (1 - t_o)$ or, stated differently, the "overall" tax must be greater than the optimal tax. Again, while we refer to t as the "overall" tax rate, it is an optimal tax rate. Therefore, under the objective of import restrictions, optimal policy requires a tax on foreign earnings above and beyond the optimal tax. If t_o is negative, that is, if it is desirable to subsidize foreign earnings, the "overall" subsidy will be smaller than the optimal subsidy, that is, $-t > -t_o$.

On the other hand, if $K < 0$, then $r(1 - t^*) = r^*$ is substituted into (25), in which case the "overall" optimal tax rate is given by

(30) $1/1 - t^* = B(1/1 - t^*_o)$.

Since $B < 1$, $(1/1 - t^*) < (1/1 - t^*_o)$, and, thus, $t^* < t^*_o$. Therefore, in the case in which the home country is a net importer of capital, the import restriction requires a reduction in the tax rate such that the "overall" tax rate is less than the optimal tax rate. This result contrasts sharply with the case in which the home country is a net exporter of capital. The direction of the net capital movement determines whether the overall tax will be greater or less than the optimal tax. The conclusion can be appreciated intuitively. If the home country is a net exporter of capital, then, its Value of Exports = Value of Imports minus Foreign Earnings. Self-sufficiency may be pursued by holding the value of exports near constant, while reducing considerably the foreign earnings accruing to the home country. A rise in the rate of tax on foreign earnings discourages domestic producers from transferring home their foreign earnings, which effectively lowers the value of home imports. Conversely, if the domestic country is a net importer of capital, then its Value of Exports minus Earnings on Foreign Capital = Value of Imports. One path to import reduction is to raise the earnings on foreign capital, while keeping the value of exports near constant, which is accomplished by lowering the rate of tax on the earnings of foreign capital. It is conceivable, in the presence of the self-sufficiency objective, that the earnings on foreign capital may require subsidization in spite of the fact that the optimal tax was positive in the absence of the additional constraint.

17. Objective 3: Restriction on Foreign Capital, $K \leq \overline{K}$. In view of the United States' attempt to control its investments abroad, largely for balance of payments reasons, and some interest on the part of other countries in restricting capital inflow, it may be topical to derive the optimal policy in the light of such a constraint. Adding in the additional constraint, $K \leq \overline{K}$, yields the Lagrangean $\theta_3 = \alpha - \beta_3(K - \overline{K})$. As the reader may verify,

all the optimality conditions, except (18), are unaltered. Condition (18), however, now becomes

(31) $p^*[\partial X_2^*/\partial K - r^*/p^*] - p[\partial X_2^*/\partial K - r/p] - \beta_3/\lambda_1 = 0,$

where β_3 is the shadow price associated with the constraint. For $K > 0$, to obtain the "overall" tax rate on foreign earnings, $r = r^*(1 - t)$ and $p^* = p(1 + \tau)$ are substituted into (31):

(32) $t = -[\varepsilon^*_2(1 + \varepsilon^*_2)/\mu^*\eta^*_2] + \beta_3/\lambda_1 r^* = t_\circ + C$

where $C = \beta_3/\lambda_1 r^* > 0$.

Since C is positive, the "overall" optimal tax must be greater than the previously optimal tax. Therefore, the optimal policy for the home country, which is a net exporter of capital, is the imposition of an additional tax above and beyond $t_\circ$. Of course, it is conceivable that t may be negative, in which case it may still pay to subsidize investments going abroad, but, since C is positive, this subsidy will be lower than the optimal subsidy to be given in the absence of the stated noneconomic objective. In light of the fact that condition (17) is unaltered, the optimal tariff, $\tau_\circ$ remains the same. Hence, the optimal policy for a net creditor large home country wishing to restrict its investments abroad is composed of (i) an optimal tariff, (ii) an optimal tax, and (iii) a tax in addition to the optimal tax.

The case $K < 0$ expectedly yields different conclusions, and, furthermore, depends upon whether the objective is to encourage foreign investment (then $-K \geq -\overline{K}$ or $K \leq \overline{K}$) or to restrict foreign investments coming into the home country (then $-K \leq -\overline{K}$). First, consider the case in which the home country wishes to attract foreign capital. The Lagrangean expression and condition (31) remain unchanged, but now $r(1 - t^*) = r^*$ along with $p^* = p(1 + \tau)$ are substituted into equation (31) yielding

(33) $1/(1 - t^*) = 1/(1 - t^*_o) - C.$

Hence, it is clear that $(1/1 - t^*) < (1/1 - t^*_\circ)$, or, $t^* < t^*_\circ$, i.e., the "overall" optimal tax is less than the previously optimal tax, t^*_o. Therefore, optimal policy requires (i) an optimal tariff, and (ii) a reduction in t^*_o to t^*, if the objective is to encourage foreigners to invest in the home country. Any alternative method of attracting foreign capital will result in suboptimal welfare. For example, an attempt to subsidize the production of the commodity made with foreign capital will cause a divergence between the marginal rate of transformation and the domestic price ratio.

On the other hand, if the objective is to restrict foreign investment coming into the home country ($-K \leq -\bar{K}$), equation (33) then is replaced by

(34) $1/(1 - t^*) = 1/(1 - t^*_o) + C.$

In this case, the "overall" optimal tax will exceed the previously optimal tax. Thus, restricting the net inflow of foreign capital to the home country requires (i) the imposition of a tax above and beyond the optimal tax, (ii) an optimal tax, and (iii) an optimal tariff. If the optimal tax is negative, the overall tax, t^*, may still be negative, but the subsidy now will be less than the previous subsidy.

18. B. The Small Country Case. Once the optimal policies have been derived for the case in which there is a natural monopoly power in foreign trade, the results for the pure competition, or small home country, case are quite simple to derive and are special cases of the large home country formulae. If the home country is a small country, then the price elasticity of foreign import demand, η^*_2, equals infinity. It is clear from the expressions for the optimal tariff and tax rates, that, if $\eta_2^* = \infty$, $\tau_o = t_o = t_o^* = 0$. In other words, given pure competition in international trade, welfare is maximized by nonintervention in commodity as well as capital markets, i.e., laissez-faire. The optimality conditions in the small country case may be summarized as

(15) $U_2/U_1 = \lambda_2/\lambda_1 = p$,

(16) $\partial\phi/\partial X_1 = -\lambda_1/\lambda_2 = -1/p$,

(35) $p^* = p$, and

(36) $r^* = r$.

19. The pursuit of the noneconomic objectives within the framework of pure competition will lead to slightly different policy implications, as should be expected. If the objective is $X_2 \leq \overline{X}_2$, to encourage the domestic production of the importable commodity, the optimality condition will still be given by (25). Given (35) and (36) tariffs and taxes are no longer required to maximize social welfare, which means that a policy of production tax-cum-subsidy imposed on the importable commodity with no intervention in foreign trade or international capital markets is desirable. This conclusion is the same as that of Bhagwati and Srinivasan.

20. If the policy objective is $E_1 \leq \overline{E}_1$, one of restricting the level of imports, the introduction of a tariff and a tax becomes the optimal policy. From (26), it is evident that

(37) $\tau = A = \beta_2/(\lambda_1 - \beta_2)$,

if $\eta^*_2 = \infty$; since β_2 is assumed to be less than λ_1, $\tau > 0$. Similarly, when $\eta^*_2 = \infty$, or $t_o = 0$ we have from (29)

(38) $t = 1 - B = \beta_2/\lambda_1 > 0$.

Therefore, when the home country is a net exporter of capital, both a tariff and a tax are required to restrict imports. Furthermore, both rates are positive. This result should be compared to that of Bhagwati and Srinivasan where, in the absence of the consideration of international capital movements, optimal policy was solely one of tariff imposition.

However, if the home country is a net importer of capital, then the optimality condition for the tax is derived from (30), so that with $t^*_o = 0$, in the absence of monopoly power,

(39) $t^* = (B - 1)/B = -\beta_2/(\lambda_1 - \beta_2) < 0.$

Since $\beta_2 < \lambda_1$, the tax rate must be negative. That is, optimal policy requires that the home country subsidize the earnings on foreign capital. Of course, this subsidy is in addition to the tariff given by (37).

21. Finally, we can consider the case in which the home country wishes to regulate international capital movements. If the home country is a net exporter of capital and it desires to restrict investments abroad, the policy recommendations can be deduced from (32). With $t_o = 0$, optimality requires a positive tax alone equal to

(40) $t = C = \beta_3/\lambda_1 r^*.$

If the home country is a net importer of capital, and, if it wishes to attract more foreign capital, optimality requires a subsidy, which can be derived from (33), equal to

(41) $t^* = -C/(1 - C).$[14]

However, if the objective is to discourage foreign capital, welfare will be maximized by a tax which is derived from (34) and is equal to

(42) $t^* = C/(1 + C).$

From (40), (41), and (42), clearly, regulation of international capital movements requires intervention only in the capital market. Conditions (40) and (42) require a tax on foreign earnings to discourage their flow, while condition (41) requires a subsidy to encourage their flow. Any other policy, such as intervention in the foreign trade market or in the domestic production market in order to affect the flow of foreign capital would yield less than maximum welfare.

III. The Case of Complete Foreign Specialization

22. <u>A. Large Country Case</u>. It is well known that the optimal tariff and tax rates will change if the foreign country is completely specialized

in the production of the home country's importable commodity, X^*_1, since r^* becomes a function of K and not of p; specifically, $\partial r^*/\partial p^* = \partial\phi/\partial K = \varepsilon_2^* = 0$, and $\partial r^*/\partial K < 0$. These changes in turn alter the optimal intervention policies. In the absence of noneconomic objectives these changes cause equation (20), the equation for the optimal tariff, to reduce to

(43) $\tau_\circ = -1/(1 + \eta^*_2)$.

Moreover, because of the impact of a change in K upon r^*, unlike the case of incomplete foreign specialization, the net foreign real income will be affected, even if commodity prices remain constant. Therefore, we have

$$\partial E^*_2/\partial K = \partial D_2^*/\partial K - \partial X_2^*/\partial K = (\partial D_2^*/\partial Y^*)(\partial Y^*/\partial K) = -(m^*_2/p^*)\,[(\partial r^*/\partial K)K]$$
$$= -(m_2^*/p^*)r^*\delta^*,$$

where Y^* denotes the national income in the foreign country, δ^* (= $K/r^* \cdot \partial r^*/\partial K$) is the elasticity of the foreign rate of return with respect to international investment, and m_i^* denotes the foreign marginal propensity to consume the ith commodity. Note: $m_1^* + m_2^* = 1$. In view of these changes, the expressions for the optimal tax given in (21) and (22) no longer hold and are replaced by

(44) $t_\circ = -\delta^*(\eta^*_2 + m^*_2)/\eta^*_2$ and

(45) $t^*_\circ = \delta^*(\eta^*_2 + m^*_2)/\eta^*_2 + \delta^*(\eta^*_2 + m^*_2)$.

From equation (43) the necessary condition for the optimal tariff to be positive is that $\eta^*_2 < -1$, i.e., the price elasticity of foreign import demand must be elastic.[15] This result is identical to that of optimal tariff theory in the absence of international capital movements. From equation (44), since $0 < m^*_2 < 1$, $\delta^* < 0$ when $K > 0$[16], and $\eta^*_2 < -1$ for $\tau_\circ$ to be positive, it is clear that the optimal tax on foreign earnings, $t_\circ$, must also be positive. In the case of the optimal tax on foreign capital, equation (45), since $\delta^* > 0$ when $K < 0$, both the numerator and the denominator are negative, so that $t^*_\circ$ must be positive also. Therefore, whenever $\eta^*_2 < -1$, it is never profitable for the home country to subsidize imports, lending or borrowing when the foreign country is completely specialized.

23. <u>Objective 1: $X_2 \leq \bar{X}_2$.</u> It may be remembered that the conclusion was reached that the optimal policy to pursue in increasing the production of the importable commodity, in the case of incomplete foreign specialization, was to impose a production tax-cum-subsidy on the importable commodity, in addition to the optimal tariff and tax. This conclusion holds in the presence of complete foreign specialization. Since the non-economic objective is confined to the home country's production sector, the assumption of complete or incomplete foreign specialization cannot affect the optimal policy, although τ_o and t_o will be set at different levels.

24. <u>Objective 2: $E_1 \leq \bar{E}_1$.</u> As with the case of incomplete foreign specialization, restriction of imports as a policy objective of the home country alters the optimality conditions. The "overall" optimal tariff, τ, can be derived from equation (26) by setting $\varepsilon_2{}^* = 0$, so that

(46) $\tau = [A\eta^*{}_2/(1 + \eta^*{}_2)] - 1/(1 + \eta^*{}_2) = \tau_o(1 - A\eta^*{}_2)$,

where $A > 0$. Since the price elasticity of foreign import demand, $\eta^*{}_2$, is negative, the "overall" optimal tariff, τ, will be greater than the previously optimal tariff, τ_o. Contrast this result with the incomplete foreign specialization case, where the "overall" tariff may be less than the optimal tariff. Thus, the policy conclusion concerning the tariff with international investment in the analysis is identical to the Bhagwati and Srinivasan conclusions for $E_1 \leq \bar{E}_1$, without international capital movements considered.

Moreover, not only the optimal tariff, but the optimal tax rates as well are altered. The tax formulae and policy conclusions given by equations (29) and (30) remain unchanged, namely

(29) $(1 - t) = B(1 - t_o)$ and

(30) $1/(1 - t^*) = B[1/(1 - t^*{}_o)]$, where $B < 1$,

but t_o and t^*_o differ from the rates derived for the incomplete foreign specialization case.

25. <u>Objective 3: $K \leq \bar{K}$</u>. The policy conclusions for the regulation of international capital movements by the home country in the case of complete foreign specialization are similar to those in the incomplete foreign specialization case. First, consider the situation in which the home country is a net exporter of capital. For the incomplete foreign specialization case optimal policy required an optimal tariff, an optimal tax, and an additional tax on foreign earnings. The conclusion is the same for the complete foreign specialization case. The "overall" optimal tax, given $K \leq \bar{K}$, is

(47) $t = t_o + C$,

which is the same as (32), although, again, it should be remembered that the equation for t_o is different.

Similarly, when the home country is a net importer of foreign capital, if the policy objective is to attract foreign capital, then the "overall" optimal tax is given by

(48) $1/(1 - t^*) = 1/(1 - t^*_o) - C$.

On the other hand, if the objective is to discourage the flow of foreign capital, the "overall" tax rate is given by

(49) $1/(1 - t^*) = 1/(1 - t^*_o) + C$.

Since these optimal tax rates are the same as those given in (33) and (34), except for differences in the calculation of t_o and t^*_o, the policy conclusions remain unaltered.

26. <u>B. The Small Country Case</u>. It will be recalled that the optimal policy in the small home country and incomplete foreign specialization case was one of <u>laissez-faire</u>. However, in the case of complete foreign specialization, while nonintervention in commodity markets continues to be optimal, nonintervention in international capital markets leads to less than maximum

welfare. Optimal policy requires an optimal tax. This case has not been explored previously by either Kemp or Jones, but is very interesting, since it suggests that, even if it enjoys no monopoly power in trade, the home country is required to impose an optimal tax on capital to achieve maximum welfare. This can be shown as follows.

If the home country's trade is purely competitive, then $\eta^*_2 = \infty$, so that from equation (43) $\tau_\circ = 0$. Therefore, free trade is optimal. But, $t_\circ$ and $t^*_\circ$ from equations (44) and (45) do not reduce to zero, i.e.,

(50) $t_\circ = -\delta^*$ and

(51) $t^*_\circ = \delta^*/(1 + \delta^*)$.

Equation (50) gives the optimal tax for the case in which the home country is a net capital exporter. When $K > 0$, $\delta^* < 0$, and, therefore, $t_\circ > 0$. On the other hand, in the case in which the home country is a net capital importer, $\delta^* > 0$, and, thus, $t^*_\circ > 0$. In other words, whether the home country is a net exporter or importer of capital, welfare is increased with the imposition of a tax. Moreover, both $t_\circ$ and $t^*_\circ$ are determined by δ^*, the elasticity of the foreign rate of return with respect to borrowed capital.

27. The implications of the noneconomic objectives for optimal policies may be stated briefly for the small home country and complete foreign specialization case. (1) If the noneconomic objective is to encourage the domestic production of the importable commodity (i) a production tax-cum-subsidy to the importable commodity plus (ii) the optimal tax leads to maximum welfare. (2) The policy implications for the "self-sufficiency" objective may be derived by substituting $\eta^*_2 = \infty$ into (46), (29), and (30), so that τ, t, and t^* are now given by

(52) $\tau = A, \quad A > 0,$

(53) $1 - t = B(1 - t_\circ)$, where $t_\circ = -\delta^*$, and

(54) $1/(1 - t^*) = B[1/(1 - t^*_\circ)]$, where $t^*_\circ = \delta^*/(1 + \delta^*)$.

Thus, (i) a tariff, (ii) a tax, and (iii) an additional tax are required for maximum welfare, a conclusion which is identical, except for the differences in the specific rates, to the large home country and complete specialization case. (3) In addition, the conclusions for $K \leq \bar{K}$ are identical to the large home country and complete foreign specialization case. Of course, in both (2) and (3), τ, t_o, and t^*_o have different meanings.

IV. Concluding Remarks

28. By introducing international investment into the traditional Heckscher-Ohlin, two-country, two-commodity, two-factor trade model, Kemp has opened several new possibilities to which the traditional results can be extended or modified. Apart from an article by Jones [4], we are not aware of any other analysis which proposes to discuss current results in the presence of international investment. We hope that our article, which extends the existing analyses of tariffs, subsidies, and noneconomic objectives to the case where international capital movements are allowed, will fill this need. The presence of capital movements may modify several other results, namely, whether the improvement in the terms of trade leads to an improvement in welfare, or whether a higher tariff is inferior to a lower tariff, and so on. These questions, however, are clearly beyond the scope of this paper, but we hope to return to the subject at some future date.

Footnotes

*The authors' names are listed alphabetically and both share equally in any remaining errors. This paper was written while Raveendra Batra was Assistant Professor of Economics at Southern Illinois University.

[1]The debt to Kemp's article [6] will be clear to the reader, particularly during the early part of our analysis. In addition to conforming to his symbols, so that the reader may refer back to Kemp, we have followed the development of his argument closely. Kemp [6] and Jones [4] are the only articles to appear that work within the framework of a Neo-Heckscher-Ohlin approach, although investment effects on the gains from trade have been considered previously. See for example [5, 8, 9, 13].

[2]This condition depends upon whether the home country's exportable commodity is capital or labor intensive abroad. See paragraphs 14 and 15.

[3]See footnote 2.

[4]It is worth noting that the income distribution effects of the optimal policies have not been ignored, but are implicit in the selection of the social welfare function.

[5]Throughout the paper commodity 1 is taken to be the numeraire.

[6]See Kemp [6], p. 793. Some readers of our paper have been confused by the equation $-\partial\phi/\partial K = r/p$, in part, because of an apparent printing error in Kemp [7, p. 325, footnote 23] and, also, because Kemp does not provide a proof of the relationship. Kemp [6, p. 793] makes use of this relationship in his equation 2c and the sign of r/p is negative both in that equation and in footnote 10. On the other hand, while Kemp [7, p. 325] has r/p negative in equation 13A2c,

it appears positive in his footnote 23. Clearly, he means $-\partial\phi/\partial K = r/p$. An examination of either his equation 2c in [6] or 13A2c in [7] indicates that utilizing r/p, rather than $-r/p$, of course, would render Kemp's results indeterminate. In view of this confusion, it is worthwhile deriving Kemp's relationship explicitly.

Differentiating X_2 in equation (7) partially with respect to K, we have: $\partial X_2/\partial K = (\partial\phi/\partial X_1 \cdot \partial X_1/\partial K) + \partial\phi/\partial K = (1/p\ \partial X_1/\partial K) + \partial\phi/\partial K$ or $p\partial\phi/\partial K = \partial X_1/\partial K + p\ \partial X_2/\partial K$. It can be shown easily that, at a constant commodity price ratio, $\partial X_1/\partial K + p\partial X_2/\partial K = -r$ (also, see Jones [4, p. 5]). Utilizing this relationship we can write that $\partial\phi/\partial K = -r/p$.

[7] This is because, at constant commodity prices, the change in net foreign real income equals r^*dK which the foreign country has to pay back as its payment to the home country.

[8] Of course, this proposition holds only under the assumption of constant returns to scale. If returns to scale are nonconstant, then r^* becomes a function not only of p^*, but also of the scale of output of the capital-intensive commodity in the foreign country. For details on this point, see Batra [1].

[9] Again, the reader is reminded that the Stolper-Samuelson theorem may be modified in the absence of nonconstant returns to scale. See Batra [1].

[10] In showing that $\mu^*\gamma^* = \varepsilon_2^*$, use has been made of the result that $\partial r^*/\partial p^* = \partial X_2^*/\partial K$. This result was first derived by Samuelson [11]. However, Kemp [6] gives a simpler proof.

[11] This result follows from the Rybczynski theorem [10], according to which $\partial X_i^*/\partial K \gtrless 0$ depending on whether X^*_i is capital or labor intensive. Evidently, $\varepsilon^*_2 \gtrless 0$ if X_2^* is capital or labor-intensive relative to X_1^*. Rybczynski proved

his result under the assumptions of a two-commodity and two-factor model. Recently, however, his results have been extended by Kemp [7] and Batra [2] to a three-commodity, three-factor model.

[12] In his book Kemp has a different equation concerning the equality of earnings on capital in both countries (see [7, p. 326, equation 9.11b]). However, for the sake of simplicity we follow Kemp's formulation in [6, p. 795]. Jones [4, p. 9] follows the same procedure. For a good justification for adopting this procedure, see Kemp [6, p. 794, footnote 13].

[13] The home country commodity price ratio prior to the introduction of the constraint is equal to λ_2/λ_1 and is obviously positive. As a result of the introduction of the constraint the home country commodity price ratio, from equation (25), is $\lambda_2/(\lambda_1 - \beta_2)$, if welfare is to be maximized in the presence of the constraint. β_2 is positive, if the constraint is to be binding. Since the home country commodity price ratio must always be positive and since $\beta_2 > 0$, $\beta_2 < \lambda_1$, and, therefore, $B = (\lambda_1 - \beta_2)/\lambda_1$ must be a positive fraction.

[14] Of course here we assume $C < 1$. This must be so because the shadow price of the relevant constraint on foreign capital in terms of the numeraire, commodity 1, β_3/λ_1, must be less than r^*, the foreign rate of return. Since $\beta_3/\lambda_1 < r^*$, it follows easily that $C = \beta_3/\lambda_1 r^* < 1$.

[15] For certain conditions, inherent in the model, which make $\eta^*_2 < -1$ or $\tau_0 > 0$, see Kemp [6].

[16] See Kemp [6, p. 805].

References

1. R. Batra, "Protection and Real Wages under Conditions of Variable Returns to Scale," Oxford Economic Papers, Nov. 1968, 354-61.

2. __________, "Factor Accumulation and the Terms of Trade: A Three Country, Three Commodity, Three Factor Analysis," Econometrica, forthcoming (July, 1970).

3. J. N. Bhagwati and T. N. Srinivasan, "Optimal Intervention to Achieve Non-Economic Objectives, Rev. Econ. Stud., Jan. 1969, 27-38.

4. R. W. Jones, "International Capital Movements and the Theory of Tariffs," Quar. Jour. Econ., Feb. 1967, LXXXI, 1-38.

5. M. C. Kemp, "Foreign Investment and the National Advantage," Econ. Record, March 1962, 38, 56-62.

6. __________, "The Gain from International Trade and Investment: A Neo-Heckscher-Ohlin Approach," Amer. Econ. Rev., Sept. 1966, LVI, 788-809.

7. __________, The Pure Theory of International Trade and Investment, Englewood Cliffs, 1969, pp. 30-51.

8. G. D. A. MacDougall, "The Benefits and Costs of Private Investment from Abroad: A Theoretical Approach," Econ. Record, March 1960, 36, 13-35.

9. T. Negishi, "Foreign Investment and the Long Run National Advantage," Econ. Record, Dec. 1965, 41, 628-32.

10. T. N. Rybczynski, "Factor Endowments and Relative Commodity Prices," Economica, N.S., Nov. 1955, 22, 336-41.

11. P. A. Samuelson, "Prices of Factors and Goods in General Equilibrium," Rev. Econ. Stud., 1953, 21 (1), 1-20.

12. T. Scitovsky, "A Reconsideration of the Theory of Tariffs," Rev. Econ. Stud., Summer 1941, 9, 89-110.

13. P. B. Simpson, "Foreign Investment and the National Economic Advantage: A Theoretical Analysis," in R. F. Mikesell, ed., U.S. Private and Government Investment Abroad, Eugene, Oregon, 1962, Ch. 18.

14. W. F. Stolper and P. A. Samuelson, "Protection and Real Wages," Rev. Econ. Stud., Nov. 1941, IX, 58-73.