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FOREIGN OWNERSHIP AND THE THEORY OF TRADE AND WELFARE*

by

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FOREIGN OWNERSHIP AND THE THEORY OF TRADE AND WELFARE

Richard A. Brecher and Jagdish N. Bhagwati

1. Introduction

This paper reconsiders a number of standard topics in theory of international trade, by taking explicit account of the distinction between national and aggregate income, when fixed supplies of foreign-owned inputs are present within the domestic economy. Extending the work of Bhagwati and Brecher (1978)[1], the following analysis takes a new look at welfare-theoretic aspects of international transfer, economic expansion and tariff policy, while emphasizing significant departures from conventional wisdom that arise in the presence of foreign ownership. As these selected departures suggest, many standard results are open to serious question, when part of the domestic product accrues to factor inputs from abroad.

Originally, the motivation for the present two-group analysis (based upon the national-foreign distinction) came from a recent concern in Latin America, where policymakers have been worried about the impact of trade liberalization on national welfare, given the domestic presence of foreign-owned multinational corporations. After further reflection, however, it is clear that the treatment below has much greater applicability, to a broad range of analytically similar cases. For example, it is possible to treat in much the same way a wide variety of alternative domestic distinctions, including those based upon race, sex, age or ethnicity. The following

techniques and results, moreover, are directly relevant for the fully analogous two-group issue relating to the distribution of gains (or losses) between two trading partners in a customs union with complete factor mobility. For the sake of brevity, however, only the national-foreign distinction is pursued explicitly here.

Section 2 reviews the basic model of an open economy, in which foreign-owned and national supplies of two homogeneous factors are combined to produce two commodities. As section 3 then shows, a transfer-receiving country might suffer a loss in national welfare, even under the usual conditions which would ensure a welfare gain if foreign ownership were absent. As established next by section 4, a country experiencing economic expansion (due to factor-endowment growth or technological advance) might encounter a deterioration in

national welfare, even under well-known conditions which would preclude this possibility of "immiserizing growth" in the absence of foreign ownership. Afterwards, section 5 explains why free trade might be inferior both to no trade and to subsidized trade, as far as national welfare is concerned.[2] A summary of the paper's main results is provided by section 6.

2. The Basic Model

Following the analysis of Bhagwati and Brecher (1978), the present section summarizes the basic two-commodity two-factor model of an open economy, which plays host to inputs from abroad. The home country has perfectly inelastic supplies of capital and labour, which must be combined in positive amounts to yield commodities one and two, according to well-behaved production functions exhibiting constant returns to scale. The aggregate factor endowments of the country are $\bar{K}^a$ units of capital and $\bar{L}^a$ units of labour; while $\bar{K}^n$ and $\bar{L}^n$ are the national endowments of capital and labour, respectively. (Thus, the fixed supplies of foreign-owned capital and labour within the home country are $\bar{K}^a - \bar{K}^n$ and $\bar{L}^a - \bar{L}^n$, respectively). It is assumed that $\bar{K}^a > \bar{K}^n > 0$ and $\bar{L}^a > \bar{L}^n > 0$, to exclude the possibility that either factor within the home country is owned wholly by nationals or completely by foreigners.[3] Producers maximize profits while consumers maximize utility, under perfectly competitive conditions. The second commodity is always labour-intensive relative to the capital-intensive first commodity, at any wage/rental ratio prevailing in the market.

In Figure 1, home production takes place on the aggregate

Differential-Trade-Volume Phenomenon

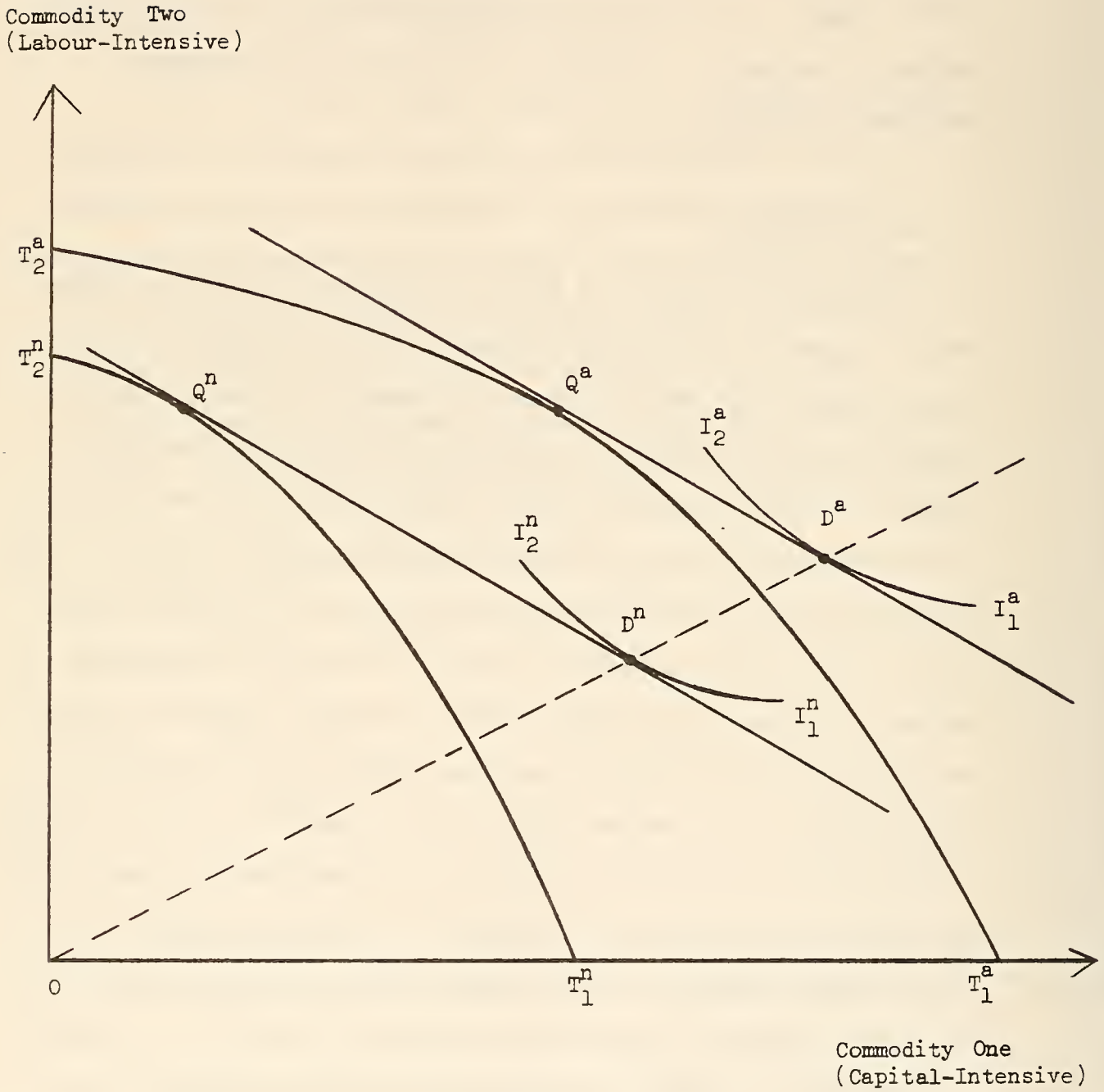

Figure 1

production-possibility frontier, $T_2^a T_1^a$, corresponding to $\bar{K}^a$ and $\bar{L}^a$ units of capital and labour. If only $\bar{K}^n$ and $\bar{L}^n$ units of capital and labour were used, the available combinations of output would be represented by the curve $T_2^n T_1^n$, which may be called the national production-possibility frontier. Although production actually takes place along curve $T_2^a T_1^a$, as all inputs are combined without regard to their source of ownership, curve $T_2^n T_1^n$ will be very helpful as a hypothetical frontier in the following analysis.

For the sake of illustration, suppose that the international commodity-price ratio equals (minus) the slope of line $Q^a D^a$, which is tangent to curve $T_2^a T_1^a$ at point Q^a. Then, aggregate production is at point Q^a, and aggregate income is represented by the budget line $Q^a D^a$. By the reasoning of Bhagwati and Brecher (1978), national income may be represented similarly by the budget line $Q^n D^n$, parallel to line $Q^a D^a$ and tangent to curve $T_2^n T_1^n$ at point Q^n. Thus, even though national and foreign-owned factors combine to produce along frontier $T_2^a T_1^a$, national income may be represented generally by the price line drawn tangent to frontier $T_2^n T_1^n$, under the assumption (maintained throughout this paper) that each of these frontiers shows incomplete specialization[4].

In formal terms,

$$X_i^j = F_i^j(p), \quad i = 1, 2, \quad j = a, n, \tag{1}$$

and

$$Y^j = X_1^j + pX_2^j, \quad j = a, n, \tag{2}$$

where p denotes the relative price of the second commodity in terms of the

first; X_i^j denotes the output level of commodity i on frontier $T_2^j T_1^j$; F_i^j is a conventional function of the product-price ratio, given $\bar{K}^j$ and $\bar{L}^j$ as well as the (uniform) level of technology for commodity i; and Y^a and Y^n denote the real value of aggregate and national income, respectively, in terms of the first commodity.

In Figure 1, aggregate consumption occurs at point D^a, where the aggregate budget line $Q^a D^a$ is touched by an aggregate indifference curve, labelled $I_2^a I_1^a$. (For simplicity of exposition, it is assumed that all income earned by factors from abroad is consumed locally, to avoid having to show repatriation of such income within the diagram.) Similarly, the national position in consumption is at point D^n, where the national indifference curve $I_2^n I_1^n$ is tangent to the national budget line $Q^n D^n$.

To emphasize that the main results of this paper qualitatively do <u>not</u> require any differences in consumer preferences between nationals and foreigners within the home country, assume throughout that the same set of indifference curves with unitary income-elasticities of demand represents both national and aggregate tastes in consumption. Consequently, points D^a and D^n lie on the same ray ($OD^n D^a$) from the origin within the diagram, although this simplification of the exposition could be dropped without detracting from the essence of the analysis.

Each aggregate or national indifference curve corresponds to an aggregate or national level of welfare, denoted by W^a or W^n, respectively. These levels are determined as follows:

$$W^j = U^j(C_1^j, C_2^j), \quad j = a, n, \tag{3}$$

where C_i^a and C_i^n, respectively, denote the levels of aggregate and national consumption of commodity i (i = 1,2); each U^j is a concave function of C_1^j and C_2^j; and each of these functions has positive partial derivatives, denoted by $U_i^j \equiv \partial U^j / \partial C_i^j$ (i = 1, 2). Since consumption must

satisfy the budget constraint,

$$C_1^j + pC_2^j = Y^j, \qquad j = a, n. \tag{4}$$

In Figure 1, the home country offers units of the second commodity for export, in exchange for an equal-valued bundle of commodity one, as indicated by a comparison of points D^a and Q^a. This actual pattern of trade for the economy in aggregate is the same (in direction) as the hypothetical national pattern of trade, indicated by comparing points D^n and Q^n. Consequently, in the case drawn, a rise in p (the relative price of the second commodity) means an aggregate and national terms-of-trade improvement, implying an increase in aggregate and national welfare.

An alternative situation is depicted in Figure 2, labelled to enable self-evident comparison with Figure 1. In the new diagram, the national (hypothetical) pattern of trade differs from the (actual) trade pattern for the aggregate economy, which still exports the second commodity in exchange for imports of the first commodity. Consequently, a rise in p here means an aggregate terms-of-trade improvement (as before), but (unlike before) implies correspondingly a deterioration in the terms of trade and level of welfare from the national point of view.

The key to understanding the difference between the two diagrams lies in the relative factor abundance of the national versus the aggregate endowment. Figure 1 represents the case in which the national factor endowment is labour-abundant relative to the capital-abundant endowment of the aggregate economy, in the sense that $\bar{K}^a/\bar{L}^a > \bar{K}^n/\bar{L}^n$.

Differential-Trade-Pattern Phenomenon

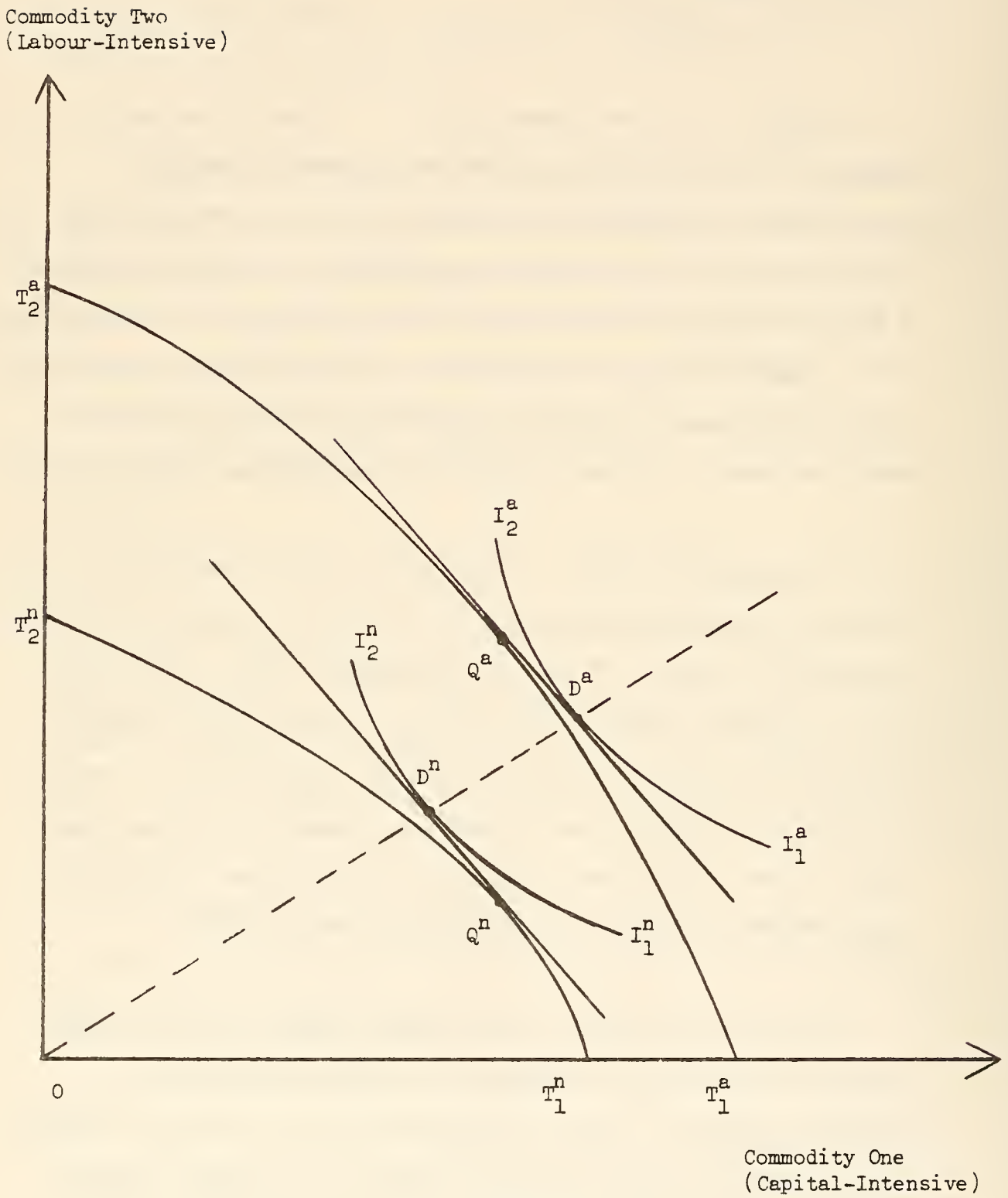

Figure 2

The opposite factor-abundance ranking, however, holds for Figure 2, where $\bar{K}^a/\bar{L}^a < \bar{K}^n/\bar{L}^n$. Thus, for any value of p, $X_1^a/X_2^a \gtrless X_1^n/X_2^n$ in Figure 1 or 2, respectively, by a straightforward extension of the reasoning of Rybczynski (1955). These alternative commodity-ratio rankings explain the trade-pattern discrepancies, which underlie the differences in terms-of-trade and (hence) welfare response, when Figures 1 and 2 are compared.[4a]

The difference between aggregate and national patterns of trade in Figure 2 illustrates the Differential-Trade-Pattern phenomenon of Bhagwati and Brecher (1978). Yet another situation, here called the Differential-Trade-Volume phenomenon, is illustrated in Figure 1 by the discrepancy between the aggregate and national volumes of trade. Both of these phenonena play important roles in the analysis below.

For the sake of concreteness, let the situation in Figure 1 or 2 correspond to free-trade equilibrium. Consequently, the well-behaved[5] offer curve (not drawn) for the rest of the world must pass through point D^a when the origin of this curve is placed at point Q^a, according to the well-known technique of Baldwin (1948). In the usual way, the rest of the world's offer curve reflects the extent to which the home country possesses or lacks monopoly power in trade. The following analysis is sufficiently general to cover both large-country and small-country cases.

3. International Transfer

According to a standard result in the literature [see Mundell (1960)], a transfer-receiving country cannot suffer a loss in aggregate welfare despite any possible deterioration in the aggregate terms of trade, as long as international commodity-market equilibrium is stable. In other words, the transfer-induced change in W^a cannot be negative, assuming that an excess demand for or supply of the second

good in world markets can be cleared by a rise or fall in p, respectively. As the following argument demonstrates, however, a (large) transfer-receiving country might suffer a deterioration in national welfare, even under the assumption (maintained throughout the present paper) that commodity markets are stable. This demonstration of a transfer-induced fall in W^n, moreover, does not even require a rise in the relative price of home importables.

Assuming that the transfer is given only to nationals, equations (2) are modified as follows:

$$Y^j = X_1^j + pX_2^j + \tau, \quad j = a, n, \tag{5}$$

where τ is the real value of the transfer in terms of the first commodity. If any part of the transfer were given to foreigners within the home country, the chances for a decline in W^n would simply be enhanced, thereby strengthening the argument below.

To examine the welfare implications of the transfer, differentiate equations (1), (3), (4) and (5) totally with respect to τ — assuming (without loss of generality) that initially $U_1^j = 1$, while noting that $U_2^j/U_1^j = p = -(dF_1^j/dp)/(dF_2^j/dp)$ from the first-order conditions for maximizing utility and profit. In this way, it is a straightforward exercise to derive that

$$dW^j/d\tau = 1 + E^j dp/d\tau, \quad j = a, n, \tag{6}$$

where $E^j \equiv X_2^j - C_2^j$. Recalling the assumption that the home country exports the second good, $E^a > 0$ throughout the present paper. As

illustrated above, however, E^n can be either positive (in Figure 1) or negative (in Figure 2).

As equations (6) confirm, $dW^a/d\tau$ is the familiar sum of the following two components: the primary gain (= 1) from the transfer-induced increase in aggregate income, at the initial (pre-transfer) set of relative prices; plus the secondary effect (= $E^a dp/d\tau$) from the possible increase or decrease in the real exchange value of the initial volume of home exports, in the event of a transfer-induced change (if any) in relative prices. The expression for $dW^n/d\tau$ is analogous, but is dependent instead upon E^n, which can differ from E^a (for reasons given above). If foreign inputs were entirely absent from the home country, the distinction between national and aggregate variables would disappear, thereby implying that $E^n = E^a$ and (hence) that $dW^n/d\tau = dW^a/d\tau$. Given the actual presence of factor inputs from abroad, however, $dW^n/d\tau$ generally differs from $dW^a/d\tau$, except in the special case where <u>either</u> $E^n = E^a$ (despite the foreign presence) <u>or</u> $dp/d\tau = 0$ (see below).

To determine precise conditions for the direction of change in welfare, consider the standard transfer-induced terms-of-trade response, analysed previously by Samuelson (1952, 1954) and subsequently by Mundell (1960). Thus, by well-known reasoning,

$$dp/d\tau = (1 - m - m^*)/(e + e^* - 1)E^a, \qquad (7)$$

where e (> 0) and m denote the relative-price elasticity of import demand and the marginal propensity to consume the importable, respectively, for the home country; e^* (> 0) and m^* denote the corresponding variables for the rest of the world; and $\tau = 0$ in the initial (pre-transfer)

equilibrium. Given the above assumption that world commodity-market equilibrium is stable, $e + e^* > 1$ throughout the present paper.

Substituting equation (7) into equations (6), simple manipulation confirms that

$$dW^a/d\tau = (\varepsilon + \varepsilon^*)/(e + e^* - 1) > 0, \qquad (8)$$

but shows that

$$dW^n/d\tau \gtreqless 0 \quad \text{as} \quad (e + e^* - 1)E^a \gtreqless (m + m^* - 1)E^n, \qquad (9)$$

where ε (> 0) and ε^* (> 0) denote the compensated (constant-utility) relative-price elasticity of import demand for the home country and the rest of the world, respectively; while $e = \varepsilon + m$ and $e^* = \varepsilon^* + m^*$, according to a standard decomposition. Although $dW^a/d\tau > 0$ unambiguously, it is evidently possible to have $dW^n/d\tau < 0$. If $E^n = E^a$ -- a special case that would hold if (for example) foreign inputs were entirely absent from the home country — it would then be true that $dW^n/d\tau > 0$ (recalling that $e - m = \varepsilon > 0$ and $e^* - m^* = \varepsilon^* > 0$). Given the actual presence of foreign ownership, however, $dW^n/d\tau$ can differ from $dW^a/d\tau$ in sign as well as magnitude.

To highlight the important role of the Differential-Trade-Pattern and Differential-Trade-Volume phenomena as determined by factor-abundance differences between the national and aggregate endowments, it is helpful to revert to equations (6), which may be manipulated readily to obtain the following result:

$$dW^n/d\tau = dW^a/d\tau + (E^n - E^a)dp/d\tau. \qquad (10)$$

This formulation suggests that, even though $dW^a/d\tau$ cannot be negative, it is nevertheless possible to have $dW^n/d\tau < 0$ if $(E^n - E^a)dp/d\tau < 0$. The sign and magnitude of $dp/d\tau$ are determined in the usual manner, as outlined above. As for $E^n - E^a$, this difference depends upon the factor abundance of the national versus the aggregate endowment, as explained below.

In the case of the Differential-Trade-Volume phenomenon with $E^n > E^a > 0$ -- implying[6] that $\bar{K}^a/\bar{L}^a > \bar{K}^n/\bar{L}^n$ as in Figure 1 -- it is possible to have $dW^n/d\tau < 0$ (even though $dW^a/d\tau$ cannot be negative), if $dp/d\tau < 0$ in equation (10). That is, when the national endowment is labour-abundant, a transfer-induced decline in national (though not in aggregate) welfare might occur, provided that the national (and aggregate) terms of trade deteriorate. Alternatively, in the case of the Differential-Trade-Pattern phenomenon characterized by $E^n < 0 < E^a$ -- implying[7] that $\bar{K}^a/\bar{L}^a < \bar{K}^n/\bar{L}^n$ as in Figure 2 -- it is possible to have $dW^n/d\tau < 0$ (despite the fact that $dW^a/d\tau$ cannot be negative), if $dp/d\tau > 0$ in equation (10).[8] In other words, if nationals are capital-abundant, a transfer-induced decline in national (but not in aggregate) welfare might take place, provided that the national terms of trade deteriorate as a result of an aggregate terms-of-trade improvement. Incidentally, if $dp/d\tau = 0$ -- as implicit in the small-country case and possible for the large-country case -- $dW^n/d\tau = dW^a/d\tau = 1$ in equations (6), thereby ruling out a decline in national welfare.

Thus, national welfare may deteriorate if the national terms of trade move unfavourably, regardless of whether the aggregate terms of trade improve or worsen. By similar reasoning, if home exportables were relatively intensive in their use of capital (rather than labour), a transfer-induced deterioration in national (though not in aggregate) welfare would still be possible, provided that either the aggregate terms of trade improve in the case of labour-abundant nationals or an aggregate terms-of-trade decline occurs in the presence of capital-abundant nationals.

4. Economic Expansion

As Bhagwati (1958a) has demonstrated, a once-for-all increase in a factor endowment or in a technological level might deteriorate the aggregate terms of trade enough to worsen aggregate welfare of the home country, but this immiserizing growth can occur only if either the rest of the world has an inelastic offer curve or growth would decrease the production of home importables at the initial product-price ratio. In other words, if the offer-curve elasticity for the rest of the world is not less than unitary and economic expansion is not "ultra-biased" against the production of home importables, then the growth-induced change in W^a cannot be negative. Even under these circumstances (assumed throughout the present section) which preclude a fall in aggregate welfare, however, the following analysis demonstrates that a (large) country might suffer a loss in national welfare. This demonstration of a growth-induced decline in W^n, moreover, does not even require a rise in the relative price of home importables.

To allow for factor-endowment expansion or technological advance, equations (1) may be rewritten as follows:

$$X_i^j = F_i^j(p, \theta), \quad i = 1, 2, \quad j = a, n, \tag{11}$$

where θ is a general shift parameter, a rise in which indicates either a factor-endowment increase (for $\bar{K}^j$ or $\bar{L}^j$) or a disembodied technological improvement for an industry (one or two). It is assumed that any addition to the aggregate supply of capital or labour is owned fully by nationals. If any part of such addition were foreign-owned, the likelihood of a decline in W^n would simply be enhanced, thereby strengthening the argument below. However, the ability of domestically located producers to take advantage of disembodied technological progress should be independent of the source of ownership of the inputs used, as assumed here.

Differentiating equations (2), (3), (4) and (11) totally with respect to θ, while recalling that $U_1^j = 1$ initially and that $U_2^j/U_1^j = p = -(\partial F_1^j/\partial p)/(\partial F_2^j/\partial p)$, the following result is readily obtained:

$$dW^j/d\theta = Y_\theta^j + E^j dp/d\theta, \quad j = a, n, \tag{12}$$

where $Y_\theta^j \equiv \partial Y^j/\partial\theta$. Thus, each $dW^j/d\theta$ is the sum of a primary growth effect (Y_θ^j) plus a secondary relative-price effect ($E^j dp/d\theta$), which are analogous to the above-mentioned welfare-related effects of the transfer in section 3. Although national and aggregate welfare again would remain equal if foreign inputs were entirely absent from the home country, the actual presence of foreign ownership gives rise to the possibility of having $dW^n/d\theta$ differ from $dW^a/d\theta$.

Turning to the standard growth-induced terms-of-trade response, analysed previously by Bhagwati (1958b) and subsequently by Kemp (1969, p. 110), it is a well-known fact that

$$dp/d\theta = (\beta - m)Y_\theta^a/(e + e^* - 1)E^a, \tag{13}$$

where $\beta \equiv (\partial X_1^a/\partial\theta)/Y_\theta^a$. Substituting this result into equations (12), straightforward manipulation confirms that

$$dW^a/d\theta = (\varepsilon + \beta + e^* - 1)Y_\theta^a/(e + e^* - 1) > 0, \tag{14}$$

but shows that

$$dW^n/d\theta \lessgtr 0 \quad \text{as} \quad E^a(e + e^* - 1)Y_\theta^n \lessgtr E^n(m - \beta)Y_\theta^a, \tag{15}$$

where $\beta \geqq 0$, recalling the assumption that growth would not reduce production of home importables at the initial commodity-price ratio; and $e^* \geqq 1$, recalling the assumption that the rest of the world's offer curve

is not inelastic. Thus, despite the fact that $dW^a/d\theta > 0$ unambiguously under these circumstances, it is still possible to have $dW^n/d\theta < 0$.

Returning to equations (12), it is a straightforward exercise to derive the following result:

$$dW^n/d\theta = dW^a/d\theta + (E^n - E^a)dp/d\theta + Y^n_\theta - Y^a_\theta. \qquad (16)$$

Thus, even though $dW^a/d\theta$ cannot be negative, it is still possible to have $dW^n/d\theta < 0$ if $(E^n - E^a)dp/d\theta < Y^a_\theta - Y^n_\theta$. The term $dp/d\theta$ may be expressed in the usual manner, as outlined above. The difference $E^n - E^a$ depends, as before, upon relative factor abundance of the national versus the aggregate endowment. The expression $Y^n_\theta - Y^a_\theta$ varies with the type of economic expansion, as explained in the following discussion.

For example, suppose that the national endowment of capital increases, thereby raising $\bar{K}^n$ and $\bar{K}^a$ by the same amount[9]. Then Y^n_θ and Y^a_θ may be cancelled from equation (16) because, by the reasoning of Kemp (1969, p. 110), both of these partial derivatives equal the uniform[10] marginal product of capital in the economy. Also, $dp/d\theta > 0$ in this case (assuming no inferiority in consumption), according to Kemp's (1969, p. 110) analysis. Thus, it is possible to have $dW^n/d\theta < 0$, provided that $E^n < 0 < E^a$ as in Figure 2, where $\bar{K}^a/\bar{L}^a < \bar{K}^n/\bar{L}^n$. In other words, if the national endowment is capital-abundant, an expansion-induced decline in national (though not in aggregate) welfare may occur, when the national terms of trade deteriorate as a result of an aggregate terms-of-trade improvement in the presence of the Differential-Trade-Pattern phenomenon.

Alternatively, consider a Hicks-neutral technological advance in the first industry[11]. In this case, $dp/d\theta > 0$ (recalling the assumption of no inferiority in consumption) and $Y^j_\theta = X^j_1$ $(j = a, n)$, by the reasoning of Kemp (1969, p. 112). Consequently, if $X^n_1 = X^a_1$ in Figure 2,

it is possible to have $dW^n/d\theta < 0$ (even though $dW^a/d\theta$ cannot be negative), by analytically the same argument as just given for the case of capital-stock expansion. The likelihood of having a decline in national welfare, moreover, would be increased or decreased as $X_1^n \lesseqgtr X_1^a$, respectively.

If nationals are instead labour-abundant as in Figure 1, it is possible for $dW^n/d\theta < 0$ when $dp/d\theta < 0$ under some other types of economic growth, as could be shown readily. Relevant examples could be constructed either in the case where $\bar{K}^n$ and $\bar{L}^n$ increase in the same proportion (leaving $\bar{K}^n/\bar{L}^n$ constant but hence lowering $\bar{K}^a/\bar{L}^a$) or in the case where both industries are subject to the same degree of Hicks-neutral technological advance. Such analysis in terms of Figure 1 would reflect the Differential-Trade-Volume phenomenon in the now-familiar fashion. An increase either in $\bar{L}^n$ (and hence $\bar{L}^a$) alone or a Hicks-neutral technological advance in only the second industry would not suit present purposes, however, in view of the fact that these types of growth are known to be ultra-biased against production of home importables [see Bhagwati (1958a)].

Thus, national welfare might deteriorate if the national terms of trade move unfavourably, regardless of whether the aggregate terms of trade improve or worsen. By similar reasoning, if home exportables were relatively capital-intensive, it would be possible to have an expansion-induced deterioration in national (though not in aggregate) welfare under a variety of circumstances, including the following: an increase either in the national stock of labour or (Hicks-neutrally) in the level of technology for the production of importables, when the

national factor endowment is labour-abundant; or an equal proportionate increase either in the national endowment of both factors or (Hicks-neutrally) in the level of technology for both sectors, when nationals are capital-abundant. In any case, if $dp/d\theta = 0$ - - as implicit for a small country and possible for a large country - - $dW^n/d\theta = Y^n_\theta > 0$ in equations(12),thereby ruling out a decline in national welfare.

5. Tariff Policy

According to a standard result in the literature [see Bhagwati (1968)], free trade is ranked superior both to no trade and to subsidized trade (assuming that both offer curves are well-behaved [12]), from the viewpoint of aggregate welfare. In other words, the home country cannot increase W^a above the free-trade level either by using an import (or export) tax to eliminate trade or by imposing an export (or import) subsidy to encourage trade. From the national-welfare point of view, however, the above ranking may be reversed. Since Bhagwati and Brecher (1978) already demonstrated the possibility of such a reversal for free trade versus autarky, the following analysis concentrates on free versus subsidized trade.

To allow for tariff policy, equations (2) may be modified as follows:

$$Y^j = X_1^j + pX_2^j + (C_1^a - X_1^a)\alpha/(1 + \alpha), \quad j = a, n, \qquad (17)$$

where α denotes the ad valorem tariff, which is an import tax (if $\alpha > 0$) or an import subsidy (if $\alpha < 0$); the domestic relative price of the second good is still denoted by p, so that the relative price of this good in world markets is now equal to $p(1 + \alpha)$; and $(C_1^a - X_1^a)\alpha/(1 + \alpha)$ equals the real value (in terms of the first good) of tax revenues or subsidy payments, evaluated at domestic prices[13]. In writing equations (17), it is assumed (for the sake of simplicity) that all tax revenues or subsidy payments, respectively, are returned to or collected from national consumers in lump-sum fashion. If foreigners within the home country were to receive or finance any part of these revenues or payments, respectively, comparison of the free-trade and autarkic equilibria (which generate no tax revenues) clearly would be unaffected, while the chances of having free trade inferior to subsidized trade simply would be enhanced (thereby strengthening the analysis below).

To show that free trade might be inferior to subsidized trade from the national point of view, it is sufficient to establish the possibility of having $dW^n/d\alpha < 0$ in free-trade equilibrium. Consequently, throughout the following discussion, let $\alpha = 0$ in the initial (pre-tariff) equilibrium.

Differentiating equations (1), (3), (4) and (17) totally with respect to α, again recalling that $U_1^j = 1$ intially and that $U_2^j/U_1^j = p = -(dF_1^j/dp)/(dF_2^j/dp)$, it may be verified readily that

$$dW^j/d\alpha = dR/d\alpha + E^j dp/d\alpha, \quad j = a, n, \tag{18}$$

where $R \equiv (C_1^a - X_1^a)\alpha/(1 + \alpha)$. By well-known reasoning [see Kemp (1969, p. 96)],

$$dp/d\alpha = p(1 - m - e^*)/(e + e^* - 1), \tag{19}$$

noting that $1 - m$ equals the home country's marginal propensity to consume the exportable; and recalling that $\alpha = 0$ initially. Substituting this result into equations (18), simple manipulation confirms that

$$dW^a/d\alpha = \varepsilon p E^a/(e + e^* - 1) \gtreqless 0, \tag{20}$$

but shows that

$$dW^n/d\alpha \lesseqgtr 0 \quad \text{as} \quad (e + e^* - 1)E^a \lesseqgtr (m + e^* - 1)E^n, \tag{21}$$

noting that $dR/d\alpha = C_1^a - X_1^a = pE^a$ when (balanced) trade is initially free (with $\alpha = 0$)[14]. Thus, despite the fact that $dW^a/d\alpha \geq 0$, it is evidently possible to have $dW^n/d\alpha < 0$.

From equations (18), it immediately follows that

$$dW^n/d\alpha = dW^a/d\alpha + (E^n - E^a)dp/d\alpha. \tag{22}$$

Thus, even though $dW^a/d\alpha$ cannot be negative, it is still possible to have $dW^n/d\alpha < 0$ if $(E^n - E^a)dp/d\alpha < 0$, as suggested by equation (22). The sign and magnitude of $dp/d\alpha$ may be expressed in the usual manner, as outlined above. As will be recalled, the difference $E^n - E^a$ depends upon the relative factor abundance of nationals.

As readily established by repeating the method of sections 3 and 4 above, it is possible to have $dW^n/d\alpha < 0$ (even though $dW^a/d\alpha$ cannot be negative) <u>either</u> if nationals are labour-abundant (Figure 1) when $dp/d\alpha < 0$ (the "normal" price response) <u>or</u> if nationals are capital-abundant (Figure 2) when $dp/d\alpha > 0$. [The "perverse" price response ($dp/d\alpha > 0$) can occur only in the large-country case, under conditions discussed by Metzler (1949).] Once again, these two cases in Figures 1 and 2 correspond respectively to the <u>Differential-Trade-Volume</u> and the <u>Differential-Trade-Pattern</u> phenomena. By similar reasoning if home exportables were relatively capital-intensive, it would be possible to have $dW^n/d\alpha < 0$ (even though $dW^a/d\alpha$ cannot be negative) <u>either</u> if nationals are labour-abundant when $dp/d\alpha > 0$ <u>or</u> if nationals are capital-abundant when $dp/d\alpha < 0$.

Thus, a trade subsidy might raise national (but not aggregate) welfare above the free-trade level. This analysis of a small subsidy (tax) on trade, moreover, complements the discussion of Bhagwati and Brecher (1978), who concentrate on prohibitive taxes on trade and thus are able to avoid the issue of tariff revenues.

6. Summary

As demonstrated by this paper, welfare aspects of international trade theory need to be reconsidered, when national and aggregate income differ in the presence of foreign ownership. Examples of this need are provided by the analysis of international transfer, economic expansion and tariff policy. For a country receiving a transfer from abroad, national (but not aggregate) welfare might deteriorate even when international commodity-market equilibrium is stable, regardless of the direction of change in the world product-price ratio. In the case of economic expansion from factor-supply growth or technological advance, national (but not aggregate) welfare might worsen even when the rest of the world does not have an inelastic offer curve and domestic expansion is not ultra-biased against production of home importables, no matter what the direction of change in the world commodity-price ratio. As for tariff policy, free trade might be ranked inferior both to no trade and to subsidized trade (in either direction), from the viewpoint of national (but not aggregate) welfare. The analysis suggests, moreover, the importance of relative factor abundance for the national versus the aggregate endowment of labour and capital.

Footnotes

[1] Their work, in turn, extends the analysis of Bhagwati and Tironi (1978), who concentrate upon a special case mentioned in footnote 3 below.

[2] This result is obtained also by Bhagwati and Tironi (1978), for a special case identified in footnote 3 below. In addition, since Bhagwati and Brecher (1978) compare free-trade equilibrium with autarky, the present paper will emphasize instead the comparison of free versus subsidized trade.

[3] For the special case in which $\bar{K}^a > \bar{K}^n = 0$ and $\bar{L}^a = \bar{L}^n > 0$, see Bhagwati and Tironi (1978).

[4] The discussion could be extended readily to allow for the possibility of complete specialization, following the analysis of Bhagwati and Brecher (1978).

[4a] If the home exportable were relatively capital-intensive instead, a discrepancy between the aggregate and national patterns of trade could arise when $\bar{K}^a/\bar{L}^a > \bar{K}^n/\bar{L}^n$ (as in Figure 1) but could not occur when $\bar{K}^a/\bar{L}^a < \bar{K}^n/\bar{L}^n$ (as in Figure 2).

[5] In the present paper, an offer curve is said to be well-behaved if it represents imports as a monotonic decreasing function of their relative price.

[6] The implication follows from the present assumption that $C_2^a/C_1^a = C_2^n/C_1^n$ initially, as illustrated diagrammatically.

[7] Footnote 6 applies here too.

[8] If $0 < E^n < E^a$, however, $dW^n/d\tau > 0$ even when $dp/d\tau > 0$, as implied by equations (6) and (10).

[9] In this case, let $\bar{K}^j = \bar{K}_0^j + \theta$; where $\bar{K}_0^j$ is the initial value of $\bar{K}^j$ (j = a, n), and $\theta = 0$ initially.

[10] In Figures 1 and 2, the marginal product of capital is the same at point Q^n as at point Q^a, in view of Samuelson's (1949) one-to-one correspondence between (relative) commodity prices and (absolute) factor rewards.

[11] In this case, $\theta = 1$ initially, and a rise in θ indicates an equal proportionate increase in the amount of first-commodity output producible (efficiently) with a given combination of inputs allocated to industry one.

[12] Recall footnote 5. For the significance of this assumption in tariff analysis, see Bhagwati and Kemp (1969).

[13] Although the corresponding value at <u>world</u> prices would be $(C_1^a - X_1^a)\alpha$, consumers respond directly to <u>domestic</u> (tariff-inclusive) prices instead.

[14] Note that $dW^a/d\alpha = 0$ only in the small-country case where $e^* = \infty$; and even then the change in W^a does not equal zero for any discrete change in α, by well-known reasoning.

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