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Foreign Ownership and the Theory of Trade and Welfare

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Some standard topics in the theory of international trade are recon-
sidered in this paper by distinguishing between national and aggre-
gate income when fixed supplies of foreign inputs are present within
the home country. Under conditions that would ensure a national
welfare gain if foreign ownership were absent, international trans-
fer, economic growth, or tariff policy might cause a national welfare
loss in the presence of foreign ownership. The techniques developed
could be applied to other domestic distinctions (such as those based
on race, sex, age, or ethnicity) and to the theory of customs unions in
a three-country world.

I. Introduction

This paper reconsiders a number of standard topics in the 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. Ex-
tending the work of Bhagwati and Brecher (1980),[1] the following

    [1] Their work, in turn, extends the analysis of Bhagwati and Tironi (1980), who
concentrate on a special case mentioned in n. 3 below.

analysis takes a new look at welfare-theoretic aspects of international transfer, economic expansion, and tariff policy, while it emphasizes 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 on 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 on 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 trading partners in a customs union (such as the European Economic Community) with factor mobility. While these other policy problems are of considerable importance and interest as well, only the national-foreign distinction is pursued explicitly here for the sake of brevity.

Section II 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 III 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 IV, 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. Afterward, Section V explains why free trade might be inferior to *both* no trade and subsidized trade, as far as national welfare is concerned.[2] Section VI summarizes the paper's main results, based on the possibility of aggregate and national welfare moving in opposite directions.

Needless to say, this possibility would not arise if foreign-owned factors were taxed to the nationally optimal extent. Indeed, with these factors in perfectly inelastic supply, the optimal tax on each foreign

[2] This result is obtained also by Bhagwati and Tironi (1980), for a special case identified in n. 3 below. In addition, since Bhagwati and Brecher (1980) compare free-trade equilibrium with autarky, the present paper will emphasize instead the comparison of free versus subsidized trade.

input clearly would be 100 percent, thereby removing the after-tax distinction between aggregate and national welfare. Assuming that this type of optimal taxation of factors is politically infeasible, however, the present analysis cautions nationally oriented policymakers against the usual, automatic adoption of the standard welfare conclusions which reflect an aggregate point of view. More specifically, this paper shows precisely how the traditional (aggregate) propositions must be modified for a truly national perspective, when political constraints eliminate optimal taxation of inputs from abroad.

II. The Basic Model

Following the analysis of Bhagwati and Brecher (1980), the present section summarizes the basic two-commodity, two-factor model of an open economy (large or small), which plays host to given quantities of inputs from abroad. The aggregate factor endowments of the country are fixed at $\bar{K}^a$ units of capital and $\bar{L}^a$ units of labor, while the given amounts $\bar{K}^n$ and $\bar{L}^n$ are the national endowments of capital and labor, respectively. (Thus, the fixed supplies of foreign-owned capital and labor 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 $\bar{L}^a > \bar{L}^n > 0$, excluding the possibility that either factor within the home economy is owned wholly by nationals or completely by foreigners.[3] Commodity two is always labor intensive relative to capital-intensive commodity one, and the well-behaved technology exhibits constant returns to scale.

In figure 1, the home country is depicted in free-trade equilibrium. Aggregate production is at point Q^a on production-possibility frontier $T_2^a T_1^a$ (corresponding to $\bar{K}^a$ and $\bar{L}^a$), aggregate income is represented by budget line $Q^a D^a$, and aggregate consumption occurs at point D^a on indifference curve $I_2^a I_1^a$. (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.) By the reasoning of Bhagwati and Brecher (1980), national consumption takes place at point D^n on indifference curve $I_2^n I_1^n$, with national income given by budget line $Q^n D^n$ (parallel to $Q^a D^a$), as if nationals produced separately at point Q^n on production-possibility frontier $T_2^n T_1^n$ (drawn for $\bar{K}^n$ and $\bar{L}^n$).[4] To emphasize that the main results of this paper qualitatively do *not* require any differences in consumer preferences between nationals and foreigners within the home country, assume throughout the text that the same set of indifference

[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 (1980).

[4] The discussion could be extended readily to allow for the possibility of complete specialization, following the analysis of Bhagwati and Brecher (1980).
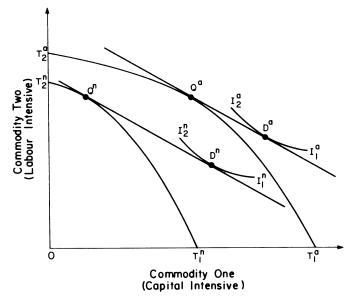
FIG. 1.—Differential trade-volume phenomenon

curves with unitary income elasticities of demand represents both national and aggregate tastes in consumption, although this simplification of the exposition could be dropped (as in footnotes to this paper) without detracting from the essence of the analysis.[5]

The model may be summarized conveniently as follows:

$$X^j_i = F^j_i(p), i = 1, 2, j = a, n; \tag{1}$$

$$Y^j = X^j_1 + pX^j_2, j = a, n; \tag{2}$$

$$W^j = U^j(C^j_1, C^j_2), j = a, n; \tag{3}$$

$$C^j_1 + pC^j_2 = Y^j, j = a, n; \tag{4}$$

where p denotes the relative price of the second commodity in terms of the first; X^j_i denotes output of commodity i on frontier $T^j_2 T^j_1$; each F^j_i is a conventional function of p, given $\bar{K}^j$, $\bar{L}^j$ and the (uniform) technology for commodity i; Y^a and Y^n denote the real value of aggregate and national income, respectively, in terms of the first commodity; C^a_i and C^n_i denote aggregate and national consumption, respectively, of commodity i ($i = 1, 2$); W^a and W^n denote aggregate and national welfare,

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[5] Nn. 6–8, 10, and 15 below extend the discussion to let tastes differ between nationals and foreigners within the home country. These extensions bring out the essentially "three-country" flavor of the analysis, in which nationals, domestically located foreigners, and the rest of the world can be treated as three distinct components of the international economy.
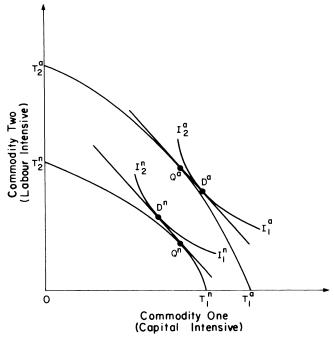
FIG. 2.—Differential trade-pattern phenomenon

respectively; and each U^j is a concave function of C_1^j and C_2^j, with positive partial derivatives denoted by $U_i^j \equiv \partial U^j / \partial C_i^j$ ($i = 1, 2$).

Later in the paper when a change in relative prices is induced by various parametric shifts, either of the following phenomena might lead to a fall in national despite a rise in aggregate welfare, depending on the strength of other induced effects. The differential trade-volume phenomenon is shown in figure 1, where the aggregate (actual) volume of trade (defined by line segment $Q^a D^a$) is less than the national (hypothetical) volume of trade (defined by line segment $Q^n D^n$), implying (ceteris paribus) that a terms-of-trade deterioration worsens national by more than aggregate welfare. Figure 2 (labeled similarly) illustrates the Bhagwati and Brecher (1980) differential trade-pattern phenomenon, which arises when the aggregate and national patterns of trade differ (in direction), so that an aggregate terms-of-trade improvement (tending to raise W^a) means a national terms-of-trade deterioration (tending to lower W^n). The national relative to the aggregate endowment of factors is labor abundant in figure 1 (with $\bar{K}^a / \bar{L}^a > \bar{K}^n / \bar{L}^n$) but capital abundant in figure 2 (with $\bar{K}^a / \bar{L}^a < \bar{K}^n / \bar{L}^n$), as suggested by the relative shapes of frontiers $T_2^a T_1^a$ and $T_2^n T_1^n$, in accordance with the reasoning of Rybczynski (1955).

To understand the possibility of a fall in national welfare despite a rise in aggregate welfare, it might be tempting to go no further than the following simple observation. Whenever the national and aggregate endowments exhibit different capital/labor ratios, the domestic distribution of income might deteriorate for nationals, as a change in relative commodity prices alters the wage/rental ratio for reasons expounded by Stolper and Samuelson (1941). It is important to recognize, however, that generally this income-redistribution effect will not be strong enough to produce the differential responses in national and aggregate welfare if the relative factor-endowment discrepancy is too small to create either the differential trade-volume or the differential trade-pattern phenomenon. Even when either of these phenomena arises, moreover, a fall in national welfare despite a rise in aggregate welfare can occur if and only if certain specific conditions (derived below) are satisfied.

III. 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.

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

$$Y^j = X^j_1 + pX^j_2 + \tau, j = a, n, \tag{5}$$

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 $U^j_1 = 1$, while noting that $U^j_2/U^j_1 = p = -(dF^j_1/dp)/(dF^j_2/dp)$ from the first-order conditions for

maximizing utility and profit. In this way, it is a straightforward exercise to derive

$$dW^j/d\tau = 1 + (E^j dp/d\tau), j = a, n, \qquad (6)$$

where $E^j = X_2^j - C_2^j$. Consistent with figures 1 and 2, which depict the home country exporting the second good, $E^a > 0$ by assumption throughout the present paper. As illustrated above, however, E^n can be either positive (in fig. 1) or negative (in fig. 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 (pretransfer) 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. 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 either $E^n = E^a$ (despite the foreign presence) or $dp/d\tau = 0$.

To determine precise conditions for the direction of change in welfare, consider the standard transfer-induced terms-of-trade response, analyzed 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 (pretransfer) equilibrium.[6] Given the assumption above that world commodity-market equilibrium is stable, $e + e^* > 1$ throughout the present paper.

If equation (7) is substituted into equations (6), simple manipulation confirms that

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

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[6] If preferences in consumption were allowed to differ between nationals and foreigners within the home country, it would be necessary to rewrite eq. (7) as follows, to reflect the present assumption that the entire transfer goes exclusively to nationals:

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

where m^n denotes the national marginal propensity to consume the home importable.

but shows that

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

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 $e = \epsilon + m$ and $e^* = \epsilon^* + m^*$, according to a standard decomposition.[7] Although $dW^a/d\tau > 0$ unambiguously, it is evidently possible to have $dW^n/d\tau < 0$ nevertheless.[8]

To highlight the important role of the differential trade-pattern and differential trade-volume phenomena, it is helpful to revert to equations (6), which imply that a fall in national despite the rise in aggregate welfare can occur only if $(E^n - E^a)dp/d\tau < 0$. This necessary condition for a fall in W^n holds if either $dp/d\tau < 0$ in presence of the differential trade-volume phenomenon of figure 1 (where $E^n > E^a > 0$) or $dp/d\tau > 0$ in conjunction with the differential trade-pattern phenomenon of figure 2 (where $E^n < 0 < E^a$).[9] Correspondingly, if home exportables were relatively intensive in their use of capital (rather than labor), a transfer-induced deterioration in national

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[7] Alternatively, if eq. (7') from n. 6 above were substituted into eqq. (6), simple manipulation could show that

$$dW^a/d\tau = [(\epsilon + \epsilon^*) + (1 - \gamma)(m^f - m^n)]/(e + e^* - 1) \qquad (8')$$

and

$$dW^n/d\tau = [(\epsilon + \epsilon^*) + (1 - \gamma)(m^f + m^* - 1)]/(e + e^* - 1), \qquad (9')$$

where m^f denotes the marginal propensity to consume the home importable for foreigners within the home country; $\gamma \equiv (C_1^n - X_1^n)/(C_1^a - X_1^a) = E^n/E^a$; and use is made of the fact that $m = \gamma m^n + (1 - \gamma)m^f$. Eq. (8') indicates that $dW^a/d\tau$ can be decomposed into two comparative-static components. As could be shown readily, the first component $[(\epsilon + \epsilon^*)/(e + e^* - 1)]$ is the transfer-induced change in W^a that would occur initially if the transfer were given temporarily to nationals and domestically located foreigners in the respective amounts $\gamma\tau$ and $(1 - \gamma)\tau$, whereas the second component $[(1 - \gamma)(m^f - m^n)/(e + e^* - 1)]$ is the subsequent change in W^a that would occur as the portion $(1 - \gamma)\tau$ was passed from domestically located foreigners to nationals (the ultimate recipients of the entire transfer). Eq. (9') could be interpreted analogously, since $-dW^n/d\tau$ equals the worldwide sum of transfer-induced changes in welfare for everyone excluding home-country nationals, as could be shown readily.

[8] Under the present assumption that $m^f = m^n = m$, eq. (8') of n. 7 above is equivalent to eq. (8), while eq. (9') leads directly to condition (9). Alternatively, if it were the case that $m^f \neq m^n$, there would arise the new possibility of having $dW^a/d\tau < 0$ in eq. (8'). Also if it were supposed that $m^f = 1 - m^*$, it would be the case that $dW^n/d\tau > 0$ unambiguously in eq. (9'). This last result can be understood intuitively as follows: If foreign tastes are uniform throughout the world, the reasoning behind eq. (8) shows equally well that the transfer must lower worldwide foreign welfare; that is, $-dW^n/d\tau < 0$, recalling n. 7 above. Incidentally, in view of the fact that worldwide foreign welfare otherwise can rise (when $dW^n/d\tau < 0$) if $m^f \neq m^*$, international aid might be especially attractive for a donor country with investments in the aid-receiving economy.

[9] Although $(E^n - E^a)dp/d\tau < 0$ also if $0 < E^n < E^a$ when $dp/d\tau > 0$, $dW^n/d\tau > 0$ in this case, as implied by eqq. (6). The reader may also see alternatively that, from condition (9), $dW^n/d\tau < 0$ if and only if $(\epsilon + \epsilon^*)E^n + (E^a - E^n)(e + e^* - 1) < 0$. Therefore, national welfare *may* decline despite the increase in aggregate welfare if $E^n < 0 < E^a$ (i.e., the differential trade-pattern phenomenon holds) or if $E^n > E^a > 0$ (i.e., the differential trade-volume phenomenon holds).

(though not in aggregate) welfare would still be possible, provided that either the aggregate terms of trade improve in the case of labor-abundant nationals or an aggregate terms-of-trade decline occurs in the presence of capital-abundant nationals.

Consequently, the basic results of this section can be summarized generally in the following terms. When the home exportable uses intensively the factor that is relatively abundant in the national (as compared with the aggregate) endowment, the national and aggregate patterns of trade are the same, in which case a fall in national welfare might occur through a differential trade-volume phenomenon if the (national and aggregate) terms of trade worsen unambiguously. Alternatively, when the home exportable uses intensively the factor that is relatively scarce in the national (as compared with the aggregate) endowment, the aggregate and national patterns of trade could differ, in which case the differential trade-pattern phenomenon might give rise to a deterioration in national welfare if the national terms of trade worsen through an aggregate terms-of-trade improvement. These general results, moreover, hold equally well for changes in p induced by economic expansion and tariff policy, as will be clear from the analysis below.

IV. 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 "ultrabiased" against the production of home importables, 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:

$$X^j_i = F^j_i(p, \theta), i = 1, 2, j = a, n, \tag{10}$$

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 labor 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 (10) totally with respect to θ, while recalling that $U_1^j = 1$ initially and that $U_2^j/U_1^j = p = -(\partial F_1^j/\partial p)/(\partial F_2^j/\partial p)$, we readily obtain the following result:

$$dW^j/d\theta = Y_\theta^j + (E^j dp/d\theta), j = a, n, \qquad (11)$$

where $Y_\theta^j \equiv \partial Y^j/\partial \theta > 0$. 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 welfare-related effects of the transfer mentioned above in Section III. 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 $dW^n/d\theta < 0$ when $dW^a/d\theta > 0$, except in the special case where $dp/d\theta = 0$.

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

$$dp/d\theta = (\beta - m)Y_\theta^q/(e + e^* - 1)E^a, \qquad (12)$$

where $\beta \equiv (\partial X_1^q/\partial\theta)/Y_\theta^q$. When this result is substituted into equations (11), straightforward manipulation confirms that

$$dW^a/d\theta = (\epsilon + \beta + e^* - 1)Y_\theta^q/(e + e^* - 1) > 0 \qquad (13)$$

but shows that

$$dW^n/d\theta \lesseqqgtr 0 \text{ as } E^a(e + e^* - 1)Y_\theta^n \lesseqqgtr E^n(m - \beta)Y_\theta^q, \qquad (14)$$

where $\beta \geq 0$, which recalls the assumption that growth would not reduce production of home importables at the initial commodity-price ratio; and $e^* \geq 1$, which recalls 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 $dW^n/d\theta < 0$ nevertheless.[10]

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[10] Along lines suggested by nn. 6–8 for the case of international transfer, the analysis of economic expansion could be extended readily to distinguish between m^n and m^f. It is worth noting, however, that it would still be possible to have $dW^n/d\theta < 0$ even if it were the case that $m^f = 1 - m^*$.

Equations (11) imply that a fall in national despite the rise in aggregate welfare can occur only if $(E^n - E^a)dp/d\theta < Y_3^a - Y_3^n$. As could be shown readily, this necessary condition for a fall in W^n can result from each of the following alternative events, for example: an increase in either the national endowment of capital or the technological level of industry one, with $dp/d\theta > 0$ in the presence of the differential trade-pattern phenomenon (fig. 2); and an increase in either the national endowment of both factors or the technological level of both industries, if $dp/d\theta < 0$ with the differential trade-volume phenomenon (fig. 1).[11] Correspondingly, 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 labor or in the level of technology for the production of importables, when the national endowment is labor abundant; or an increase either in the national endowment of both factors or in the level of technology for both sectors, when nationals are capital abundant.

V. Tariff Policy

According to a standard result in the literature (see Bhagwati 1968), free trade is ranked superior to both no trade and 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 ranking above may be reversed. Since Bhagwati and Brecher (1980) 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:

$$Y^j = X_1^j + pX_2^j + [(C_1^a - X_1^a)\,\alpha/(1 - \alpha)], j = a, n; \qquad (15)$$

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

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[11] Although $Y_3^a = Y_3^n$ with a national factor-endowment increase, it is possible that $Y_3^a > Y_3^n$ for a technological advance. Thus, with the latter (but not the former) type of economic expansion, a fall in national welfare despite the rise in aggregate welfare might occur even without the differential trade-volume and differential trade-pattern phenomena—if both industries experience the technological advance and $dp/d\theta < 0$.

[12] I.e., the offer curve is assumed to represent imports as a monotonic decreasing function of their relative price in world markets. For the significance of this assumption in tariff analysis, see Bhagwati and Kemp (1969).

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 $(C_1^q - X_1^q)\alpha/(1 + \alpha)$ equals the real value (in terms of the first good) of tax revenues or subsidy payments, evaluated at domestic prices.[13] In writing equations (15), 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 (pretariff) equilibrium.

Differentiating equations (1), (3), (4), and (15) totally with respect to α and again recalling that $U_1^j = 1$ initially and that $U_2^j/U_1^j = p = -(dF_1^j/dp)/(dF_2^j/dp)$, we may verify readily that

$$dW^j/d\alpha = pE^a + (E^j dp/d\alpha), j = a, n; \tag{16}$$

note that $pE^a = C_1^q - X_1^q$ when (balanced) trade is initially free (with $\alpha = 0$). By well-known reasoning (see Kemp 1969, p. 96),

$$dp/d\alpha = p(1 - m - e^*)/(e + e^* - 1); \tag{17}$$

note that $1 - m$ equals the home country's marginal propensity to consume the exportable and recall that $\alpha = 0$ initially. When this result is substituted into equations (16), simple manipulation confirms that[14]

$$dW^a/d\alpha = \epsilon pE^a/(e + e^* - 1) \geqq 0 \tag{18}$$

but shows that

$$dW^n/d\alpha \lesseqgtr 0 \text{ as } (e + e^* - 1)E^a \lesseqgtr (m + e^* - 1)E^n. \tag{19}$$

Thus, despite the fact that $dW^a/d\alpha \geqq 0$, it is evidently possible to have $dW^n/d\alpha < 0$ nevertheless.[15]

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[13] Although the corresponding value at *world* prices would be $(C_1^q - X_1^q)\alpha$, consumers respond directly to *domestic* (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.

[15] Along lines suggested by nn. 6–8, the analysis of tariff policy could be extended readily to let $m^f \neq m^n$, without eliminating the possibility of having $dW^n/d\alpha < 0$ even if $m^f = 1 - m^*$.

As implied by the equations (16), it is possible to have $dW^n/d\alpha < 0$ (even though $dW^a/d\alpha$ cannot be negative) if either a differential trade-volume phenomenon arises (fig. 1) when $dp/d\alpha < 0$ (the "normal" price response) or a differential trade-pattern phenomenon occurs (fig. 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].) Correspondingly, 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) if either nationals are labor abundant when $dp/d\alpha > 0$ or 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 (1980), who concentrate on prohibitive taxes on trade and thus are able to avoid the issue of tariff revenues.

The analysis of this section has an important implication for the traditional method of estimating the cost (benefit) of tariff protection or trade liberalization. Since the conventional method (as outlined by Johnson [1960]) ignores the source of ownership of domestically located inputs, the concept measured (in present notation) is clearly $dW^a/d\alpha$ rather than $dW^n/d\alpha$. Thus, the traditional estimate of the impact of protection or liberalization is an aggregate measure, which overstates or understates the national cost (benefit) if $(E^n - E^a)dp/d\alpha \lesseqgtr 0$, respectively, as suggested by equations (16). This misstatement arises because the conventional estimate simply sums the three standard components (namely, the external terms-of-trade effect and the costs of distortion in both production and consumption), while it fails to exclude the foreign-factor portion of the tariff-induced change in aggregate welfare.[16]

VI. Summary

As demonstrated by this paper, welfare aspects of international trade theory need to be reconsidered, when national and aggregate income

[16] The foreign-factor portion of the change in aggregate welfare is represented by the expression $(E^a - E^n)dp/d\alpha$, which must be excluded from $dW^a/d\alpha$ to give $dW^n/d\alpha$, as suggested by eqq. (16). Also by repeating the procedure of Bhagwati, Ramaswami, and Srinivasan (1969), it is possible to write (in present notation) that $dW^a/d\alpha = (E^a dp^*/d\alpha) + [(p^* - p)dX_2^q/d\alpha] + [(p - p^*)dC_2^q/d\alpha]$, where the relative price of the second good in world markets is denoted p^*, which equals $p(1 + \alpha)$. The components $E^a dp^*/d\alpha$, $(p^* - p)dX_2^q/d\alpha$, and $(p - p^*)dC_2^q/d\alpha$ are the effects due to the terms-of-trade change, the production distortion, and the consumption distortion, respectively. When evaluated in free-trade equilibrium (where $\alpha = 0$ and $p = p^*$), the latter two (distortion-related) components disappear, leaving only the first (terms-of-trade) component. This remaining (first) component, moreover, is equivalent to the right-hand side of eqq. (16) for $j = a$, since (in free-trade equilibrium) $dp/d\alpha = (dp^*/d\alpha) - p$.

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 ultrabiased 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 to both no trade and subsidized trade (in either direction), from the viewpoint of national (but not aggregate) welfare. Moreover, the conventional empirical estimates of the cost of protection à la Johnson's (1960) methodology are generally seen to be in need of correction if the economy has foreign-owned factors of production. In fact, many economies typically do have substantial labor inflows under *gastarbeiter* or other programs defined by immigration-quota policies, and, of course, equally there are substantial flows of capital among nation states.[17]

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[17] Variations in protection may, in turn, lead to variations in the presence of foreign factors in the economy. Thus, for instance, Bhagwati (1980) has considered linkages between reduction in protection and reduction in the restrictiveness of immigration quotas. However, the analysis in the text has taken the endowment of *both* national and foreign-owned factors to be invariant to policy changes.

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