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# Voluntary Export Restrictions Versus Import Restrictions: A Welfare-Theoretic Comparison

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Richard A. Brecher

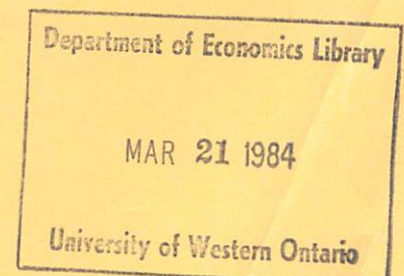
and

Jagdish N. Bhagwati

This paper contains preliminary findings from research still in progress and should not be quoted without prior approval of the author.

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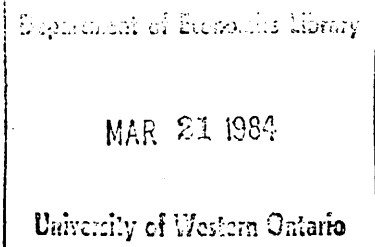
by

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VOLUNTARY EXPORT RESTRICTIONS VERSUS IMPORT RESTRICTIONS:  
A WELFARE-THEORETIC COMPARISON

Richard A. Brecher and Jagdish N. Bhagwati

The theoretical analysis of voluntary export restrictions (VERs) is notable for its paucity. In partial equilibrium, Tackacs (1978) has compared them with alternative trade restrictions from the viewpoint of "equivalence" as defined and considered by Bhagwati (1965; 1968; 1969, Chapter 9) and later writers. Subsequent to theoretical work of Falvey (1979) and Rodriguez (1979), Feenstra (1982) has demonstrated elegantly that Japanese VERs on auto exports to the United States have induced a shift towards higher-quality exports, and has calculated the magnitude as well as analyzed the implications of this shift.

There appears to be no theoretical analysis, however, of the following principal proposition on VERs which is part of the conventional wisdom: VERs, relative to import restrictions, would be beneficial for the exporting country and detrimental to the importing country in a two-country framework, since VERs would appropriate to the former the restriction-induced rents that would otherwise accrue to the latter. In fact, in the policy-oriented discussions, as in the analysis of market disruption and proposed changes to GATT Article XIX, it is generally assumed that VERs build into themselves automatic compensation to the exporting countries whose markets are being restricted and that therefore no explicit compensation needs to be paid when VERs are imposed.<sup>1</sup>

It is the purpose of this paper to subject this conventional wisdom to analytical examination. Our results, in general-equilibrium

analysis, are startling; they demonstrate that the question is more complex than has been assumed to date.

Section I briefly outlines the conventional wisdom and its theoretical foundation in partial-equilibrium analysis. Section II then introduces general-equilibrium analysis of the problem, demonstrating the need for and analyzing the differential consequences of the following two alternative assumptions: (i) the policy objective of the two alternative restrictions being compared is to fix the volume of home imports; or (ii) the objective is instead to fix the home-price ratio. For convenience of analysis, we assume that the VERs and the import restrictions are "price" rather than "command" instruments: i.e., we compare export duties abroad with import duties at home. Since either policy therefore generates revenue, the former abroad and the latter at home, we extend our analysis in Section III to the case where the policies lead to "revenue seeking" as in Bhagwati and Srinivasan (1980): i.e., the revenue in this analysis is not assumed to be redistributed in a lump-sum fashion to consumers but is instead dissipated to the clients of revenue-seeking lobbyists. Thus, our analysis in Section III is yet another application of what Bhagwati (1982) has termed the theory of "directly unproductive profit-seeking" (DUP) activities, and indeed is a further demonstration of how the introduction of DUP activities has a critical impact on theoretical analysis.

### I. THE CONVENTIONAL ARGUMENT

The proposition that VERs, relative to import restrictions, benefit the foreign country while hurting the home country follows readily from partial-equilibrium analysis.

In Figure 1,  $DD$  and  $S_d S_d$  are the home demand and supply curves, whereas  $S_f$  is the foreign supply curve. With an import tariff at ad valorem rate  $t$ , the international price remains  $\overline{JO}$ , the domestic price in the home country becomes  $\overline{JO}(1 + t) = \overline{KO}$  corresponding to curve  $S'_f$ , imports are reduced to  $\overline{EF}$ , and the area of rectangle  $EFGH$  represents the revenue accruing to the home government. Shift the policy now to a VER, i.e., an export duty at rate  $t$  by the foreign government. In this event, the domestic price in the foreign country remains  $\overline{JO}$ , the international price rises to  $\overline{KO}$  which now becomes also the domestic price in the home country, and the revenue represented by rectangle  $EFGH$  now is clearly earned by the foreign government. Since the real equilibrium at home and abroad is otherwise undisturbed, the conventional proposition readily follows: VERs, relative to import restrictions, benefit the foreign country and harm the domestic country.<sup>2</sup>

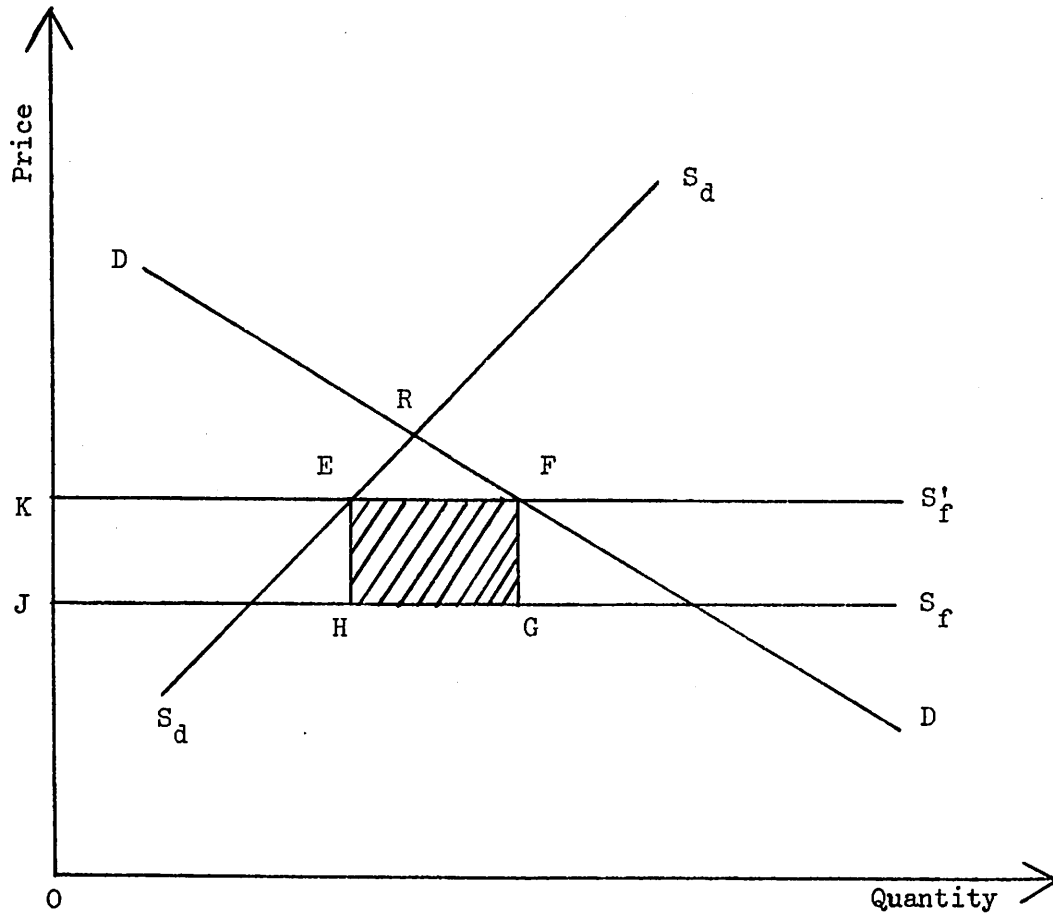


Figure 1\*

\*The striped area of rectangle EFGH, accruing originally as revenue to the home country, subsequently accrues instead as revenue to the foreign country when the policy is shifted from a home import duty to a foreign VER at ad valorem rate  $t$ .



## II. GENERAL-EQUILIBRIUM ANALYSIS

Once we shift to general-equilibrium analysis, however, the implicit partial-equilibrium assumption--that the underlying supply and demand curves are independent of the policies being compared--is no longer valid. Hence, once the general-equilibrium effects are considered, VERs and import restrictions are no longer "equivalent" policies in Bhagwati's (1965) well-known sense: i.e., the replacement of one policy instrument by the other does not yield an identical real equilibrium. It equally follows that we must now distinguish between alternative objectives (or constraints) subject to which foreign VERs are compared with home import tariffs, as we do immediately below.<sup>3</sup>

It would appear that there are two important reasons for restricting trade. There may be either a quantity objective, in the sense of a maximum acceptable level of home imports, or a price objective in the sense of a minimum acceptable level for the relative price of the importable within the home country. We consider these objectives now, in turn, comparing a home-country import tariff with an alternative foreign-country VER export tariff in each instance.<sup>4</sup> The revenue generated in either case is assumed in this section to be redistributed to consumers in a Meade-like lump-sum fashion as in conventional general-equilibrium tariff theory.

Case 1: Fixed Volume of Home Imports

In Figure 2, OH and OF are the free-trade offer curves of the home and foreign countries, which export goods Y and X, respectively. As usual, we assume that all offer curves are well behaved, in the sense of never bending back towards the origin. Also, for simplicity of exposition only, all offer curves are assumed to be elastic.

To restrict its imports below the free-trade level at point C, the home country can use an import tax to shift curve OH inwards to pass through (say) point A. Alternatively, to achieve the same reduction in trade of good X, the foreign country can impose an export tax which shifts curve OF inwards to pass through point B (vertically above A). By drawing in the usual trade-indifference curves, we could readily see that the move from A to B unambiguously raises foreign and lowers home welfare, since the foreign (home) country gets increased (constant) imports for constant (increased) exports. Thus, in this particular case, the welfare effects of switching from home to foreign taxation accord with the conventional wisdom.

It is easy to see intuitively why the conventional wisdom holds here. Home welfare must necessarily decline since the terms of trade worsen without any mitigating improvement as the volume of imports does not increase. Foreign welfare must necessarily improve since the terms of trade improve with no offsetting deterioration as the volume of exports does not diminish.

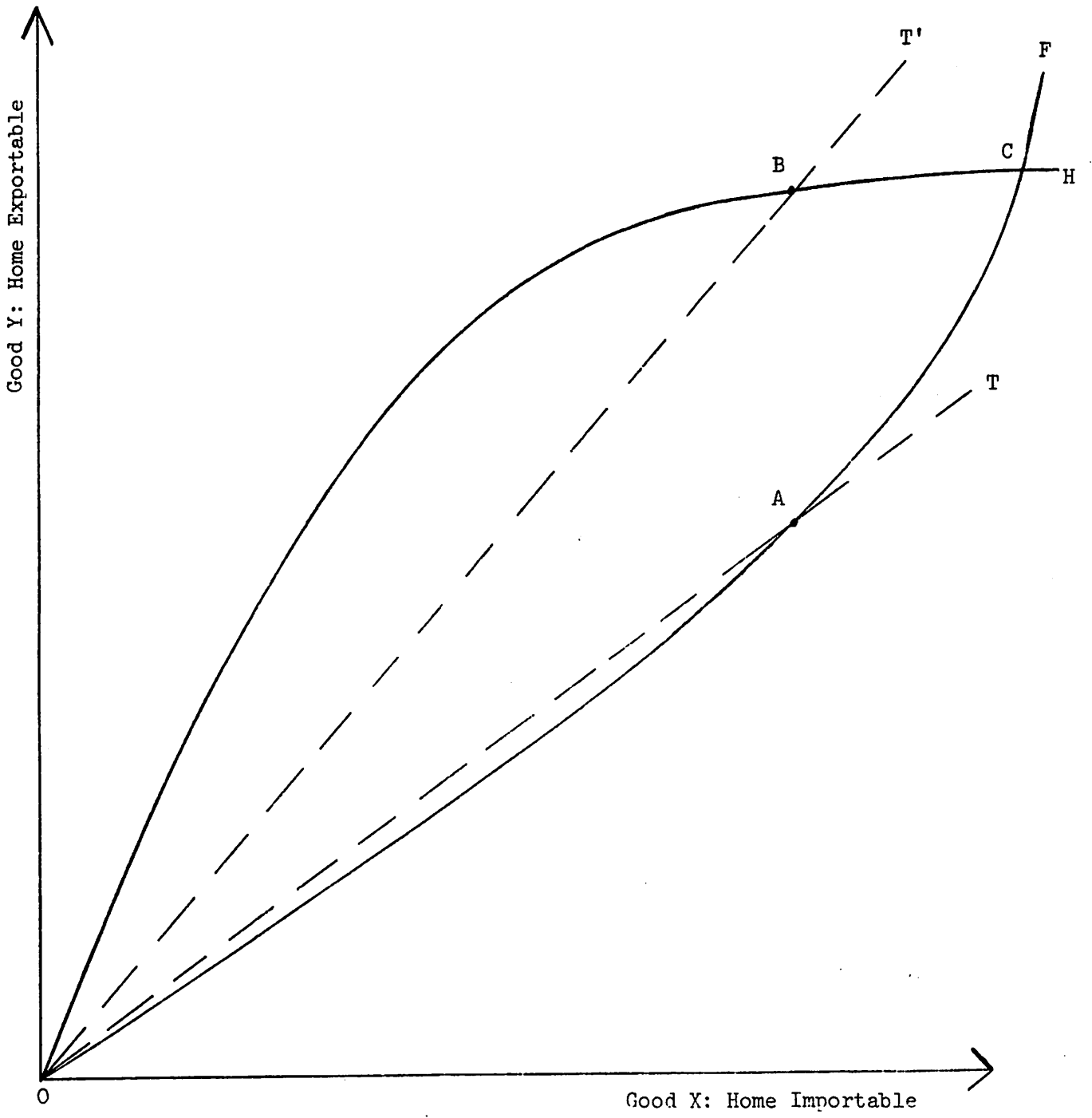


Figure 2

Case 2: Fixed Home-Price Ratio

In Figure 3 (which reproduces curve OH from Figure 2), an import tax of the home country leads to (say) point A, where the ratio of international (and foreign) prices is given by the slope of ray OT, while the home-price ratio is given by the necessarily greater slope of line DD'. Foreign welfare is represented by the trade-indifference curve FF', tangent to ray OT at point A, whereas home welfare is given by the trade-indifference curve (not shown) tangent to line DD' at A.

When the home country's import tax is replaced by a foreign tax on exports, the equilibrium shifts to point B, where the ray OT' (parallel to DD') intersects OH, so that the home-price ratio remains unchanged. By requiring a foreign export tax (rather than subsidy) to keep the home-price ratio constant, we are implicitly assuming no Metzler Paradox for the home country. Also, without this assumption, the home country would have paradoxically used an import subsidy (rather than tax) to achieve the price objective in the first place.

The move from point A to B clearly lowers home welfare because home expenditure declines, at constant prices, by  $\overline{OD}$  units of good X. In the case illustrated, however, foreign welfare remains unchanged at the level defined by curve FF'. For this constant-welfare result to occur, we must have point B lying southwest of A, thereby implying that good Y is inferior in home consumption. (Note that, as at point A, the home country has an undrawn trade-indifference curve tangent to the home-price line through point B.) If the home country had a smaller (larger)

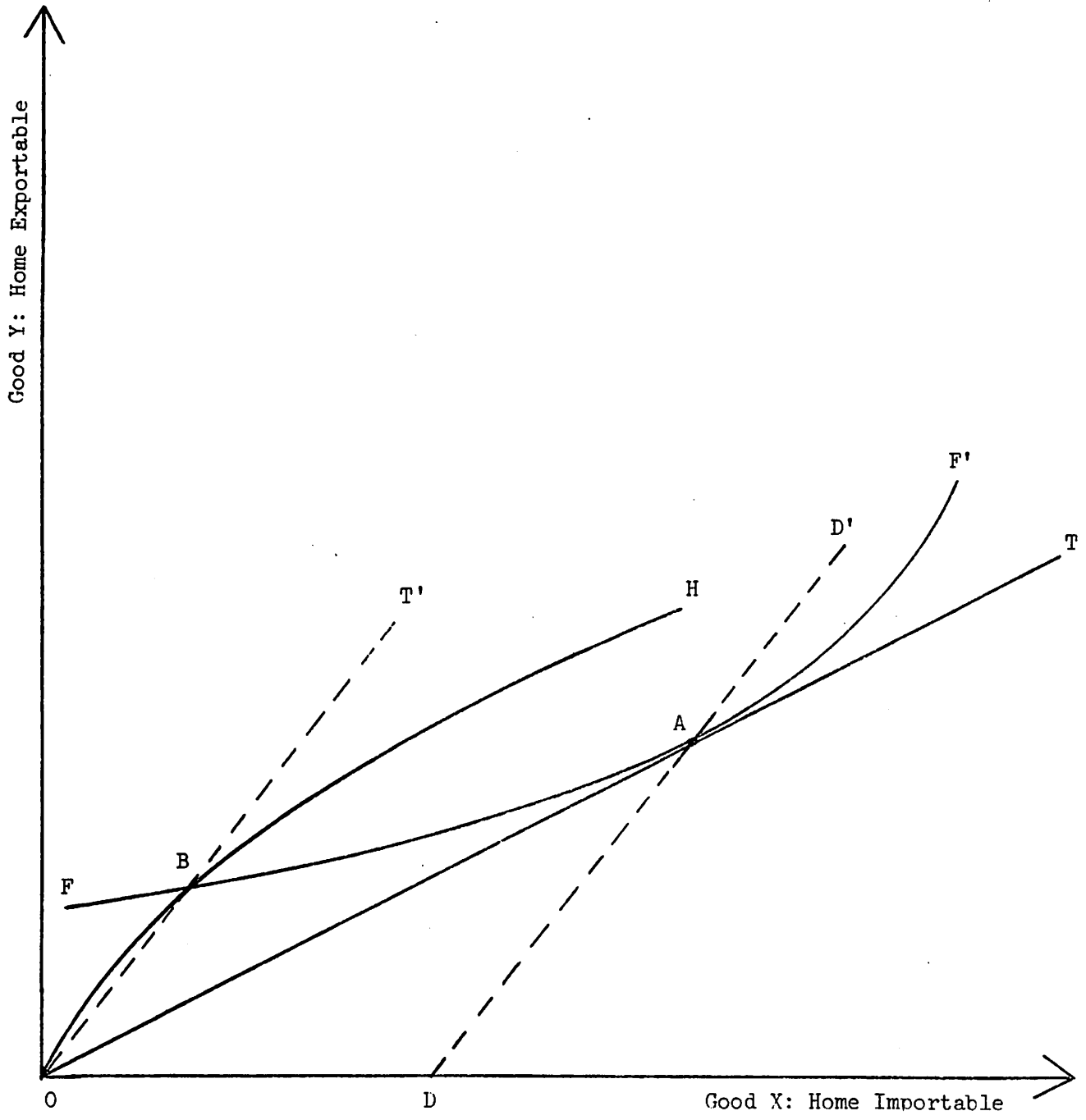


Figure 3

marginal propensity to consume good Y, ceteris paribus, foreign welfare would fall (rise). Thus, a rise in foreign welfare would be ensured by normality in home consumption.

Again, the intuition behind this result is readily spelled out. The home country is necessarily hurt by the shift to VERs because, with the domestic price ratio fixed, this shift must imply a worsened international terms of trade with no offsetting production and consumption gain. On the other hand, for the foreign country, the corresponding improvement in the international terms of trade and hence welfare can be offset by diminished gains from a reduced volume of exports (which may be a sufficiently large reduction if the home country's exportable good Y is inferior in consumption and therefore the home country's demand for imports falls sharply as its real income falls).

### III. INTRODUCING REVENUE SEEKING

We now extend our analysis to incorporate revenue-seeking activity, which draws scarce primary inputs away from the production of goods X and Y, assumed (as usual) to be the only arguments in the national utility functions. Since the burden of DUP activity is shifted from the home to the foreign country when the former's import tax is replaced by the latter's export tax, we would intuitively expect that home welfare may increase at the expense of foreign welfare. This outcome is indeed possible under certain specific conditions, as shown by the following analysis.

Case 3: Revenue Seeking With Home Imports Fixed

In Figure 2, the home tax on imports leads to equilibrium at point A. (Of course, the tax required to reach this point now with revenue seeking will generally differ from the tax needed in the seeking-free environment of Case 1 above.) At point A, the ratio of international (and foreign) prices is given by the slope of ray OT, whereas the home-price ratio equals the slope of (say) ray OT', which is necessarily steeper.

After the home import tax is replaced by a foreign export tax, the new equilibrium is on curve OH at point B, which lies vertically above A. (We implicitly assume that, even with revenue seeking, a tariff always shifts a country's offer curve unambiguously inwards.) In the special case illustrated, point B happens to lie also on ray OT'.

The corresponding special situation regarding home welfare is illustrated in Figure 4, where QQ' is the production-possibility frontier drawn for the fixed endowments of capital and labour under constant returns to scale. Initially, with the home country taxing imports, the home-price ratio is given by the slope of line AC, which touches curve QQ' at point A. As shown by Bhagwati and Srinivasan (1980), consumption takes place on a community indifference curve at point C where national welfare is maximized subject to expenditure equalling income at factor cost, given that revenue seekers waste resources worth the fully dissipated proceeds of the tax. As they establish, moreover, production takes place at B, which is the point of intersection for the following

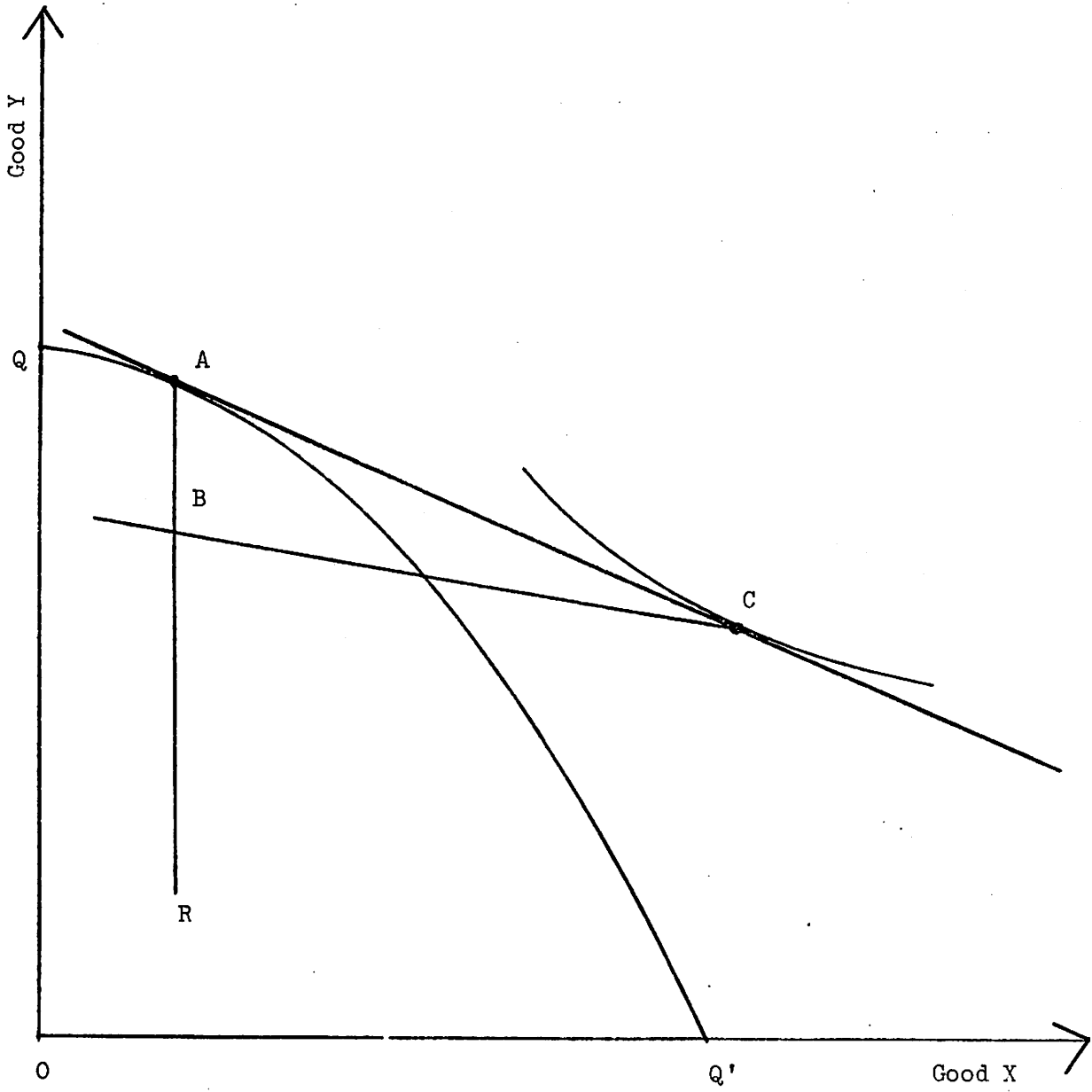


Figure 4



two lines: the international-price line BC, drawn through B; and the (generalized) Rybczynski line AR, drawn through A, for the withdrawal of productive factors into revenue-seeking activity. This line is drawn vertical to make Figure 4 consistent with Figure 2.

In the case of Figure 4, home consumption and hence welfare remain constant at the level defined by point C when the tax replacement is implemented. By similar reasoning, if the Rybczynski line through point A passed instead to the left or right of vertical line AR, home welfare would rise or fall, respectively. In the former case, for example, ray OT' of Figure 2 would pass above point B; the home-price line would therefore have to flatten (to pass through B) when the tax replacement occurred; and thus, in Figure 4, the home country would clearly reach a higher indifference curve.

The change in foreign welfare can be evaluated symmetrically to show a gain or loss, respectively, as the foreign Rybczynski line passes to the left or right of a vertical line through the initial production point. Of course, if either country has no revenue-seeking activity, that country's welfare change is determined as in Case 1 above.

#### Case 4: Revenue Seeking With Home-Price Ratio Fixed

Since the home-price ratio is fixed by assumption, national income as factor cost remains unchanged when the home tax is replaced by the foreign one. Thus welfare of the home country is correspondingly constant, unambiguously. The situation could be described again by Figures 4 and 2 without modification.

To analyze the change in foreign welfare, introduce Figure 5,

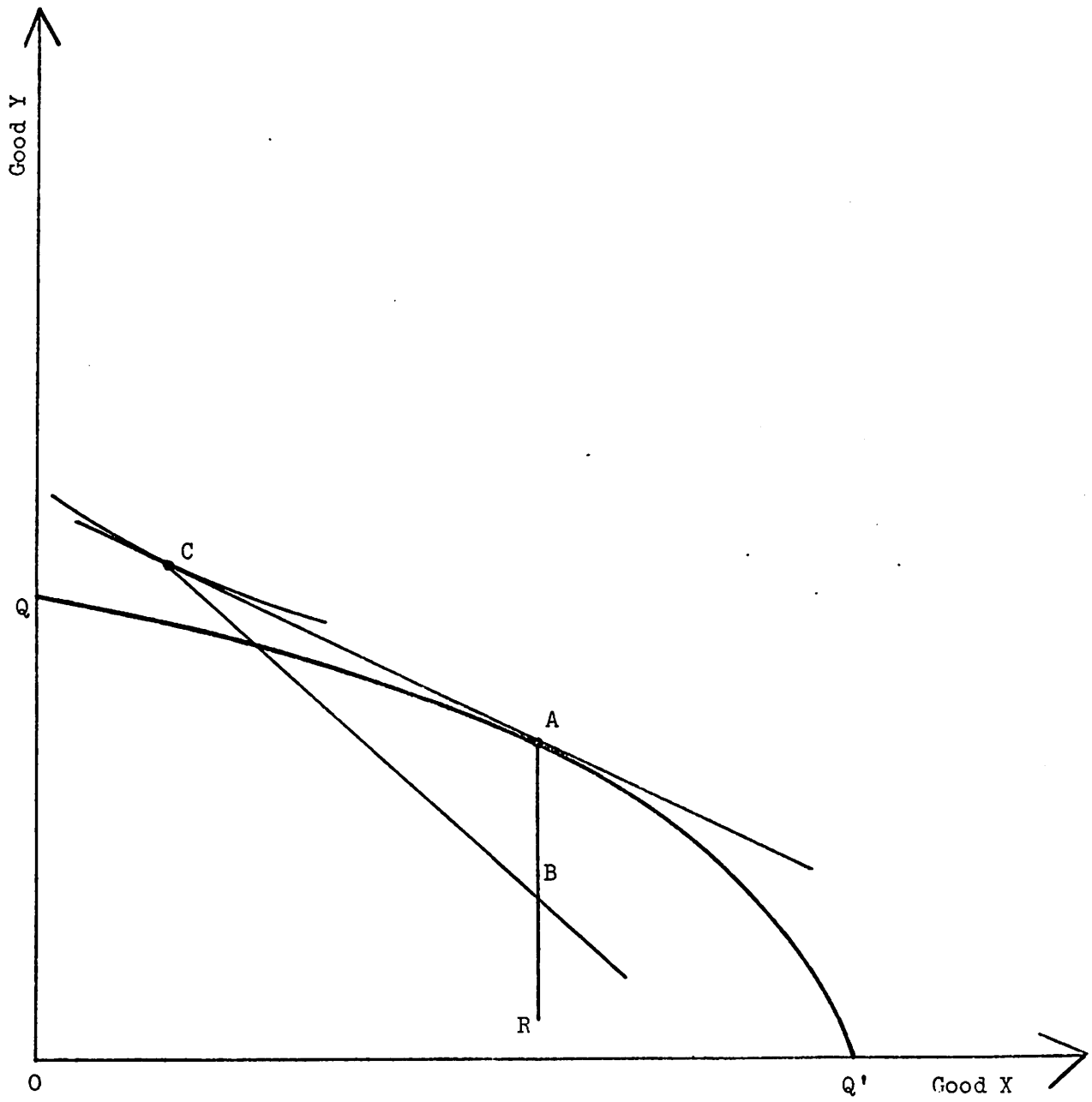


Figure 5

where  $QQ'$  is the production-possibility frontier for the foreign factor endowments under constant returns to scale. Initially, production is at point A and consumption is at point C, with the slope of line AC giving the ratio of international and foreign prices. After the tax replacement, the ratio of international prices is given by the slope of the necessarily steeper line BC (parallel to AC of Figure 4). If the Rybczynski line AR has the same slope as its home counterpart, foreign consumption would remain at point C while production shifts to point B, since the trade triangle constructible from line segment BC of Figure 5 is then equal to the analogous triangles corresponding to line segments AC and OB of Figures 4 and 2, respectively. (This result does not require that the Rybczynski lines be vertical, but only that they be equally sloped.) Thus, in this case, foreign welfare is unchanged too.

Suppose instead that the foreign Rybczynski line passed to the right of the vertical line AR, while the home Rybczynski line was still vertical. Then, as could readily be shown, the foreign tax needed to keep consumption at point C in Figure 5 would shift curve OF of Figure 2 to intersect ray OT' above point B. Thus, to reach the equilibrium point (B) in Figure 2, the foreign country would have to raise its tax somewhat. This rise would increase the relative price of good Y within the foreign country, given the international-price line OT'. Thus, foreign welfare would be diminished in Figure 5, as the foreign-price line flattens relative to AC. (Again, what matters is the comparative slopes of the Rybczynski lines, not the absolute slope of either one.) By similar reasoning, a Rybczynski line passing to the left of AR in Figure 5 (given Figure 4 as drawn) would imply a rise in foreign welfare.<sup>5</sup>

If there were revenue-seeking activity in only one of the countries, the income-consumption curve in the other country would take over the previous role of the Rybczynski line there, in determining the change in foreign welfare.

#### IV. CONCLUDING REMARK

Our analysis casts doubt on the conventional wisdom, according to which the home country loses while the foreign country gains if responsibility for trade restriction passes from the former to the latter. In fact, the actual welfare outcomes depend importantly on the objective of trade restriction and on the method of disbursing the resulting (tariff) revenues or (quota) rents.

FOOTNOTES

1. See Bhagwati (1977) for an analysis of the question of market disruption in the context of GATT Article XIX, and Bhagwati and Srinivasan (1976) for a theoretical analysis of the issue. The former accepts the conventional wisdom on VERs which is re-examined in the present paper.
2. Recall that the restrictions compared in this paper are price rather than command instruments.
3. This has been done also in the "equivalence" literature on tariffs versus quotas, as in the important papers by McCulloch and Johnson (1973), Pelcovits (1976), and others. See Bhagwati (1978) for a detailed review and synthesis.
4. As shown by Lizondo (1983), a home import restriction and foreign VER that give rise to the same volume of trade may lead to different domestic-price ratios for the home country, in a general-equilibrium context.
5. If the Rybczynski line in Figure 4 is not vertical, home output of good X will change. Thus, the government might prefer to fix the domestic output of this good, rather than the internal product-price ratio. Our analysis can be extended readily to handle this output constraint, subject to which the foreign country might still fail to gain at the home country's expense.

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