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ARE ECONOMISTS' TRADITIONAL TRADE POLICY VIEWS STILL VALID?

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ABSTRACT

Recent analysis of trade policies under imperfectly competitive market conditions as well as in situations where trade in high-technology products is important have raised doubts whether economists should continue their traditional opposition to trade taxes and subsidies. This paper evaluates the new theoretical arguments for interventionist trade policies by comparing them with the traditional arguments for and against free trade, investigating the empirical evidence supporting the conditions assumed in the new models, appraising the realism of the behavior assumptions of these models and the sensitivity of their conclusions to changes in these assumptions, and considering the political economy implications of these conclusions. The general conclusion is that there are serious practical difficulties with the interventionist arguments of the "new" trade theorists, as they themselves recognize, just as there are with such traditional arguments for trade intervention as the terms-of-trade case for protection. However, the new industrial organization approach to trade theory has already provided valuable insights into trade behavior in international markets and promises to provide many more as more realistic behavior models are developed.

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I. Introduction

Recent developments in trade theory have raised doubts whether economists should continue their traditional opposition to trade taxes and subsidies. A group of self-styled "new" trade theorists has discovered new arguments for the use of these measures by analyzing trade policy under imperfectly competitive market conditions, in contrast to the perfectly competitive conditions traditionally assumed.[1] Furthermore, in focussing on the special characteristics of high-technology industries, they have come up with new reasons for some of the old arguments for government intervention.

It was two industrial organization (I-O) theorists, Brander and Spencer (1981, 1983), who first pointed out the main new argument for trade-policy intervention in imperfectly competitive international markets. Just as a firm competing in an imperfectly competitive domestic market may be able to increase its profits by behaving strategically, e.g., by investing in excess capacity to deter potential competitors from entering the market, so too may a country be able to increase its welfare through strategic trade-policy behavior when its firms are competing in imperfectly competitive international markets. For example, if a country's firms are competing imperfectly against those of another country for the export market of a third country, the government may be able to bring about a shift in profits from foreign to domestic exporters by introducing either an export subsidy or export tax. Similarly, if a domestic market

is being supplied either entirely by a foreign monopolist or by imperfectly competitive foreign and domestic producers, a tariff or import subsidy introduced by the home government may raise national welfare. According to Brander (1986) these arguments ". . demonstrate that there is a unilateral economic motive for interventionist trade policy in certain cases. This conclusion is in sharp contrast to the standard results and received wisdom of mainstream international trade theory."

Key features of firms operating in modern, high-technology sectors are large research and development outlays for new products, cost structures influenced by strong learning-by-doing effects, high risks of producing and marketing new products, and knowledge spillovers. Since the first two characteristics result in significant static and dynamic internal economies, there is likely to be only a relatively small number of firms in the markets for these products. The riskiness of the product ventures undertaken makes these firms' success highly dependent on well-functioning capital markets, while the existence of knowledge externalities can cause research expenditures to be less than their socially optimal level. Although the implications of imperfect product and factor markets and of external economies for government intervention have long been recognized, the new (or I-O) trade theorists believe that the importance of the modern reasons for these distortions has not been sufficiently appreciated in traditional trade literature.

This essay analyzes these recent theoretical arguments for

an interventionist trade policy with a view toward answering the question posed in the title. In addition, insights provided by the new analysis on the need for an institution such as the General Agreement on Tariffs and Trade (GATT) to prevent countries from becoming trapped in Prisioner Dilemma situations and on how some trade laws may operate in unintended ways are discussed. Traditional arguments for and against free trade are also reviewed. The procedure is to explain the theoretical basis for the different trade-policy conclusions and then evaluate the practicality of these conclusions in terms of the empirical evidence supporting the economic conditions assumed in the models, the realism of the models' behavior assumptions and the sensitivity of their conclusions to changes in these assumptions, and their political economy implications. In discussing the various models, areas in which the greatest contributions have been made will be pointed out as well as those where there seems to be a need for further theoretical or empirical work.

Section II briefly sets forth the static argument for free trade, while section III explains and evaluates the major traditional argument for trade-policy intervention, namely, the terms-of-trade or optimum tariff argument. The practicality of this argument is considered in some detail, since many of the factors relevant in evaluating the real-world significance of the terms-of-trade case for government intervention also apply to the case for government intervention under the I-O approach to trade theory. The models of the new trade theorists are explained

(using a simple general equilibrium approach for the basic Cournot
model rather than the usual partial approach) and critiqued in section IV, while conclusions are summarized in section V.

II. The Case for Free Trade under Perfect Competition

As trade economists since John Stuart Mill's time have pointed out, the case for free trade from a national viewpoint rests on the special assumption that the country faces infinitely elastic foreign demand and supply curves for internationally traded commodities. Only under these conditions will the Pareto first-order conditions for maximizing the country's welfare be satisfied with free trade. The familiar diagram in Figure 1 shows this point. TT' depicts the home (H) country's production-possibilities curve for commodities X and Y (based on constant returns-to-scale production functions for the two goods), while the reciprocal of the slope of the line FPF' indicates the fixed price of Y (in terms of X). Since country H is small relative to the world market for these commodities, it could trade all of the X it can produce for Y without bidding up the price of Y in the international market.

Under the traditional assumption of perfect competition and the absence of any domestic distortions, the economy will produce at point P where the marginal social cost of producing X equals the price of X and trade along FPF' to a point, e.g., C, where a community indifference curve (the dashed curve) is tangent to the

price line. Since with a straight line offer curve the social marginal revenue from trading equals the international price of X, there is an equality among social marginal revenue, social marginal cost and the social marginal rate of substitution in consumption for the two goods.

Suppose a small tariff on imports of Y or tax on exports of X (the two policies are equivalent, as Abba Lerner (1936) pointed out long ago) is introduced and assume for the moment that production is fixed at P. The import tax will raise the domestic price of the import good above its international price, thereby distorting domestic consumption. For example, by increasing the domestic price of Y in terms of X, the tariff will shift consumption to a point along the country's trading possibilities line such as C', where a community indifference curve (the dashed curve at C') has the same inverse slope as a line indicating the new domestic price of Y. Since the community indifference curve at C' cuts the international trading line, everyone could be made better off by moving slightly toward the point C.

If production is not fixed at P, the increase in the domestic price of Y will induce producers to increase the output of this commodity and reduce the output of X to a point such as P', where the marginal cost of producing Y equals the new domestic price of Y. The country will still trade along a line with the same inverse slope as FPF' but the new consumption point C", where a community indifference curve has the same inverse slope as a line indicating the new domestic price of Y, will be

below the line FPF'. By appropriate lump-sum redistribution (assumed to be costless), the free trade consumption point could be shifted along FPF' to a point where there are more of both commodities than at the tariff-distorted consumption point C". With more of both goods at this new free trade point, one can be sure that it would be possible to make everyone better off than at C", no matter how the collection of goods at C" is distributed among consumers. Thus, the policy of free trade is said to be potentially superior to a policy of import protection in the welfare sense that there is always some free trade point on the optimal trading line, FPF', at which everyone could be made better off than they are at some particular trade-distorted consumption point.

This statement does not mean, it should be emphasized, that the actual free trade collection of goods, e.g., C, is potentially welfare superior to the actual collection of goods reached with the tariff, e.g., C". Because the distribution of income changes as relative prices change, community indifference curves can intersect and, therefore, it is possible for the community indifference curve tangent to the domestic price line at C" to pass to the right and above the free trade point, C.[2] In this case, the particular free trade collection of goods at C will be insufficient to make everyone as well off as they are under the particular collection reached with the tariff, namely, C".[3]

III. The Terms-of-Trade Argument for Protection

What if a country can influence the international price of traded commodities by restricting its demand for or the supply of these commodities by various policy measures? It seems that even many small developing countries have international market power over some commodities. Under these circumstances the Pareto optimal condition that the marginal rate of transforming one commodity into another through trade, i.e., marginal revenue, equal the marginal rate of transforming one commodity into another through production, i.e., marginal cost, is not satisfied for the country. Therefore, taking as fixed any trade policy of foreign countries, free trade is not the welfare-maximizing policy for the country. It is possible to make everyone in the country better off with an import duty or export tax. This is the best-known traditional argument against free trade.

A. Imposing an Optimum Tariff

Let the curve oF in Figure 2 represent the foreign offer curve faced by the home country. The point, o, is the origin for the offer curve with points along oCC'F indicating the amounts of commodity Y foreigners will offer for commodity X at various prices of X in terms of Y.[4] For example, at the price of X indicated by the slope of the line, oC, foreigners will offer oG of Y for GC of X. Placing the origin of the offer curve, o, at any point on the production possibilities curve, TT', shows how much of X can be traded for Y, starting from that production point. Sliding the offer curve around the production

possibilities curve traces out an envelope curve (MCT') with the characteristic that the slope of the offer curve where it forms part of the envelope curve will equal the slope of the production-possibilities curve at the origin of the offer curve on the production-possibilities curve (Robert Baldwin, 1948). For example, the slope of the offer curve and envelope curve at C (marginal revenue) equals the slope of the production-possibilities curve at o (marginal cost).[5]

The optimal welfare position for the country will be the point where a community indifference curve (the dashed curve) is tangent to the envelope curve, i.e., at C. If a social planner were determining production and trade in the home country, this individual would simply set the international price of X equal to the slope of oC and produce at point o, where the marginal social cost of producing X equals the marginal revenue from trading X. If, however, perfectly competitive market conditions prevail domestically and internationally, the optimum point C can be reached by the government imposing an appropriate import duty on Y (or export tax on X) that raises the domestic price of Y above its international price and brings production to the point o on the production-possibilities curve.[6] The domestic price of Y would equal the reciprocal of the slope of the production-possibilities curve at the point o, which is the marginal cost of producing Y, and the reciprocal of the slope of the community indifference curve at C, which indicates the marginal rate of substitution in consumption between the two goods. As is well-

known, the international price of Y in terms of X, the reciprocal of the slope of the line oC, will be less than under free trade conditions, thereby resulting in an improvement in the country's terms-of-trade, provided the government redistributes the tariff revenue among the country's consumers or, if the government spends the revenue itself, the absolute value of the country's elasticity of import demand is greater than the fraction of the tax revenue spent by the government on the imported good.

The locus of possible free-trade consumption points at different relative price of the goods (not shown) will lie below the envelope curve, (Baldwin, 1948). For example, the point C' will be a point on this free trade locus, since the slope of the line oC', the price of X at which foreigners will offer and demand the amounts indicated by the length of oC', equals the slope of the production-possibilities curve at the production point o, i.e., the marginal cost of producing X.[7]

In summary, under variable production conditions, if the offer curve a country faces is not completely elastic, foreign trade policies are taken as fixed, and there are no domestic distortions, an optimum tariff or export-tax policy is better than a free-trade policy for a country in the following welfare sense: no matter what the free trade collection of goods, there is some attainable collection of goods reached with an optimum tariff where there are more of all goods and thus the welfare of all consumers could be increased compared to their free trade welfare position.[8] Again, this does not mean that the actual

collection of goods achieved with an optimum tariff represents a potentially welfare superior position compared to the actual collection of goods attained under free trade. There need not be more of all goods at the optimum tariff position than at the free trade point and thus it may not be possible by redistributing the optimum tariff bundle of goods to make everyone better off than they are with the free trade bundle. Put another way, the community indifference curve through the free trade collection of goods may pass above the optimum tariff bundle of goods.

The terms-of-trade argument for protection fits nicely into the "distortions" framework for analyzing various theoretical grounds for government intervention that was developed in the 1950s and 1960s by such economists as James Meade (1955), Jagdish Bhagwati and V.K. Ramaswami (1963) and Harry Johnson (1965). As these writers pointed out, there is a theoretical case for government intervention by a country when the Pareto optimality conditions are not satisfied for the country due either to an international or domestic economic distortion. In the terms-of-trade case, the distortion is an international one, since under free trade and perfect competition, a country's marginal revenue from trading will not equal its marginal cost of production and marginal rate of substitution in consumption. (With government intervention the country gains at the expense of its trading partners and world trade becomes distorted.) As noted later in the discussion on increasing returns, production externalities are an example of a domestic distortion that can be corrected

with appropriate government intervention.

B. Practicality of the Terms-of-Trade Argument

i) Empirical Evidence

Although policymakers in large developed countries seem aware that their countries possess monopoly power in international markets, one does not observe support on their part nor on the part of economists for government intervention on term-of-trade grounds. One reason may simply be a belief that relevant demand and supply elasticities are too high for optimal trade taxes to bring appreciable gains to their countries. However, empirical estimates of these elasticities do not support this view. For example, using the central-tendency values for import demand and export demand elasticities that Robert Stern, J.H. Francis, and B. Schumacher (1976) found by surveying some 150 studies of trade elasticities, John Whalley (1985) estimates on the basis of his computable general equilibrium (CGE) model of world trade that the optimum tariff for both the European Community and the United States, assuming no retaliation, is around 150 percent.

While it is generally agreed that the so-called Armington (1969) assumption[9] employed by Whalley in his CGE model tends to overemphasize terms-of-trade effects, there seems little doubt but that large industrial countries like the United States could gain by unilaterally raising their tariffs or restricting exports. However, since national welfare begins to decline if duties are increased, or export supplies reduced, beyond their

optimum levels, the reluctance of policymakers to impose tariffs for terms-of-trade reasons may also be due to their uncertainty about the values of the demand and supply elasticities that are needed for calculating optimum tariffs.

ii) Retaliation

The main reason for the lack of support for applying the theoretical terms-of-trade argument in the actual policy world is, I would suggest, the belief that other countries are very likely to retaliate with their own protective actions, if a country tries to improve its trading terms by imposing higher tariffs and export taxes. There is also a widespread view that the resulting trade war is likely to reduce the benefits from trade below those achieved by the country before its unilateral trade intervention.

Under GATT rules, a country that increases tariffs bound under a prior trade negotiation must compensate the major exporters of the products affected by reducing duties on other products of interest to these exporters or else risk retaliatory increases in foreign duties on its own important export products. The founders of the GATT clearly wanted to discourage unilateral protectionist actions by this rule, since they were convinced that retaliatory tariff increases during the depression of the 1930s reduced the income of all nations and caused political repercussions that contributed to the outbreak of World War II.

Johnson (1953-54) demonstrates that theoretically a process of retaliation and counter-retaliation may end up with all the

parties being worse off than under free trade, but this is not a necessary outcome. Equilibrium in a retaliatory game between two trading partners may be reached at a point where one of the parties is better off than under the initial free trade position.[10] However, Whalley's (1985) calculations based on his CGE model indicate that, if the world's major trading blocs simultaneously imposed their unilaterally optimal tariffs, all would lose and worldwide GNP would fall by over 3 percent. Clearly, there is a need for both more theoretical and empirical work directed at explaining and measuring the factors that determine the outcomes of retaliatory trade wars.

If an industrial country initiates a protectionist policy in an effort to improve its trading terms, trade economists have traditionally recommended that other governments threaten retaliation if the trade measure is not eliminated and simultaneously seek assistance in resolving the issue through the dispute settlement mechanisms of the GATT. However, if the GATT-sponsored negotiations fail, they have generally argued for retaliation to demonstrate to the country it cannot gain from such beggar-thy-neighbor policies and, thereby, to make the instigator receptive to accepting a multilateral negotiation aimed at eliminating the new import barrier. In other words, viewing the tariff determination process as a repeated game, one country is likely to be able to deter another country from deviating from the free trade position for terms of trade reasons by announcing it will counter with a retaliatory tariff and

maintain this tariff indefinitely. The country considering deviating from free trade will realize that the discounted value of its income over the entire time period will be higher under free trade than at the retaliatory equilibrium position.

iii) Income-Distribution Considerations

Even in dealing with small developing countries whose retaliatory powers are weak, one does not observe policymakers in the developed countries pressing for optimal trade taxes to take advantage of their greater monopoly power. On the contrary, we see these developed countries extending zero-duty treatment and foreign aid to small developing nations as a means of assisting their development efforts.

There are at least two reasons for this. First, policy-makers know that voters are likely to oppose protective actions, especially if no injured domestic industry benefits from the protection, since voters realize that indirect taxes such as tariffs raise the domestic price of the taxed good. Economists may tell them it is theoretically possible under an optimal tariff situation to redistribute income to make everyone better off than initially, but most voters perceive that in the real world of public policy choices their chances of personally benefitting from the tariff, either in the form of lower taxes or increased government spending beneficial to them, are quite small. Thus, unless some politically powerful domestic industry benefits, elected officials are not likely to support protection for terms-of-trade reasons, since they are unlikely to regard the

actual level and distribution of real income achieved with an optimum tariff as an increase in social welfare.

Voters and policymakers in developed countries are also likely to be uncomfortable about reducing the income levels of poor developing countries unless these countries have been engaging in "unfair" practices themselves. Such beggar-thy-neighbor policies are inconsistent with the value judgments that led them to support redistributive tariff preferences and foreign aid programs. In other words, some individuals are unwilling to accept the notion that the welfare of one's own country is all that matters in designing national policies.

In contrast to officials in developed countries, policymakers in developing nations often do advocate the use of restrictions on their exports of primary products to improve their trading terms. However, since there usually are a number of developing countries producing most primary products, they need the cooperation of most of these countries to establish an effective international commodity agreement. Frequently, this cooperation is not forthcoming or, at least, not for long. The developed countries must also agree not to retaliate for the terms-of-trade improvement to materialize. Fortunately for the developing countries, in a number of instances, the developed countries have accepted export restrictions by the developing countries on income distribution grounds or for foreign policy reasons. International commodity agreements covering such products as coffee, tin, and sugar are examples, although these

agreements all eventually broke down.

Thus, while introducing import duties and export taxes to increase a country's potential economic welfare is a theoretically sound argument, the assumption of no retaliation is rightly regarded as unrealistic by policymakers. Officials in developed countries fear that, if they try to take advantage of other developed countries, a retaliatory process will occur in which their country ends up being worse off than initially. In situations where they believe retaliatory power is weak, they are often reluctant to lower the income levels of countries who are usually already among the world's poorest. These income distribution concerns have enabled some developing countries to apply the terms-of-trade argument successfully against the developed countries, however. Economists in developed countries generally share these various views of policymakers and oppose introducing trade restrictions on terms-of-trade grounds.

IV. Trade Policy under Imperfectly Competitive Market Conditions

The new or I-O trade theorists have made an important analytical contribution by examining the welfare implications of alternative trade policies under imperfectly competitive conditions in contrast to the perfectly competitive paradigm traditionally assumed. However, instances where a country acts as a monopolist are a standard part of traditional theory, as the preceding analysis of the terms-of-trade argument indicates. Furthermore, the situation of a country raising its welfare by

introducing tariffs to counter the tariffs of a foreign government is well-known, as such classic articles as Tibor Scitovsky (1942) and Johnson (1953-54) demonstrate. H. Katrak (1977) and P. Svedberg (1979) also have analyzed the situation where a tariff is imposed against imports from a private foreign firm acting as a monopolist.

Prior to the I-O approach to trade theory, however, little analysis existed of international markets in which there are a small number of countries supplying a product, each country with a small number of firms, or in which there are a large number of firms in each country, but each is producing a differentiated product (the Chamberlinian large numbers case). Analysis of the first situation, namely, oligopoly, yields the most striking implications for government intervention and thus is examined here. But, instead of analyzing this situation in partial equilibrium terms with exogenous factor prices, as the new trade theorists do, it will be analyzed in simple general equilibrium terms, in keeping with the framework of traditional trade theory. The welfare effects of government intervention also are less likely to be misinterpreted under this framework than a partial equilibrium one.

A. A Simple General Equilibrium Trade Model with Oligopolistic Competition

To take the simplest case of oligopoly, namely, duopoly, suppose that, instead of there being one country acting as a monopolist toward another country, two countries, the home

country (H) and a rival country (R), export the same homogeneous product to a third country (T). Furthermore, assume that each of the exporting countries behaves in the manner postulated by Cournot, namely, each selects the optimum production level and quantity of exports, assuming the other country keeps its quantity of exports fixed. There may be only one firm producing the export good in each country or there could be many firms who act collusively toward the third-country, perhaps by means of a national marketing board for international sales.

Although the two exporting countries also consume the export good, transportation costs are assumed to prevent trade between these two countries in this good or reexports from the third country back to the two exporting countries. Factor markets in each country are assumed to be perfectly competitive. Furthermore, it is assumed that the export good is sold to domestic consumers at a price equal to the marginal cost of producing the good, either because the monopolistic marketing board only arranges for international sales or the government introduces a domestic sales subsidy to offset the domestic distortion resulting from the duopolist's markup above marginal costs (Helpman and Krugman, 1989, 112-115).

Let the curve oUWVF in Figure 3 be the third country's (T) offer curve of commodity Y for commodity X. For example, at the price of X (in terms of Y) equal to the slope of the line oV, country T will demand oA of X in return for AV of Y. Suppose the duopolist in the rival country, R, supplies AB of this demand of

oA of X. The demand for X that the duopolist in the home country, H, then observes at the price indicated by the slope of oV would then be oB and its revenue (measured in Y) for this quantity of X would be BS. Thus, the point S is on the foreign offer curve that is observed in country H when country R supplies AB of commodity X.

Consider a smaller demand for X by country T, e.g., oB of X at a price equal to the slope of oW, and assume that country R continues to supply the same amount, namely, BC (=AB). The new point on the foreign offer curve that the duopolist in country H's sees would be Q, since oC would be the demand for X it faces and the amount of Y it receives for this quantity of X at the international price equal to the slope of oW would be CQ. Taking successively lower demands for X by the third country, but keeping the supply of X by country R the same, yields other points, e.g., N, on the foreign offer curve country H faces, namely, oNQS, when country R supplies this fixed amount.

If the supply of X by the duopolist in country R were fixed at an amount equal to AC rather than AB and the international demand for X were oA, the amount of Y country T would offer to country H for oC of X would be CL. At lower demands for X, such as oB, but with the same supply from the duopolist in country R, namely, BD (=AC), M would be a point on the foreign offer curve that the duopolist in country H would observe. Since increasing the fixed amount of X supplied by country R pulls the foreign offer curve observed in country H towards the origin, the new

offer curve faced by country H will be oML. There will be separate offer curves faced by the duopolist in country H, such as oML and oNQS, for each fixed amount of X supplied by the rival duopolist in country R. Following convention related to ensuring downward sloping reaction curves (see Brander and Spencer, 1983 and 1985), it is assumed that one country's marginal revenue (measured in commodity Y) from exporting declines as the exports of the other country increases, e.g., the slope of country H's offer curve oML at L is less than the slope of its offer curve oNQZ at Q.[11]

By sliding foreign offer curves such as oML and oNQS around country H's production-possibilities curve in the manner described in the last section, the maximum amounts of X and Y country H can consume when country R supplies various fixed amounts of X, can be determined. In Figure 4 let the curve V'QT' be the envelope curve formed by sliding the foreign offer curve oNQS in Figure 3 (scaled down in size for Figure 4 and labeled oQS) around country H's production-possibilities curve. With the various economic agents in country H maximizing utility, the equilibrium consumption point will be where a community indifference curve (the dashed curve labeled ii') is tangent to this envelope curve and offer curve, namely, at Q (ignore the dashed curve oQZ). The production of X and Y associated with this consumption point will be where the offer curve tangent to (or forming part of) the envelope curve at Q originates on H's production-possibilities curve, namely

at o.

As pointed out in discussing the terms-of-trade case, the slope of the offer curve at Q, the marginal revenue from exporting, equals the slope of the production-possibilities curve at o, the marginal cost of producing commodity X. Consequently, given the offer curve oQS, which is determined by subtracting a fixed amount of X supplied by the rival country, R, from the demand for X by the third country, country H will produce at o and the duopolist will export oC of X to the third country for CQ of Y. The domestic price of X will equal the slope of the community indifference curve at Q, which, as noted, equals the marginal cost of producing this commodity. Neither the producers of X or Y have an incentive to shift from their equilibrium production and exchange positions.

The amounts of X that country H will export when country R supplies different fixed amounts of X can be determined in the same manner, namely, tracing out the envelope curve associated with the appropriate offer curve and observing where one of country H's community indifference curves is tangent to this envelope curve. The highest envelope curve derived in this manner will be the one derived when country R does not supply any X in the international market. This, of course, will be the envelope curve based on the total offer curve of the third country, T, namely, oUWVF in
Figure 3.

There will be a locus of consumption points (not drawn),

like Q in Figure 4, one for each envelope curve based on a different supply of X by the rival country R. Following conventional, partial equilibrium duopoly theory, assume that this locus of consumption points is such that, the smaller the amount of X supplied by country R and thus the higher the relevant envelope curve for country H in Figure 4, the greater country H's export supply of X.[12] Consequently, country H's reaction curve, shown in Figure 5, has the conventional downward slope. For example, when the duopolist in the rival country does not supply any X so that the duopolist in country H monopolizes the entire third country market, the duopolist in country H supplies oE of commodity X. In contrast, if country R supplies oJ of X, the duopolist in country H does not enter the market.

Country R's reaction curve is determined in the same manner as that of country H, namely, deriving the foreign offer curves observed by R when country H supplies different amounts of X, determining from these offer curves and country R's production-possibilities curve the envelope curves associated with these offer curves, and ascertaining the locus of tangencies of R's community indifference curves and these envelope curves.

The Cournot equilibrium level of exports of the duopolists is given by the intersection point of the two reaction curves in Figure 5 at B. Again, following conventional duopoly analysis, it is assumed that the equilibrium is stable and unique (see Brander and Spencer, 1985 and James Friedman, 1977, ch.4). At this point the economic agents in each country are maximizing

utility under the assumed Cournot behavior assumption in sector X and neither duopolist has an incentive to change its export supply of commodity X. Assume the Cournot equilibrium export supply of X by country H and offer of Y by the third country to country H is shown in Figure 4 as oC of X for CQ of Y (corresponds with oC of X and CQ of Y in Figure 3, where country R's equilibrium export supply of X, BC, is also indicated). The equilibrium international price of X is the slope of the line oQ and the production and consumption points for country H are o and Q, respectively, in Figure 4 (ignore the dashed curve oQZ). The excess profits earned by the duopolist in H on its foreign sales of X are (measured in commodity Y) equal to the distance QE in Figure 4, where the line Eo is tangent to the production-possibilities curve at o.

B. Strategic Trade Export Policy[13]

As Elhanan Helpman and Paul Krugman (1989, ch. 5) emphasize, under Cournot behavior each country acts on what it perceives its foreign offer curve to be rather than on the foreign offer curve that takes into account how a rival actually changes its export supply when the country changes its supply. For example, in Figure 3 when country H is supplying oC of commodity X and the rival country is supplying BC of X, (to satisfy an international demand of OB of X), country H perceives that at a lower international demand for X, e.g., oC, country R will continue to supply an amount equal to CD (=BC) and the demand for X faced by the home country will, therefore, be oD and its revenue DN. In

fact, however, if country H's export supply were oD rather than the Cournot equilibrium quantity of oC, country R's best response is to increase its supply of X beyond its Cournot equilibrium amount, as R's reaction curve in Figure 5 to the left of B indicates.

This means that the combined export supplies of countries H and R will not be oC in Figure 3 when country H supplies oD of X but an amount greater than this. Thus, the price of X will be lower and country H will receive a lower amount of commodity Y for oD of X than DN of Y; it could be DK of Y, for example. Similarly, if country H increases its volume of exports from oC of X to oB of X, country R's best response is not to continue to supply AB (=BC) of X but a lower amount, as R's reaction curve to the right of B (in Figure 5) indicates. Since the combined supply will then be less than oA of X, the price of X will be higher than the slope of oV and the amount of Y received by H in return for oB of X will be BZ of Y, for example, rather than just BS. Consequently, the foreign offer curve passing through point Q in Figure 3 that country H would observe if it had the first-move advantage in the supply game would look like the offer curve oKQZ rather than oNQS.[14] In other words, the offer curve observed by a duopolist with the first-move advantage will cut through the perceived Cournot offer curves, as oKQZ cuts oNQS from below. Thus, just as free trade is not optimal for a country who has the ability to affect its terms-of-trade, the Cournot equilibrium point is not optimal for a duopolist who has

the ability to act as a first mover.

In Figure 4, let the dashed curve oQZ (the same as oKQZ in Figure 3, except for scaling) drawn from the point o on H's production-possibilities curve be the offer curve that a first-move actor faces. Since this curve cuts through the community indifference curve tangent to the perceived offer curve oQS at Q from below, supplying more X and moving slightly up the offer curve oQZ from Q will provide the country with amounts of X and Y that are enough to make everyone better off than they are at the Cournot duopoly equilibrium point Q.

Under the Cournot game described thus far, however, it is not possible for country H to move up the first-mover offer curve oQZ from Q. A simple announcement by the duopolist in country H that it will supply more than oC of X is not credible, since country R knows that when it is supplying its own Cournot equilibrium amount of X, namely, BC, the welfare-maximizing amount of X for the duopolist in country H to supply is oC and not a larger amount. Therefore, the duopolist in country R would not reduce its export supply of X and enable country H to gain in welfare. But if somehow the country H duopolist could precommit itself to export more than oC of X and the country R duopolist would react to these exports in its best way, then H could improve upon its welfare level under the Cournot solution.

As Brander and Spencer (1985) first pointed out, if the government of H precommits itself to a specific export subsidy prior to the time the two duopolists make their supply choices,

the country will be able to act as a Stackelberg leader and raise its welfare above the Cournot level. Its optimum position is explained with the aid of Figure 6. Note first that the country H's optimum offers of X for Y, as well as the Cournot equilibrium point, will be somewhere on the offer curve oKQZ in Figure 3, since this offer curve indicates how much of Y country H receives for various export offers of X after the country R duopolist reacts to these offers. Consequently, the optimum consumption level for the country H will be at that point on the envelope curve formed by sliding this offer curve around H's production-possibilities curve where a community indifference curve is tangent to this envelope curve. Let Z'GT' in Figure 6 be the envelope curve based on the first-mover offer curve, which is the dashed curve OGZ in this figure, and G be the point on this curve where the marginal rate of substitution between the two goods for country H's consumers (the slope of the community indifference curve ii' at G) equals the marginal revenue from exporting commodity X (the slope of the first-mover envelope curve and offer curve at G) and the marginal cost of producing X (the slope of the production-possibilities curve at O). This tangency point G cannot be a Cournot equilibrium in the absence of government intervention, since the perceived Cournot offer curve passing through G, namely, OGI in Figure 6, has a lower slope at G than the community indifference curve and the first-mover offer curve, OGZ, at this point and the production-possibilities curve at O.[15]

If, however, the government of H precommits itself to an export subsidy (financed by an equivalent lump-sum tax) before the duopolists make their choices, points on the envelope curve such as G can be reached. A specific government export subsidy raises the marginal revenue received by the duopolist from exporting X above what the country receives from buyers in the third country (the home government making up the difference). In other words, for the duopolist, the slope at any point on the Cournot offer curve OGI will be greater than the actual slope of this curve.

By an appropriate export subsidy, the marginal revenue for the duopolist at point G on the Cournot offer curve OGI can be made the same as the community indifference curve and first-mover offer curve through this point. Thus, G will be the equilibrium point with the export subsidy. The optimum conditions for the home country will be satisfied, namely, the marginal rate of substitution between the two goods equals the marginal revenue from exporting X, taking into account the reaction of the duopolist in country R, and the marginal cost of producing X,

The export subsidy induces the home duopolist to export larger amounts of X for any given amount of X exported by the duopolist in country R. This has the effect of shifting the home country's reaction curve in Figure 3 to the right (not shown), causing the new equilibrium to be at a point where country H exports more than before the export subsidy. As country H's exports expand beyond the Cournot equilibrium point in the

absence of government intervention, the rival duopolist in country R reduces its exports and operates on a lower perceived offer curve, thereby reducing potential welfare in that country. Since it follows from the usual second order conditions that country H's exports increase more than country R's decrease, the international price of exports, the slope of the line OG in Figure 6, is lower than the Cournot equilibrium price. In contrast, the price of X to domestic consumers in country H, who do not receive any subsidy, rises as the production of X expands and marginal cost increases.

By appropriate lump-sum redistribution policies coupled with appropriate export subsidies, any point on the envelope curve could be attained as an equilibrium. The possible set of Cournot equilibria in the absence of export subsidies will lie below the envelope curve.[16] Consequently, in an duopolistic situation with Cournot behavior and no retaliation by rivals, a policy of government export subsidies is potentially welfare superior to a policy of non-intervention on the part of the government. This is a new theoretical argument for government intervention that trade theorists focussing on imperfect competition have discovered.

This does not mean, however, that the actual collection of goods attained with an optimum export subsidy is potentially welfare superior to the collection attained in the absence of government intervention. As is the case in comparing an optimum tariff position with a free trade point, it is not necessary for

the amounts of both good X and good Y consumed with the export subsidy to be greater than without the export subsidy. Therefore, it need not be possible by redistributing the first bundle of goods to make everyone better off than under the second bundle, no matter how this is distributed. Unfortunately, most recent analyses of strategic trade policy do imply this by assuming that the country has a unique utility function like an individual consumer. It is also usually assumed that the income elasticity of demand for the imperfectly competitive market being analyzed is zero so that the welfare analysis can be conducted in terms of consumer and producer surplus. As in the analyses of the free-trade and optimum-tariff cases, such restrictions are not necessary in making the welfare case for strategic trade policy.

C. Analytical Qualifications

The conclusion reached above concerning the appropriateness of an export subsidy is sensitive to the number of domestic firms. If there is more than a single domestic firm (or group of firms acting collusively) and each of these domestic firms maximizes its welfare, taking as given the output of other domestic firms as well as the output of the firm or firms in the rival country, an export tax rather than an export subsidy may be appropriate. By inducing domestic firms to export more, an export subsidy has the effect of inducing foreign rivals to reduce their exports, thereby shifting welfare to the home country. However, with each domestic firm ignoring the effect of

its actions on the profitability of other domestic firms, the collective exports of domestic firms may be greater than is optimal from a domestic welfare viewpoint. The conditions calling for an export subsidy may, in other words, be more than offset by those calling for export restriction (the terms-of-trade argument) and thus an export tax (see Avinash Dixit, 1984; Helpman and Krugman, 1989, Ch. 5). Furthermore, as Dixit and Gene Grossman (1986) have shown, the existence of more than one oligopolistic industry competing for factors of production weakens the case for profit-shifting subsidies.

An export subsidy may also induce more domestic firms to enter the industry. An increase in the number of domestic firms can, in turn, result in higher industry average costs and cause the benefits from profit-shifting to be offset by the increased entry costs (see Jonathan Eaton and Grossman, 1986.)

Appropriate government policy to maximize welfare when international markets are imperfectly competitive is highly sensitive to the assumed behavior conditions for the competitors, as Eaton and Grossman (1986) also show. Suppose, for example, the exports of countries H and R are good substitutes but not perfect ones and the duopolist in each country follows Bertrand behavior in setting the optimum price under the assumption that the other duopolist keeps its price fixed. Since the reaction curves of the two countries under these conditions will generally be upward-sloping, the appropriate policy for the home government to pursue to maximize domestic welfare is to precommit to an

export tax instead of an export subsidy. At the Bertrand equilibrium in the absence of government intervention, the volume of exports is too high and the price charged by each too low compared to the optimum export volume and price under the offer curve that the home country would observe if it had a first mover advantage. By precommitting to an export tax, the government can offset this distortion and shift the home country's reaction curve to the right in a manner that raises the prices at which the two countries export and lowers the volume of exports. Since the government is unlikely to known the nature of competition in the industry, e.g., Bertrand or Cournot behavior, selecting the appropriate policy for raising the country's welfare is, as a practical matter, likely to prove very difficult for the government. Furthermore, if the home duopolist is already behaving as a Stackelberg leader, any intervention by the government will reduce welfare.

Under both Cournot and Bertrand behavior by firms, the effectiveness of government intervention is due to the existence of an international distortion. Consequently, like the terms-of-trade case analyzed earlier, strategic trade-policy analysis fits nicely into the distortions framework developed by international economists in the 1950s and 1960s. In the Cournot and Bertrand cases, the firms set marginal revenue equal to marginal cost, but the revenue curve is not the one they would observe if they had the first move advantage. An export subsidy or tax corrects for this distortion.

D. Increasing Returns

i) Internal Economies of Scale

In the preceding discussion of oligopolistic behavior, it has simply been assumed that there are a small number of firms in an industry without any explanation of why this is so. The main reason is, of course, the existence of increasing returns at the firm level. Unit costs may fall for a firm over such a wide range of output, that only a few efficient-sized firms can be supported in an industry. The requirement in many industries of large initial outlays on equipment and structures has long been recognized as a factor tending to reduce units cost as these fixed costs are spread over a larger volume of output.

In giving technological innovation a greater role in trade theory, the new theorists point to two other important sources of internal scale economies. One is large initial research and development outlays required to develop the new products needed to compete successfully in many industries. These act in the same way in reducing unit costs as large initial outlays on equipment and buildings. The second source is learning-by-doing, which lowers marginal costs as cumulative output of a new product increases and workers learn how to produce a higher quality product in less time. New generations of commercial aircraft are often cited as products involving large initial research outlays and where there are steep learning curves for production.

Internal economies of scale in themselves do not justify government intervention. For example, simply because a new firm

entering a perfectly competitive international market faces higher unit costs due to its lack of production experience is not a sufficient reason for temporary protection on efficiency grounds. If the firm can become internationally competitive with sufficient production experience, it should be able to raise funds in the capital market to cover the excess of expenditures over revenues in its early production stages.

If, however, informational asymmetries are important in capital markets, specifically, borrowers know more about the riskiness of a project than lenders, and if, as is the case, the liability of borrowers is limited by law, the possibility arises of banks charging more than the social value of funds because of the adverse selection problem (Harry Flam and Robert Staiger, 1989). The appropriate policy response to these circumstances is an interest rate subsidy. However, by considering a somewhat different type of information asymmetries, David DeMeza and David Webb (1987) demonstrate that interest rate subsidies can attract the borrowers least likely to succeed and thus may reduce social welfare. In view of the practical difficulty of distinguishing between the cases where interest rate subsidies are and are not desirable, it seems prudent to be cautious about introducing such subsidies.

If increasing returns at the firm level are so significant that only a relatively small number of firms can survive in the world market and the firms follow such non-cooperative behavior patterns as those postulated by Cournot or Bertrand, then the

argument for strategic trade discussed earlier is relevant. For example, assume a duopoly situation with a foreign and domestic firm each selling in each other's domestic market as well as in third markets. Also assume that learning-by-doing causes each firm's marginal costs to be a decreasing function of cumulative output to date. If the two firms play a Cournot game in determining their market shares, there is an opportunity for strategic trade-policy actions to shift welfare in favor of one of the countries.

Krugman (1984) has shown that import protection by one of the countries would accomplish this. If a government keeps foreign goods out of its home market, increased domestic sales by the home firm reduce its marginal costs and enable the firm to expand its foreign market share credibly. Thus, as Krugman points out, import protection becomes an export promoting policy. It has been suggested by Richard Baldwin and Krugman (1988) that this policy may have been adopted by Japan as a means of overcoming the "early start" advantage of the U.S. semiconductor industry and enabling Japan's industry to become a significant exporter of the 16K RAM chip.

ii) External Economies

In addition to stressing the opportunities for shifting welfare from foreign countries to the home economy under oligopolistic international market conditions, the new trade theorists point to the existence of external economies as a reason for government intervention. Although trade theorists

explained many years ago why the existence of Marshallian external economies in perfectly competitive markets call for government intervention and pointed out that this is the key argument on which the infant industry argument must rest (see Meade, 1955, p.256), proponents of the new trade theory believe that the importance of external economies, especially knowledge spillovers from high-technology industries, is not emphasized sufficiently in traditional trade theory.

Suppose, for example, that each firm in an industry faces constant returns but there are actually increasing returns for the industry as a whole or for some other industry, due, for example, to the diffusion of new knowledge acquired as firms expand output. If firms are unable to capture the increased returns to others from their new knowledge, output in the industry will be below its social optimum because of a domestic divergence between the social and private marginal costs. If the country is a net exporter of the product, an export subsidy can bring about an equality between social marginal costs and the marginal revenue from trading. However, since domestic consumers are not being subsidized, their marginal rate of substitution in consumption between the export and import good will not equal these other two marginal conditions. One distortion will be corrected at the cost of introducing another. But if a domestic policy, in particular, a domestic subsidy, is introduced rather than an international policy (the export subsidy), the domestic distortion can be offset without introducing another distortion.

The policy message of the domestic distortions literature that has developed in the last twenty-five years is to deal with a domestic distortion by introducing another domestic distortion that just offsets the initial distortion. An international distortion will not do this and may or may not increase the country's potential welfare. For example, if there is a divergence between private and social marginal rates of substitution or a difference between the private and social marginal productivity of a factor, the correct offsetting policies are, respectively, a domestic consumption tax or subsidy and a factor subsidy or tax rather than taxes or subsidies on traded goods. International policies are proper only when an international distortion exits, such as in the terms-of-trade case or in the international oligopoly situation discussed earlier.

E. Practicality of the Trade Intervention Arguments of the New Trade Theory[17]

i) Empirical Evidence

Most economists would agree that oligopoly describes international market conditions in large parts of the economy better than either perfect competition or monopoly. Consequently, one might suppose that the theorists who have developed the I-O approach to trade theory would be urging policymakers to initiate strategic trade-policy actions in oligopolistic international markets. However, thus far, this has not been the case.

One reason may be the belief that the nature of actual competition in most oligopolistic markets is such that the gains from strategic trade-policy actions are minimal or perhaps negative. Imperfect competition does not necessarily imply excessive long-run profits in an industry once the difficulty of preventing new entrants into an industry over time is recognized. The new trade theorists know that strategic export policies may actually end up reducing national welfare because an excessive number of domestic firms from an economies of scale viewpoint are induced into the industry by the short-run rise in profits.

The few studies of strategic behavior in particular industries tend to support the view that the gains from strategic trade policies are small. For example, in an empirical study of competition in the U.S. automobile market between American and Japanese producers, Dixit (1988) found U.S. strategic welfare

gains from imposing an optimal tariff to be very small, once the domestic distortion associated with the domestic monopoly problem is corrected with a domestic production subsidy.

Analyses of the semiconductor and aircraft industries by Richard Baldwin and Krugman (1988a and 1988b) provide even less support for the desirability of engaging in strategic trade policy actions. In the semiconductor case, where they assume free entry, the authors find that closure of the Japanese market enabled the industry to develop in Japan and gain a foothold in export markets, since their simulations indicate that the Japanese industry would simply disappear under free trade. However, Japan ends up with a lower welfare level with its protection of the industry than in the absence of any domestic production under free trade conditions. In the market for wide-bodied medium-ranged commercial aircraft, specifically the Airbus A300 and the Boeing 767, they likewise conclude that Europe loses by subsidizing Airbus compared with a free trade situation in which Boeing would be the only producer of this type of aircraft. Competition from the Airbus A300 lowers the price of these medium-ranged aircraft significantly and thus brings consumer benefits to Europe but these are not enough to offset the costs to taxpayers of the huge subsidy. Empirical studies of broad liberalizing changes generally indicate considerably larger welfare gains when markets are assumed to be imperfectly competitive rather than perfectly competitive (see J. David Richardson, 1989). For example, when Richard Harris and David

Cox (1984) assume the Canadian manufacturing sector is characterized by imperfect competition in contrast to perfect competition, they find that multilateral free trade raises Canada's welfare by 8.6 percent in contrast to only 2.4 percent when they assume perfect competition. Similarly, Drusilla Brown and Stern (1989) find that Canadian welfare rises by 1.2 percent of GDP as a consequence of the U.S.-Canadian Free Trade Agreement when markets are assumed to be imperfectly competitive rather than declining slightly when markets are assumed to be perfectly competitive.[18] In a study of reducing transportation costs among members of the European Community in ten industrial sectors, Alisdair Smith and Anthony Venables (1988) estimate that welfare increases by an average of .67 percent of industry consumption if imperfectly competitive markets are assumed and only .44 percent under an assumption of perfect competition. Another implication of such results is that the mutual welfare losses of a retaliatory trade war are higher under an imperfectly competitive than perfectly competitive market structure.

As Richardson (1989) points out, the main reasons why these empirical studies show larger gains from liberalization in imperfectly competitive markets with scale economies than in perfectly competitive markets are the reductions in mark-ups of price above marginal costs brought about by greater international competition and the increase in the average size of firms as competition eliminates small, inefficient firms. Thus, empirical studies of imperfectly competitive markets have, in some ways,

strengthened the case for trade liberalization.

While little seems to have been done theoretically in analyzing customs unions and free trade areas within the context of the I-O approach to trade theory, the existence of imperfectly competitive markets would seem to strengthen the world welfare case for such arrangements due to the procompetitive effects and increasing returns-to-scale benefits resulting from the removal of trade barriers between selected countries. The Brown and Stern (1989) study of the U.S.-Canadian Free Trade Agreement supports this supposition, since the combined welfare gain (as a percentage of GNP) of the United States and Canada under the Agreement is estimated to be .3 percent under perfect competition and 1.2 percent under imperfect competition, while the smaller welfare loss to the rest of the world remains essentially unchanged under the two sets of market condition. However, careful theoretical analyses and further empirical work are needed to be more confident about the implications of the new trade theory for customs union theory.

Recent empirical evidence indicates that knowledge spillovers associated with research and development efforts seem to be more significant than most traditional trade economists thought. As Grossman (1989) reports, one study (Adam Jaffee, 1986) finds that over half of the new patents associated with a general increase in research outlays in an industry are due to spillovers, while another (Jeffrey Bernstein, 1988) estimates that over half of the social rate of return on research and

development expenditures is due to intra-industry and inter-industry externalities. Suggestions for dealing with this domestic distortion include government subsidies of research and permitting joint research activities by private companies so the spillovers will be internalized. Trade economists have long warned about the likely ineffectiveness of trade policies as a means of dealing with these externalities (Baldwin, 1969).

ii) Uncertainty about Appropriate Policies, Retaliation, and Income-Distribution Considerations

The sensitivity of appropriate strategic policy measures to the degree of market concentration and the nature of the behavior of rival firms makes most economists familiar with the new trade theory reluctant to recommend strategic policy measures. Since there is little knowledge about how firms actually behave and yet appropriate government export policy can be quite different under Cournot versus Bertrand behavior, for example, they are understandably reluctant to recommend specific trade measures to policy officials. Furthermore, both of these behavior patterns by firms are likely to be regarded as unrealistic by officials in the public and private sectors. There is clearly a need for more empirical work concerning how oligopolists actually behave in continuing markets and for more theorizing under more sophisticated behavior patterns.

The same reasons for the lack of political popularity of the term-of-trade argument also apply to the strategic trade policy arguments for government intervention. Policy officials and most

economists are skeptical about the assumption of no retaliation on the part of rival governments. Export subsidies on manufactured goods are banned under the GATT and, if a domestic subsidy is employed to get around this ban, for example, subsidizing a particular industry's research and development efforts, other countries can still retaliate (perhaps in the form of counter-subsidies), if they believe this subsidy causes material injury to a domestic industry. In view of the higher degree of concentration in imperfectly competitive in contrast to perfectly competitive markets and the existence of excess profits in oligopolistic markets, injured foreign industries are even more likely on political economy grounds to be successful in persuading their governments to retaliate than in the terms-of-trade case.

Most policymakers seem to believe that the outcome of a trade war with any major industrialized country will be to reduce welfare in both countries. Furthermore, in most instances where they believe they will benefit even with foreign retaliation, namely, in dealing with some of the developing countries, they are reluctant on international income distribution grounds to pursue beggar-thy-neighbor policies against poor countries unless these countries are engaged in unfair trade practices themselves. However, as noted in discussing the terms-of-trade argument, if some countries initiate efforts to redistribute international welfare in their favor by introducing trade subsidies or taxes, most economists believe that the countries adversely affected

should not simply accept these predatory actions. Instead, they should retaliate if threats of retaliation coupled with efforts to eliminate the new measures through the GATT dispute settlement mechanism fail.

The domestic income-distribution effects of strategic policy actions, such as introducing export subsidies, also may make policymakers reluctant to introduce such measures, even if they do not fear retaliation. For example, in his analysis of the automobile industry, Dixit (1988) finds the U.S. welfare gain of $17 million resulting from a tariff imposed for strategic purposes is the net sum of a $27 million gain in profits to U.S. auto firms, a $347 million gain in U.S. government revenue, and a $357 million loss in consumer welfare. Recognizing that the political competition for increased government revenues is unlikely to produce the ideal redistribution conditions on which theoretical welfare arguments rests, policymakers and economists may understandably be reluctant to regard this redistribution of real income as an increase in social welfare.

More appealing to policymakers than either the terms-of-trade or strategic trade-policy arguments for intervention is the case for research and factor subsidies in high technology sectors because of externalities and imperfect capital markets. There are no obvious unfair income-distribution effects from such assistance, and a good case can be made that national welfare is enhanced without adversely affecting other countries. The danger with these arguments, given the difficulty of empirically

determining their validity in particular instances, is that they can be misused to promote inefficient economic activities. As political economy models stress, rent-seeking activities are especially strong in oligopolisitic markets. This fact coupled with the difficulty of ascertaining the social benefits of new, high technology products make it imperative that each case be carefully considered on its own merits rather than accepting the appropriateness of subsidization as a general practical principle.

F. Implications for International Institutions and Trading Rules

Thus far the focus has been on evaluating the trade policy implications of the I-O approach from the viewpoint of an individual country. However, a related issue of importance is the new trade theory's implications for the nature of international institutions whose purpose is to secure mutually benefical trade policy changes in the world trading community. A major benefit from the new approach is the richer understanding of why and how nations sometimes follow trade policy sequences that reduce the economic welfare of all the participants in these policy actions. This underscores the importance of the GATT, the main international institution that tries to prevent such outcomes with various rules of "good" conduct, procedures for negotiating mutual reductions in trade-distorting measures, and mechanisms for settling disputes among nations.

Traditional trade theory stresses, for example, that export subsidies are "beggar-thy-self" and "help-thy-neighbor" policies.

Thus, to explain the widespread use of these measures, it has been necessary to rely on political economy models in which particular groups are successful in getting a government to implement policies that benefit them but reduce the welfare of the nation as a whole. However, the new I-O approach explains why export subsidies may be rational on national welfare maximization grounds and why countries become trapped in a Prisoner's Dilemma when they all introduce these subsidies. There are a number of other trade policies that can produce similar results.

This better understanding of the likely consequences of countries simultaneously pursuing such policies is likely to strengthen international support for such GATT rules as the ban on export subsidies. The new trade theory also enables one to appreciate better the difficulties faced by negotiators in trying to devise new or improved GATT rules in such areas as domestic subsidies, intellectual property rights, and trade-related investment issues. For example, in the presence of external economies and other distortions, subsidies or tariffs may not only raise a country's own welfare but also world welfare. In considering such situations, economists have traditionally assumed the country is so small that the resulting increase in output does not change the international terms of trade and consequently does not decrease the welfare of other nations. With such a framework, it was not difficult to obtain agreement in the GATT to permit developing countries (who were small

suppliers of manufactured goods at the time the GATT was formed in 1947) to adopt interventionist trade policies on infant-industry grounds.

The new approach, in focussing on imperfectly competitive markets, highlights the probability that some countries lose, even though the policy-implementing country gains and world welfare as a whole increases. In internal situations where some groups lose as a result of a government policy change, but where national welfare increases, there are usually redistributive mechanisms, financed in part by the gainers, that assist injured groups in adjusting to the changed policy. Unfortunately, there are no institutional arrangements for redistributing income across borders when particular trade policy changes benefit the world as a whole yet harm selected countries. Multilateral trade negotiations provide one means of balancing losses in one area against gains in another, but these take place only occasionally. Consequently, we observe countries who believe they will lose in such cases strongly opposing the adoption of these policies in the first place. An advantage of regional agreements, such as the European Community, is the apparent feasibility of inter-country redistribution schemes to cope with such situations. One of the benefits of the closer cooperation being sought in the Uruguay Round between the GATT and such organizations as the World Bank might be to provide structural adjustment loans to countries hurt by the world welfare-improving trade policies of other nations.

Analyses of existing trade rules and laws within an I-O framework has also provided new insights concerning the economic effects of particular trade policies. To cite just a few conclusions from such analyses, when countries pursue liberal trade policies to promote economic efficiency but, as in so-called escape clause actions, also use trade policy to achieve a more equitable distribution of income, they run the risk of becoming trapped into pursuing protectionist policies (Staiger and Guido Tabellini, 1987). For example, if governments agree to a tariff reduction as part of a multilateral trade negotiation, workers in the affected industry may accept lower wages rather than move to another sector, knowing that the government will reverse the trade liberalization policy to avoid a deterioration in their income position. Kala Krishna, 1989, shows that voluntary export restrictions (VERs) also may have unexpected effects. If imports are substitutes for domestic production, VERs facilitate collusion that results not only in an increase in the profits of domestic producers but also the profits of foreign producers, all at the expense of domestic consumers. Howard Gruenspecht (1988) and Staiger and Frank Wolak (1990) demonstrate how the antidumping laws can be used to promote collusion among domestic and foreign producers. The implication of such analyses is that modifications of our trade laws, aimed at preventing such outcomes, are needed. V.

Conclusions

The new trade theorists are very much aware of the practical limitations of their arguments, and they believe that, as a rule of thumb, free trade is the best policy for countries to follow. For example, after reviewing the new arguments for trade-policy intervention, Krugman (1987, p.143) concludes: "The economic cautions about the difficulty of formulating useful interventions and the political economy concerns that interventionism may go astray combine into a new case for free trade."

The developers of the I-O approach to trade theory like to emphasize that this view rests on an appreciation of the differences in analyzing the effects of a policy in an highly simplified theoretical model and trying to implement this policy in the real world of imperfect information, rent-seeking and economic nationalism. Furthermore, they imply that traditional support for free trade has been based on the simple model outlined in the first section. To quote Krugman (1987, p.132) again: "There is still a good case for free trade, and as a useful target in the practical world of politics, but it can never again be asserted as the policy that economic theory tells us is always right."

In interpreting the basis of the traditional support for free trade in this manner, the new trade theorists, in my view, have been led by their understandable enthusiasm for their new analytical approach into misinterpreting why trade economists, certainly those commenting on trade policy since the 1950s, have supported free trade. As any good international trade text

written prior to the discoveries of the new trade theorists indicates, trade economists have long recognized that their basic theoretical model implies that using trade taxes is the first-best policy for the many countries with an ability to affect their trading terms. Trade economists have not recommended the use of these taxes for countries like the United States because of the reasons set forth in the earlier discussion of the practicality of the terms-of-trade argument, e.g., the threat of retaliation by other large trading blocs and adverse effects on poorer countries. As has been pointed out, these reasons and others are why the new trade theorists do not recommend the use of strategic trade policies by large trading countries or blocs.

Both traditional and modern trade economists are open to the criticism of using a different model to reach policy conclusions than they employ in analyzing most trading situations. The first model is much less formal than the latter and takes into consideration such factors as retaliation on the part of trading partners, the rent-seeking efforts of economic pressure groups, and a country's social welfare judgements. Clearly, much more research is needed to broaden our formal trade models so that they include such factors.

Pointing out that the I-O trade theorists are no more "eyes-open" or politically-smart free traders than traditional trade theorists is not meant to detract from their main accomplishment. They have opened up trade-policy analysis to a market-structure framework that fits modern industrial conditions much better than

the old competitive paradigm. While, thus far, the theoretical discoveries have come from simple applications of traditional Cournot and Bertrand oligopoly theory, it is likely that more realistic behavior models will be developed, paricularly by incorporating multi-period decisionmaking that adjusts to the rival's behavior, to provide new insights on business behavior in international markets. In addition, the I-O approach has provided new insights into why countries become involved in Prisoner Dilemmas, why, in the absence of international redistributive schemes, it is so difficult to achieve agreement in situations where changes in trade policies increase world economic welfare but harm particular countries, and why some of our trade laws are operating in ways quite different than their formulators intended.

Emphasizing such features of modern high-technology industries as high fixed costs due to initial research and development expenditures, dynamic scale economies from learning-by-doing effects, and intra- and inter-industry knowledge spillovers has also provided new reasons why selective government assistance might be justified on the basis of traditional externality and market-imperfection grounds. However, as both new and traditional trade theorists emphasize, domestic rather than international policies are usually the first-best responses to these market-distorting conditions. There is also the danger that these arguments will be misapplied in the political marketplace.

The new trade theorists sometime write as if they are unaware of the extensive trade literature on domestic distortions that has developed since the 1960s. This literature emphasizes the existence in the real world of all sorts of economic distortions preventing the attainment of Pareto optimality conditions. Consequently, there are many theoretical grounds for government intervention. However, the developers of this framework go further than just pointing out that government intervention might be justified; they rank the welfare effects of alternative forms of intervention.

The existence of imperfectly competitive product markets is a distortion that fits nicely into this framework, as does the existence of technological externalities and imperfect factor markets. If calling the recent theoretical work on trade policy, the "new" trade theory, invigorates an old field, one can hardly object to this appellation. However, I would predict that, while the recent theorizing will be credited with improving traditional trade-policy theory, it will be integrated into this framework rather than replacing it.

Endnotes

1. 1. Major recent contributions to the theory of trade policy under imperfectly competitive market conditions include: James Brander and Barbara Spencer (1981, 1983, 1984, 1985), Paul Krugman (1984), Avinash Dixit (1984), Jonathan Eaton and Gene Grossman (1986), Anthony Venables (1985, 1987), and Krugman and Elhanan Helpman (1989). Krugman (1990, Introduction, and Krugman and Helpman, 1989, Introduction) are the ones who have characterized the imperfectly competitive framework as the "new" trade theory. In contrast, Brander prefers the term, the "industrial organization (I-O) approach to trade theory." Both terms will be used in the paper.

2. If this does occur, it implies that the income elasticity of demand for commodity X (measured at prices under free trade conditions) is negative between the free trade and tariff points.

3. However, because of the convexity condition, the community indifference curve tangent to the international price line at C must pass above the tariff point C". In other words, the so-called Scitovsky condition holds, namely, the collection of goods at the tariff point is always insufficient to make everyone as well off as they are at the free trade point.

4. Part of the offer curve will extend below and to the right of o, indicating that foreigners will offer X for Y at very high prices for X in terms of Y.

5. The envelope curve will be tangent to the production possibilities curve where the slope of the offer curve at its origin equals the slope of the production possiblities curve, i.e., at the autarby price of the foreign country. At points on the envelope curve below this tangency point, the home country would export commodity Y and import commodity X. However, to keep the figure as simple as possible, it is assumed that the slope of the offer curve at its origin is steeper than any point on the production possibilities curve so that the home country will only export commodity X.

6. If the production of commodity Y is controlled by a monopolist, the government can introduce a domestic consumption subsidy on Y to offset the monopolist's markup on domestic sales and achieve the optimal conditions for the country as a whole.

7. Other points on the locus are determined by taking other price lines indicating the foreign offers of Y for X and first finding the points of tangency of these lines with the production-possibilities curve (giving possible free trade production points) and then determining the amounts of the two commodities the country will end up with after the quantities of X exported and Y imported at these different prices are subtracted and added, respectively, to the quantities of X and Y produced, thus yielding possible free trade consumption points.

8. As noted in endnote 5, other than a corner point of the production-possibilities curve, there may be one point in diagrams such as Figure 2, where the slope of the offer curve at its origin equals the slope of the production-possibilities curve. At this point the locus of possible optimum tariff collections of goods coincides with the locus of possible free trade collections as well as with the production-possibilities curve.

9. Under this assumption products in different countries are treated as qualitatively different, e.g., cars produced in the United States and Japan are not regarded as being perfect substitutes.

10. One example would be when a large country trades with a number of small countries, each of whom observes a completely elastic offer curve. Since the optimum tariff for each of these countries is zero, it will not be in their interests to retaliate after the large country selects its greater-then-zero optimum tariff.

11. Total revenue (measured in the commodity Y) earned by country H from exporting commodity Y equals $X_H p(X_H + X_R)$, where X_H and X_R are the home and foreign countries' outputs, respectively, and $p(X_H + X_R)$ is the third country's inverse demand (or price) of commodity X. Thus, the home country's marginal revenue is $R_H = X_H p' + p$, where p' is the derivative of the inverse demand. The change in the home country's marginal revenue when the output of the rival country increases (holding the supply of the home country constant), is $R_{HR} = X_H p'' + p'$, is assumed to be negative, which is the condition for stability of a Cournot equilibrium established by Frank Hahn (1962). This condition will hold if the third country's demand curve is linear (p"=0), concave (p"<0), or not too convex (not p">>0).

12. The assumption discussed in endnote 9 that $R_{HR} < 0$ and the assumption that the income elasticity of demand for X is zero are sufficient to guarantee this condition.

13. There are also applications of strategic import policy, but these are not considered here.

14. The marginal revenue that the home country duopolist perceives at any point on the first-mover offer curve increases as one moves back along this true offer curve oKQZ toward o in Figure 3. This can be seen by considering first how perceived marginal revenue changes as the supply of the rival country, X_R, increases with the price of the product held constant, thus implying that home country supply, X_H, decreases by the same amount. In Figure 3 consider, for example, the slope of the perceived offer curve NQS at Q compared to the slope of the perceived offer curve oML at M. The change in H's marginal revenue when X_R is increased and p held constant, $R_{HR}|_{\bar{p}} = -p' > 0$. Thus, the slope of perceived marginal revenue at M is greater than at Q. In addition, as pointed out in endnote 9, the change in the home country's perceived marginal revenue as the supply by the rival country increases (decreases) but the supply of the home country is held constant is assumed to decrease (increase). Consequently, since the slope of the perceived offer curve (not shown) passing through K (a lower point on the first-mover offer curve than Q) is greater than the slope at M, the slope of the perceived offer curve at K is greater than the slope of the perceived offer curve passing through Q.

15. Although the perceived Cournot offer curve passes above the envelope curve T'GZ' and the community indifference curve ii' to the right of G, these points are not feasible for country H, since they are not on country R's reaction curve.

16. For the point O in Figure 6 to be a possible Cournot production equilibrium in the absence of government intervention, the perceived Cournot equilibrium offer curve beginning at O must have the same slope as it passes through the first-mover offer curve OGZ as the production-possibilities curve at O. Since the slope of the perceived Cournot offer curve OGI passing through the first-mover offer curve OGZ at G must be less than the slope of this letter offer curve at that point and thus also less than the production-possibilities curve at O, and, as pointed out in endnote 14, slopes of the perceived Cournot offer curves passing through the first-mover offer curve OGZ increase as one moves along this curve toward its origin O, a possible Cournot equilibrium must lie on the first-mover offer curve below G. The same argument applies for each point of tangency of the first-mover offer curve with the envelope curve and the production point associated with this point of tangency, as long as the slope of the production-possibilities curve is not zero or infinite.

17. In addition to the authors cited below and in Part IV C, other authors who have critiqued the new trade theory and discussed many of the issues raised in this paper include Alan Deardorff and Stern (1986), Richard Harris (1989) and W. Max Corden (1990).

18. However, they find a somewhat higher gain for the United States under perfectly competitive conditions than under imperfect competition.

REFERENCES

Armington, Paul S., "Theory of Demand for Products Distinguished by Place of Production," IMF Staff Papers, 16, 159-176.

Baldwin, Richard E. and Krugman, Paul R. "Market Access and International Competition: A Simulation Study of 16K Random Access Memories," in Robert Feenstra (ed.), Empirical Methods for International Trade, Cambridge, MA: The MIT Press, 1988a.

_____. "Industrial Policy and International Competition in Wide-Bodied Jet Aircraft," in Robert E. Baldwin (ed.), Trade Policy Issues and Empirical Analysis, Chicago: The University of Chicago Press, 1988b.

Baldwin, Robert E. "Equilibrium in International Trade: A Diagrammatic Analysis," Quarterly Journal of Economics, Nov. 1948, 62, pp. 748-762.

_____. "The Case Against Infant-Industry Tariff Protection," Journal of Political Economy, 1969, 77, (3), May/June, pp. 295-305.

Bernstein, Jeffrey I. "Costs of Production, Intra- and Inter-industry R&D Spillovers: Canadian Evidence," Canadian Journal of Economics, 1988, 18, pp. 324-347.

Bhagwati, Jagdish and Ramaswami, V.K. "Domestic Distortions, Tariffs and the Theory of Optimum Subsidy," Journal of Political Economy, 1963, 71, (1), pp. 44-50.

Brander, James A. "Rationales for Strategic Trade and Industrial Policy," in Paul Krugman (ed.), Strategic Trade Policy and the

New International Economics, Cambridge, MA: The MIT Press, 1986.

Brander, James A. and Spencer, Barbara J. "Tariffs and the Extraction of Foreign Monopoly Rents under Potential Entry. "Canadian Journal of Economics, 1981, 14, pp. 371-389.

_____. "International R&D Rivalry and Industrial Strategy." Review of Economic Studies, 1983, 50, pp. 707-722.

_____. "Tariff Protection and Imperfect Competition." In H. Kierzkowski (ed.), Monopolistic Competition and International Trade. Oxford: Oxford University Press, 1984.

Brander, James A., and Spencer, Barbara J. "Export Subsidies and International Market Share Rivalry." Journal of International Economics, 1985, 18, pp. 83-100.

Brown, Drusilla K. and Robert Stern. "U.S.- Canada Bilateral Tariff Elimination: The Role of Product Differentiation and Market Structure," in Robert C. Feenstra (ed.), Trade Policies for International Competitiveness, Chicago: The University of Chicago Press, 1989.

Corden, W. Max. "Strategic Trade Policy: How New? How Sensible?," Working Papers, Country Economics Department, The World Bank, WPS 396, April 1990.

Deardorff, Alan V. and Robert M. Stern. "Current Issues in Trade Policy; An Overview," in Robert M. Stern (ed.), U.S. Trade Policies in a Changing World Economy, Cambridge, MA: MIT Press, 1987, pp. 15-68.

Dixit, Avinash K. "International Trade Policy for Oligopolistic Industries." Economic Journal, 1984, 94, (supplement), pp. 1-16.

_____. "Optimal Trade and Industrial Policy for the U.S. Automobile Industry." In Robert Feenstra (ed.), Empirical Methods for International Trade, Cambridge, MA: MIT Press, 1988.

Dixit, Avinash K. and Gene M. Grossman, "Targeted Export Promotion with Several Oligopolistic Industries." Journal of International Economics, 1986, 21, pp. 233-249.

Eaton, Jonathan, and Grossman, Gene M. "Optimal Trade and Industrial Policy under Oligopoly." Quarterly Journal of Economics, May 1986, 101, 2 pp. 383-406.

Flam, Harry and Staiger, Robert W. "Adverse Selection in Credit Markets and Infant Industry Protection," Working Paper No. 2864, National Bureau of Economic Research, 1989.

Friedman, James W. Oligopoly and the Theory of Games. Amsterdam: North-Holland Publishing Company, 1977.

Grossman, Gene M. "Strategic Export Promotion: A Critique", in P. Krugman (ed.) Strategic Trade Policy and the New International Economics, Cambridge, The MIT Press, 1986.

---------. "Promoting New Industrial Activities: A Survey of Recent Arguments and Evidence," OECD Economic Studies, 14, Spring 1990, pp. 87-126.

Gruenspecht, Howard K. "Dumping and Dynamic Competition," Journal of International Economics, November 1988, 25, pp. 225-248.

Hahn, F. "The Stability of the Cournot Oligopoly Solution," Review of Economic Studies, 1962, 29, pp. 329-331.

Harris, Richard, with Cox, David. Trade, Industrial Policy, and Canadian Manufacturing. Toronto: Ontario Economic Council,

University of Toronto Press, 1984.

Harris, Richard G. "The New Protectionism Revisited," Canadian Journal of Economics, 22, (4), 1989, pp. 751-778.

Helpman, E. and Krugman, P. Trade Policy and Market Structure, Cambridge, The MIT Press, 1989.

Jaffee, Adam B. "Technological Opportunity and Spillovers of R&D: Evidence from Firms' Patents, Profits and Market Value," American Economic Review, 1986, 76, pp. 984-999.

Johnson, Harry G. "Optimum Tariffs and Retaliation", Review of Economic Studies, 1953/54, 21, pp. 142-53.

---------. "Optimal Trade Intervention in the Presence of Domestic Distortions," in R.E. Baldwin et al, Trade, Growth, and the Balance of Payments, Chicago: Rand McNally and Company, 1965.

Katrak, H. "Multinational Monopolies and Commercial Policy," Oxford Economic Papers, July 1977, 29, (2), pp. 283-291.

Krishna, Kala. "Trade Restrictions as Faciliting Practices," Journal of International Economics, May 1989, 26, pp. 251-270.

Krugman, Paul R. "Import Protection as Export Promotion: International Competition in the Presence of Oligopoly and Economies of Scale". In Henryk Kierzkowski (ed.), Monopolistic Competition and International Trade. Oxford: Blackwell Oxford University Press, 1984.

_____. "Introduction: New Thinking about Trade Policy," in Paul Krugman (ed.), Strategic Trade Policy and the New International Economics, Cambridge, MA: The MIT Press, 1986.

_____. "Is Free Trade Passe?," The Journal of Economic

Perspectives, Fall 1987, 1, (2), pp. 131-144.

_____. Rethinking International Trade, Cambridge, MA: The MIT Press, 1990.

Learner Abba, P. "The Symmetry Between Import and Export Taxes," Economica, August 1936, 3, (11), pp. 306-313.

Meade, J.E. Trade and Welfare, London: Oxford University Press, 1955.

Richardson, J. David, "Empirical Research on Trade Liberalization with Imperfect Competition: A Survey," OECD Economic Studies, 1989, 12, Spring, pp. 7-50.

Scitovsky, T. "A Reconsideration of the Theory of Tariffs." Review of Economic Studies. 1942, 9, (2), 42, pp. 89-110.

Smith, Alisdair and Venables, Anthony. "Completing the Internal Market in the European Community: Some Industry Simulations," European Economic Review, September, 1988, 32, pp. 1501-1525.

Staiger, Robert W. and Guido Tabellini. "Discretionary Trade Policy and Excessive Protection," American Economic Review, December 1987, 77, pp. 823-837.

--------- and Frank A. Wolak, "Strategic Use of Antidumping Law to Enforce Tacit International Collusion," Department of Economics, Stanford University, May 1990, mineo.

Stern, Robert M., J.H. Francis, and B. Schumacher. Price Elasticities in International Trade: An Annotated Bibliography, London: Macmillan Press, 1976.

Svedberg, P. "Optimal Tariff Policy on Imports from Multinationals," The Economic Record, 1979, 55, (148), pp. 64-67.

Venables, Anthony J. "Trade and Trade Policy with Imperfect Competition: The Case of Identical Products and Free Entry," Journal of International Economics, 1985, 19, pp. 1-20.

_____. Trade and Trade Policy with Differentiated Products: A Chamberlinian-Ricardian Model," Economic Journal, 1987, 97, pp. 700-717.

Venables, Anthony J. and Alasdair Smith. "Trade and Industrial Policy: Some Simulations for EEC Manufacturing," Presented at Conference on Empirical Studies of Strategic Trade Policy, Cambridge, MA, 1987, September 17-18.

Whalley, John. Trade Liberalization among Major Trading Areas, Cambridge, MA: The MIT Press, 1985.

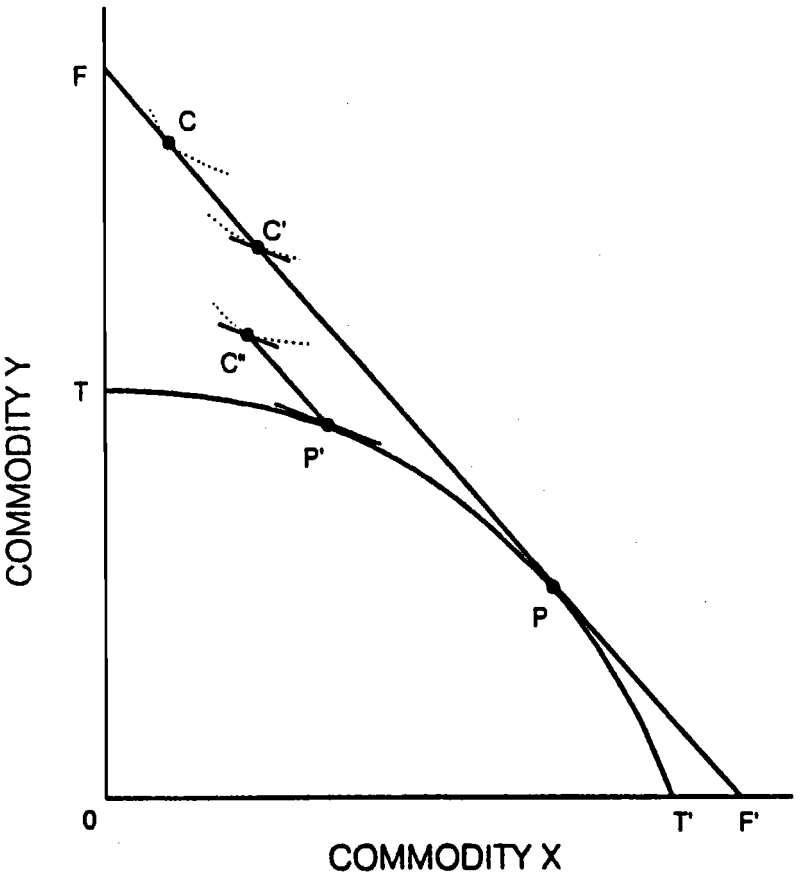

FIGURE 1

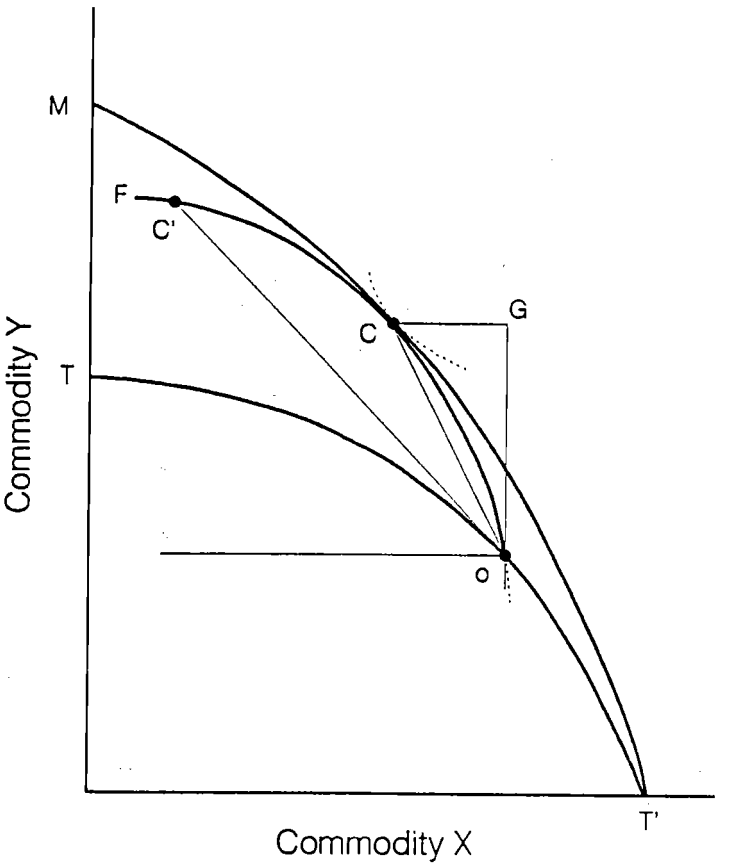

FIGURE 2

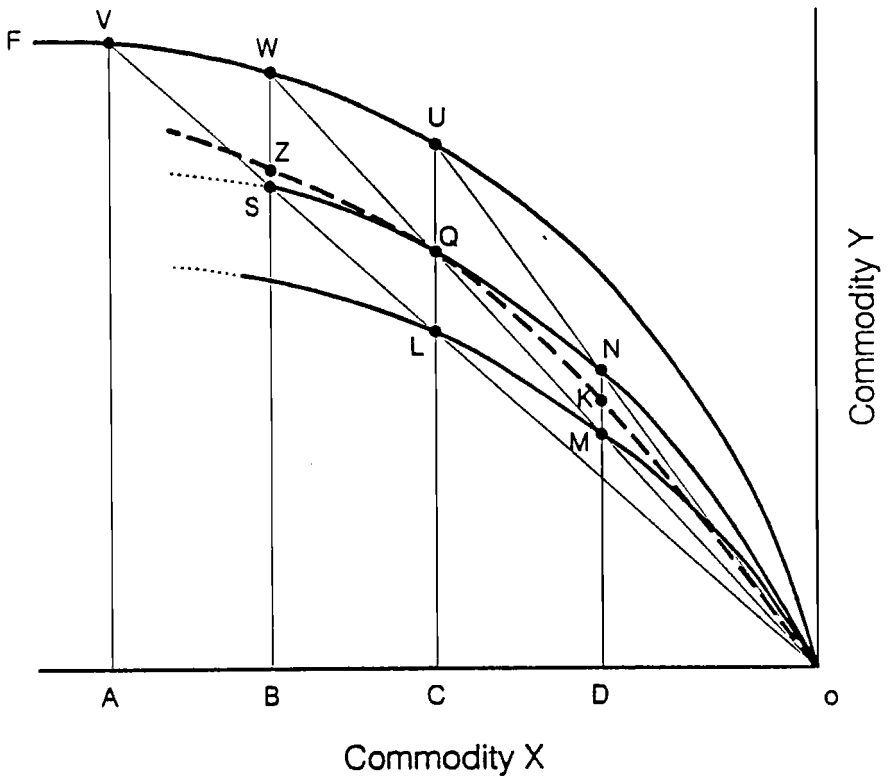

FIGURE 3

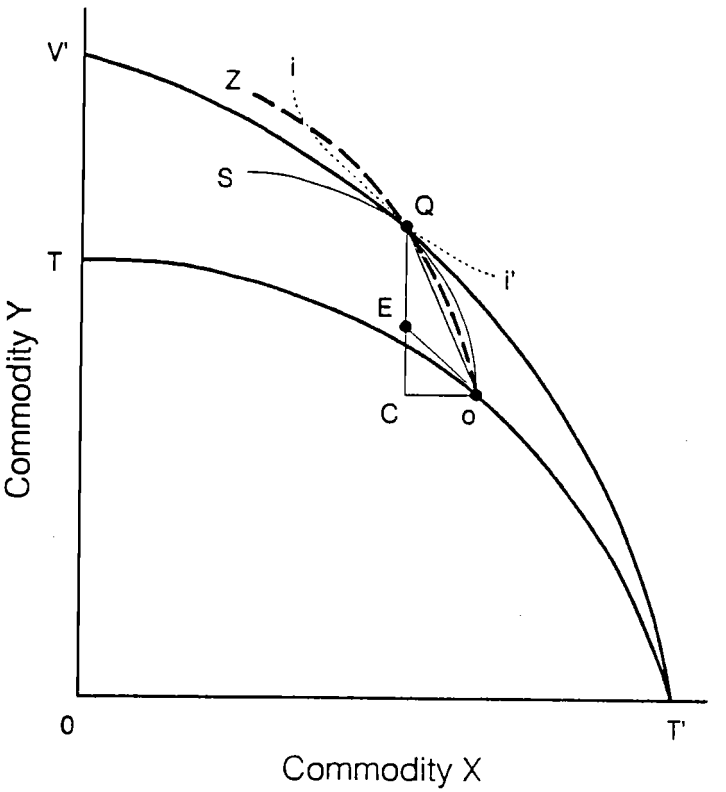

FIGURE 4

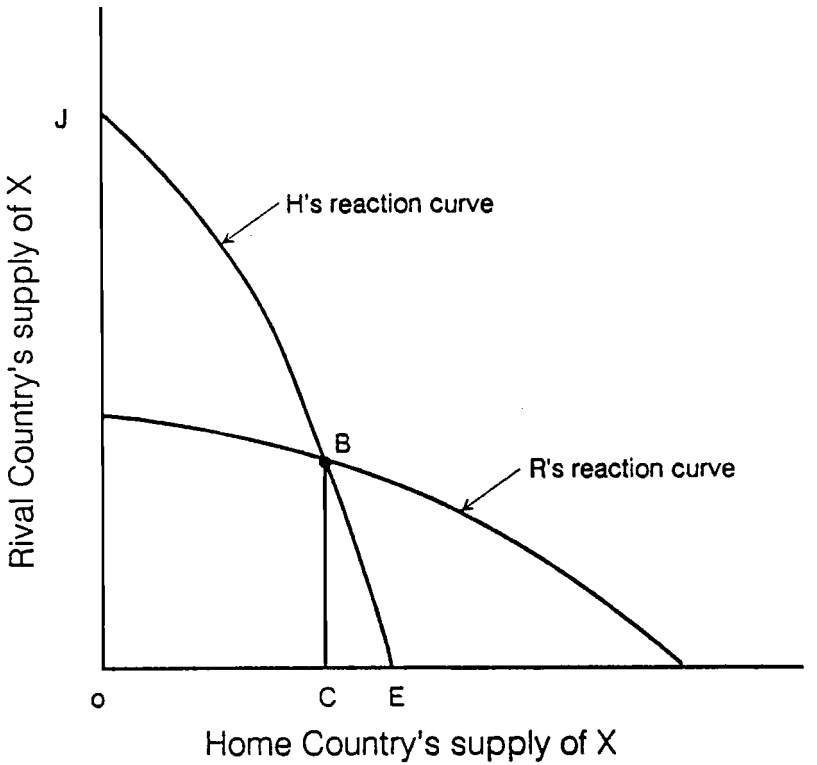
J
H's reaction curve
B
R's reaction curve
o
C
E
Rival Country's supply of X
Home Country's supply of X

FIGURE 5

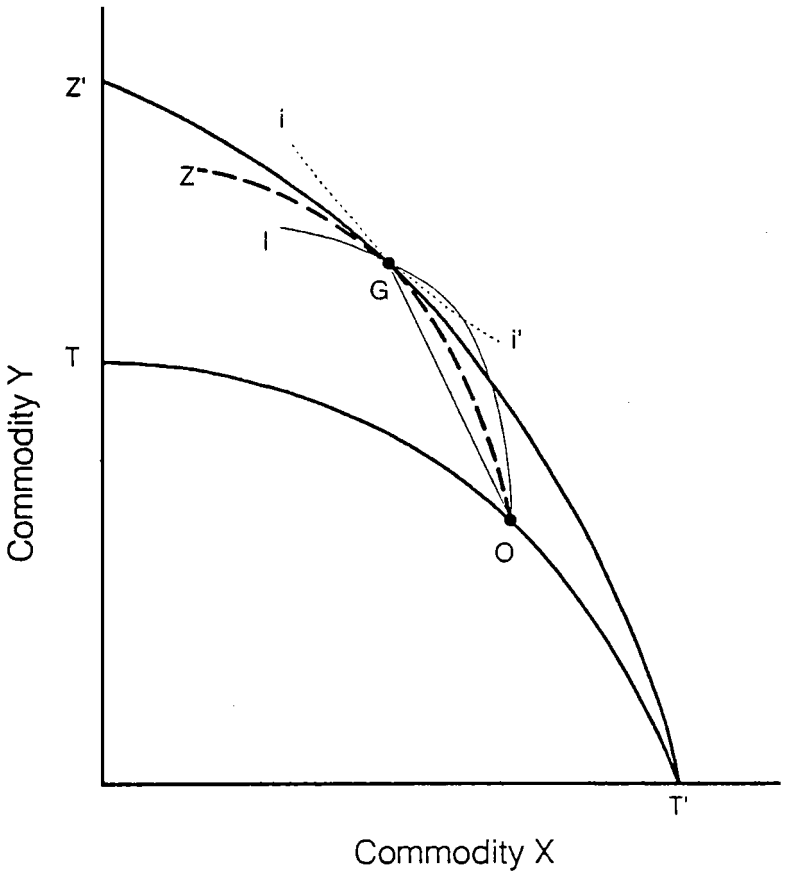

FIGURE 6