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A Review of the Role of Labor in Recent International Trade Models*

by

Drusilla K. Brown and David M. Garman
Tufts University

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I. Introduction

The traditional focus of international trade theory has had limited overlap with the analytical orientation of practitioners in the field of human resource management and industrial relations (HRM/IR). This is an unfortunate lapse since both areas are concerned with the issues of industrial growth, employment, and income distribution — issues that are closely related to international comparative advantage and commercial policy. Recently, trade economists have begun to explore the implications of international trade for issues that have previously been considered the domain of labor economists, such as the individual's decision to acquire an education, the likelihood of labor action in an industry, and the size of the union wage premium over a competitive sector. This review is intended to stimulate HRM/IR economists to consider general equilibrium influences on the behavior of labor and to invite suggestions concerning the treatment of labor issues in international trade models.

The traditional analysis of international trade under perfect competition, as developed by Heckscher, Ohlin, Samuelson, Rybczynski, and others, produced a powerful demonstration of the role of factor abundance in determining the pattern of trade, the gains from free trade, and the impact of protection on factor income and employment. A typical Heckscher-Ohlin-Samuelson (HOS) model assumes a two-good, two-factor world with perfect competition and constant returns to scale (CRS) technology. Both trading partners are assumed to share identical homothetic preferences and production technology.

This model has been used to illustrate three remarkable propositions concerning the effect of trade and commercial policy on the distribution of income. First, the Heckscher-Ohlin Theorem demonstrates that the country relatively abundantly endowed with labor

will produce relatively more of the labor intensive good and therefore will export that good. Second, free trade will equalize the price of goods across countries, which will also equalize the wage-rent ratio across both countries. This is the celebrated Factor-Price Equalization Theorem. Third, the Stolper-Samuelson Theorem identifies the effect of import protection on the returns to capital and labor. Protection will tend to raise the domestic price of the imported good. The real income of the factor used relatively intensively in the production of the import will rise and the return to the other factor of production will fall.[1]

The analysis of international trade and commercial policy changed course in the 1980s as a result of influential work by economists such as Paul Krugman, James Brander, and Barbara Spencer.[2] This new literature was spurred both by developments in the field of industrial organization[3] and by a growing discontent with the ability of traditional trade theory to explain such puzzles as the existence of significant intra-industry trade in homogeneous products and protectionist behavior by governments. The central element of both the new international trade theory and the new industrial organization is the relinquishing of the convenient assumption of perfect competition. This leads to the unsettled world of imperfect competition, rents, and strategic interaction.

The results from the new models of imperfect competition pose a challenge for the advocates of minimal government intervention in domestic or international trade. Imperfect competition can generate "excess" profits or rents that accrue to the factors employed in particular firms or particular industries. In certain cases, it may be possible to strategically manipulate trade or domestic policy in order to capture larger market shares in these industries. Imperfect competition also may increase the likelihood of beneficial spill-overs from R∆ expenditures or experience and could provide another justification for promotion of an industry by direct subsidy, import protection, or export promotion.

The modifications to the HOS view of international trade required by the incorporation of scale economies and imperfect competition are presented in Section II.

Some implications for commercial policy and some qualifications are outlined in Section III. Several applications that focus on the returns to labor are used to illustrate the basic results.

Although the recent work on strategic trade and industrial policy has received more attention, there are other areas in which trade economists have begun to examine labor related topics. A common component of these studies is the recognition by trade economists that their models can be improved by eliminating the assumption that labor is a homogenous input that is traded in a perfectly competitive market. While the treatment of labor in these models is still rudimentary, they illustrate the benefits of combining the general equilibrium perspective of international trade with the existing models of labor economics.

Three sections summarize some work in these areas. Section IV examines the models that incorporate imperfectly competitive labor markets. The inclusion of labor rents dramatically increases the potential gain from strategic trade and industrial policy. Section V reviews some international labor migration issues such as the impact of migration on economies with unemployment. Finally, Section VI outlines some recent work on the influence of international trade on human capital acquisition. These models incorporate feedback effects of trade on the incentives to acquire human capital. Section VII contains concluding comments.

II. The Gains from Trade in the Presence of Internal Economies of Scale

Recent work in international trade has focused on models of increasing returns to scale (IRS) technology and imperfect competition. Interestingly, it has been found that the presence of imperfectly competitive firms can reverse the conclusion that all countries will gain from free trade. Yet, paradoxically, the loss of guaranteed gains has been accompanied by the presumption that there is potentially more to be gained from international trade under imperfect competition than under perfect competition. The gains from international trade in an IRS model of identically endowed countries stem primarily

from two sources. First, trade can intensify the degree of competition, reduce a firm's profit maximizing mark-up of price over marginal cost, and thereby increase output. Second, trade can increase the product variety enjoyed by consumers.

Homogeneous Products

The benefit from improving the competitive environment is simply illustrated by Brander (1981). He posits an identical pair of two-sector economies in which the first sector is characterized by perfect competition and CRS, and the second sector has a monopoly producer with IRS technology. In the absence of trade, the monopolist in each country will set a profit-maximizing mark-up of price over marginal cost.

In the presence of trade, each former monopolist will want to take advantage of the profit opportunities available by selling its product in the foreign market. The duopolists created by the advent of trade in the imperfectly competitive sector, will take into account the potential response of the other to any intrusion into the foreign market. A number of patterns of strategic response have been explored, but a popular assumption is that the two firms will behave as Cournot duopolists.

As is well known, two Cournot duopolists will sell more to a single market than a single monopolist. Thus, output must rise and price must fall in the imperfectly competitive sector, and the allocation of resources between perfectly and imperfectly competitive sectors will be improved. This source of gain is sometimes referred to as the 'pro-competitive' effect of trade in imperfectly competitive markets and is shared by both trade partners. A second source of gain, the realization of scale economies, will also emerge in this example. Both of the IRS firms will increase output, moving down the average total cost curve, so that the average productivity of at least one factor will rise.

Although Brander's model assumed that sector 2 was monopolized in autarky, there are similar gains under other imperfectly competitive market structures. Markusen (1981) analyzed the case in which the imperfectly competitive sector is characterized by relatively free entry so that profits are driven to zero. The IRS industry, sector 2, is

assumed to consist of n Cournot firms that each choose a profit-maximizing price and output while taking the output of other firms as fixed. The equilibrium number of firms in this model is determined by the zero-profits condition.

Now consider the possibility of trading with an identical country. The market for good 2 will become an international market with total market demand doubled and the number of firms doubled to 2n. The autarky price-quantity combination will no longer be an equilibrium position. The representative firm still takes the output of the other 2n-1 firms as fixed, but now perceives its demand curve to have become more elastic. With the market twice as large as in autarky, a small reduction in price by a representative firm will yield a much larger expected increase in quantity demanded.

This increase in the firm's perceived elasticity of demand will result in a lower profit-maximizing price and higher output. As in the Brander model, higher firm output generates movement down the average total cost curve and an increase in factor productivity. Productivity increases reflect the pro-competitive effect of trade that will occur even when extra-normal profits are dissipated through entry.

Differentiated Products

The development of the IRS model has not been restricted to homogeneous products and Cournot behavior. The approach pioneered by Krugman (1979, 1980), Helpman (1981), and Lancaster (1979, 1980) assumes that consumers prefer variety and that each firm sells a slightly differentiated product. This class of models introduces an additional source of gain from international trade — increases in the variety of available products.

Krugman's (1979) model of differentiated products assumes that there is only one industry, but that each firm produces a differentiated product using IRS technology and labor as the only factor of production. Consumers have a utility function such that demand functions have the property that an increase in quantity consumed is accompanied by a fall in the elasticity of demand. Firms set a profit-maximizing price and quantity, taking the price of other varieties as fixed, and free entry is assumed to yield zero profits.

The change in state from autarky to trade with an identical country will initially double the number of products available to consumers. A typical consumer will reduce consumption of each individual domestic variety and begin consuming the imported varieties. As noted above, a fall in per capita sales by each firm will increase the firm's perceived elasticity of demand. As profit-maximizers, firms will respond to the increase in elasticity by raising output and lowering price.

Due to the resource constraint, attempts to raise output must lead to some exit, but the total number of firms in the world will not fall below n. Thus, consumers' utility is higher because they can consume a greater variety of goods, and firms reap economies of scale because of increased output. The usual gains from greater factor productivity are supplemented by the gains from greater product variety.

There are two implications for labor in Krugman's model. First, the increase in the scale of production will increase the productivity of labor. Second, two-way trade occurs in identical or very similar products in the IRS models. That is, each country imports and exports the same good, a phenomenon well documented in the trade statistics. As a result, increased trade does not necessarily require that labor must be reallocated between sectors. The existence of intra-industry trade leads each country to produce a larger quantity of a smaller number of varieties so that factor employment in the industry could remain close to the autarky level.

Example: The U.S.-Canada Free Trade Area

The previous discussion is intended to give the flavor of the theoretical developments in international trade with imperfectly competitive markets. The practical benefits of these results can be illustrated by the recently ratified free-trade agreement between the United States and Canada. Canadian economists and policy makers have been concerned for some time with the sizable difference between labor productivity in Canada and the United States. Low Canadian productivity has persisted despite broad similarities between the two countries in tastes, factor endowments, technology, and labor force

quality. Recent Canadian interest in an agreement has been generated by a series of studies that have found that steep tariff protection in Canada has resulted in sub-optimal plant size and an excess of locally produced varieties[4], which could explain the gap between labor productivity in the United States and Canada.

Thus, Canadian policy analysts have placed great emphasis on the gains to Canada of a reciprocal trade agreement. Tariff reductions by Canada would have a strong pro-competitive effect on Canadian firms, which would be expected to lower price-cost margins, stimulate firm output, increase the scale of production, and raise labor productivity. In addition, reciprocal tariff reductions by the United States would give Canadian firms tariff-free access to a large market, further raising the scale of production and factor productivity.

A considerable amount of empirical evidence has been marshalled to support the claimed benefits. Wonnacott (1975), using a partial equilibrium model, estimated that removal of pre-Tokyo Round tariffs on U.S.-Canada bilateral trade would raise Canadian GNP by 8.2 percent.[5] Harris (1984) used a computable general equilibrium (CGE) model to generate the estimate that multi-lateral tariff removal would raise Canadian GNP by 8.6 percent. Across the 29 sectors of the model, labor productivity rises by an average of 32.5 percent. More recent work by Harris and others place the gain to Canada from an FTA at a smaller but still sizable 1.5 percent to 2.5 percent of GDP.

Additional evidence for the existence of scale economies for Canadian firms has been documented by Baldwin and Gorecki (1986). They treat scale as consisting of the interrelated effects of plant size, number of products per plant, and length of production runs. Relative labor productivity levels of matched Canadian and U.S. manufacturing industries are calculated for 1970 and 1979 using a 4-digit SIC level of disaggregation. Their results show productivity in Canadian plants to be as much as twenty percent below U.S. productivity and they are able to explain about a third of this gap by scale differences between the two countries. Scale disadvantage for Canadian manufacturing plants could

be explained in part by high Canadian tariffs and seller concentration in import-competing industries and by smaller plant sizes in areas where Canadian firms have a comparative advantage but find their exports restricted.

III. Strategic Trade Policy

The traditional HOS trade model generally leads to the prescription of free trade as an optimal policy. In particular, small countries enjoy their largest welfare gains when there are no trade restrictions, and have no economic incentive to interfere with free trade.[6] These results change with the introduction of imperfectly competitive goods markets and IRS technology. Market imperfections that are commonly thought to be welfare reducing in autarky can provide new opportunities for using interventionist trade policy to a country's national advantage.

This section contains some simple models in which strategic trade policy can be welfare improving. Early versions of these models did not focus on the returns to labor or labor's participation in the policy game, but later versions have made labor a key component. This shift in attention is illustrated by an evaluation of the strategic potential of the automobile industry, a case in which the benefits to labor may predominate.

Strategic Trade Policy (STP) and the Transfer of Economic Rent

The primary STP role is its use in transferring economic rent from a foreign producer to a domestic producer, consumer, or government. For example, Brander and Spencer (1985) demonstrate that an export subsidy can raise national welfare when a pair of domestic and foreign firms that act as Cournot duopolists are competing for market share in a third country.

An export subsidy paid to the domestic firm effectively reduces marginal cost, thereby increasing the profit-maximizing level of output and lowering price. The subsidy will also disturb the Cournot equilibrium. A well known characteristic of a Cournot equilibrium is that the lower cost firm has a larger market share. It follows, then, that the

fall in net marginal cost of the domestic firm raises the domestic firm's market share at the expense of the foreign firm.

The subsidy will not generate a domestic welfare gain, however, unless the increase in profits of the domestic firm exceeds the amount of the subsidy. Perhaps surprisingly, this will always be the case. Domestic welfare must increase because the export subsidy can be thought of as correcting a 'market failure' in the sense that the domestic firm is not truly maximizing its profits when it treats the output of its competitor as fixed. The domestic firm would do better if it took into consideration the reaction of its competition and behaved as a Stackelberg leader.[7] The export subsidy simply increases output to the level that would be chosen by a Stackelberg leader.

This model also illustrates some of the difficulties with STPs. First, it is presumed that the government recognizes the gain from Stackelberg leadership even though the firm does not. This assumption is troubling since it is difficult, if not impossible, to determine the strategic content of a firm's observed behavior. However, the model's conclusion can be generalized. Even though firms have an incentive to increase profits through entry-deterring activities, governments will possess entry-deterring tools not available to firms and may be able to act with greater credibility. Second, the model ignores the potential for retaliation, which is likely because the export subsidy lowers the market share of the foreign competitor.

This type of analysis can also be used to evaluate the optimal policy of the importing country. The government in the importing country may realize that the foreign firm is extracting monopoly rents from domestic consumers. Brander and Spencer (1984) have examined some cases in which an import tariff can be used to transfer economic rent from the foreign producer to domestic firms or the government. They begin with a model in which domestic consumers are supplied by a monopolistic foreign firm which sets a profit maximizing price and quantity. The pre-tariff position has an equilibrium price, Po, and

import quantity qo, as shown in Figure 1. If a specific tariff, t, is imposed on imports, it would raise the consumer price to P1 and imports would fall to q1.

The tariff will be beneficial if it can be shown that the tariff revenue is greater than the lost consumer surplus. Lost consumer surplus is shown by area A + B in Figure 1, and tariff revenue is shown by area C. The case of linear demand provides a simple illustration. Marginal revenue, MR, is twice as steep as the demand curve, so area C is twice as large as area A. As long as imports fall by less than 66%, B is no larger than A, and the tariff revenue will exceed the lost consumer surplus. The tariff is a rent-shifting policy since it has captured monopoly profits from the foreign firm for the benefit of the domestic treasury.

This model also provides an opportunity to illustrate the sensitivity of the results to the specification of the underlying model. The example of Figure 1 can be easily modified such that an import subsidy is the optimal policy. Recall that the possibility that tariff revenue would exceed lost consumer surplus turned on the assumption that the MR curve is steeper than the demand curve. However, for a wide class of demand functions, such as the constant elasticity of demand case, the MR curve may be flatter than the demand curve.

Thus far, it has been shown that an import tariff can extract economic profits from a foreign firm that sells to the domestic market. Remarkably, an import tariff can also help a domestic firm extract rent from foreign consumers. Examination of this possibility was motivated by the apparent success of the newly industrializing countries (NICs) of Asia in expanding their export base through import protection.

These ideas were formalized by Krugman (1984) in a model in which one local and one foreign firm play a Cournot game in each other's markets, and marginal cost is assumed to be declining in output. An import tariff effectively raises the cost to the foreign firm of doing business in the domestic market. This increase in cost will alter the equilibrium in the domestic market by lowering the foreign firm's market share and raising

output of the domestic firm. The increased output of the domestic firm will reduce its marginal cost, thus raising its market share in the foreign market, as well. Hence, exports rise and the domestic firm obtains a larger market share in both the domestic and foreign markets.

Other Motives for Strategic Trade Policy

Welfare-improving intervention policies also exist in models without extra-normal profits and barriers to entry. Venables (1985) has analyzed a market segmentation model in which a tariff can be used to force both domestic and foreign firms to cover their fixed cost with charges to foreign customers only, thus transferring consumer surplus from foreign consumers to domestic consumers. This model assumes a set of Cournot firms in each country and free entry guarantees zero profits. The model also makes the strong assumptions that firms are not able to arbitrage between national markets and a representative firm has a greater relative market share on domestic sales than on exports. The absence of arbitrage allows firms to price discriminate between the two markets, with a separate equilibrium price emerging in each.

Consider the Venables' model in the case in which country A imposes an import tariff on imports from country B. The net receipts for country B firms would fall and they would face negative profits. Equilibrium prices must adjust so as to raise profits for country B firms while maintaining zero profits for country A firms. This is accomplished by an increase in the price paid by country B consumers, where country B firms have a relatively large market share, and a fall in the price paid by country A consumers. The tariff imposing government will earn extra revenue and consumer prices in country A will fall, raising consumer surplus. The tariff effectively transfers consumer surplus from country B consumers to country A consumers, thus raising country A welfare even in the absence of rents.

Organized Labor

Recent STP modeling has recognized that labor differs from other factors of production because of its ability to legally organize and behave in concert. These models have included labor as an actual or potential actor in policy games. However, it is important to note that the treatment of labor in international trade models remains incomplete. In particular, the models reviewed in this section rely on primitive unionization models which do not make use of an efficient bargaining environment.[8]

Brander and Spencer (1988)[9] have examined the strategic response of organized labor when an optimal trade policy is pursued for a unionized oligopoly. They are concerned with the ability of the union to capture part of the benefits of a rent-shifting subsidy or tariff, and the impact of this behavior on the optimal level of intervention. The essence of their model can be seen in the standard example of an international Cournot duopoly. The previous model is modified by assuming that the supply of labor to the local firm is controlled by a union which maximizes some function of real wages and total union employment.

Equilibrium will be determined by a two-stage game. In the first stage, the union and the firm bargain over the wage. In the second stage, the level of employment is the outcome of the Cournot rivalry between the domestic and foreign firms. The game is said to be sub-game perfect since the firm and the union understand the implications of the wage set in the first stage for output, price, and employment of the second stage. As would be expected, if the union increases the domestic wage, it will directly lower the firm's profits. More importantly, there will be a profit loss due to the weakened competitive position of the domestic firm relative to the foreign firm.

Government can be added to this game as a third player. The government will be assumed to know how the other players will respond to each potential policy and to pick the policy that will maximize national welfare. A production subsidy would lower the domestic firm's perceived marginal cost, which improves its competitive position relative to

the foreign firm. The domestic firm's market share increases, so that the subsidy has a rent-shifting effect.

Increased profitability of the firm is likely to raise union wage demands, which in turn can reduce the effectiveness of the government policy by raising the firm's marginal cost. The higher marginal cost for the firm weakens its competitive position and results in a smaller market share. A greater subsidy would be required to accomplish the same degree of rent-shifting from the foreign firm, which implies that the optimal production subsidy will tend to be higher in the presence of the union.

This model, however, is subject to the criticism that the union is not following a sophisticated strategy that maximizes the return to the domestic industry and divides the resulting quasi-rents via the collective bargaining agreement. The major implication of this model arises from an inefficient linking of the negotiated wage rate to the product price, instead of using the wage rate in a purely allocative fashion to divide the ex-post quasi-rents.[10]

Examples: Strategic Trade Policy and the Interests of Labor

The practical applicability of the theoretical gains from a STP remains a topic of debate. A recent survey of the issues and evidence by Katz and Summers (1989) seems to rule out rents to capital as a basis for a STP. They conclude that labor market rents are likely to be a more important motivation for adopting an industrial policy.[11]

Katz and Summers examine a variety of data sources to determine whether or not there exist significant compensation differences across two-digit categories of U.S. industries that can not be explained by the characteristics of the workers, the characteristics of the industries, or the degree of unionization. They find substantial unexplained wage differences in the measures they construct from 1984 CPS data, and find that these differences hold up over finer occupational disaggregation, over time, and over countries.[12] The possibility that these differences are due to compensating differentials or unobserved ability instead of rents are rejected based on the persistence of

the differences, evidence on quit rates, and data on wages of individuals who move between industries.

Katz and Summers use a stylized model of an economy with one primary and one secondary sector to illustrate the point that policy measures to expand employment in the "premium wage" sector will be welfare improving. They find the standard deviation of the unexplained nonunion wage differences to be about 18 percent, which suggests that a primary sector wage subsidy could generate a substantial welfare gain.

Katz and Summers develop further evidence on the likely benefits of export promotion versus import protection by comparing the skill adjusted wage differentials for imports and exports of manufactured goods. Export industries resemble primary sector firms and have wages that are 11 percent above the manufacturing average. Import industries, with the exceptions of autos and steel, resemble secondary sector firms and have wages that are 15 percent below average. Between 1960 and 1980 the number of jobs lost due to imports was roughly equal to the number of jobs gained from exports. This should have generated a substantial welfare gain for the United States and further gains might accrue from policies that promote the continuation of this trend.

The question of the potential benefits from a STP was approached very differently by Dixit (1988). He focused on the U.S. automobile industry as a source of potential benefit from STPs because of the potential for strategic rivalry between the United States and Japan, oligopoly in production, and monopoly rents to labor. His study investigates the benefits of an "optimal" tariff or subsidy policy using a simple static model of the United States and Japan.

The model treats demand as linear, marginal cost as constant, and the various car models are differentiated only by national origin of production. Oligopolistic behavior is modeled as a Nash equilibrium with conjectural variations. Although the conjectural coefficients are not structural values, they provide a convenient way to represent differing degrees of competition and can be determined by calibration using data for the years of

interest. The model is used to examine optimal policies for 1979 and 1980. Calibration of the model for these years is performed by reproducing the initial equilibrium with only the MFN tariff applied to Japanese imports.

Dixit runs simulations over alternative policies and parameter values and finds that the degree of monopoly rents in U.S. labor costs plays a major role in determining the optimal trade policy. Under the assumptions of central parameter values and no labor rents, the optimal tariff is 17 percent. If the optimal tariff were imposed, U.S. real income would have increased by $80 million in 1979. However, under the assumption that half of U.S. labor cost is monopoly rent, the optimal tariff for 1979 is 24% which would increase national income by $185 million. A production subsidy rather than an import tariff, however, proved to be a superior policy. If no monopoly rent is assumed to exist, the optimal production subsidy yields a gain of $251 million and the monopoly rent case yields a gain of $1.94 billion in 1979.

Dixit emphasizes that his results are preliminary and give only an upper bound for the benefits of an STP. The gains could be greatly reduced by dropping the assumptions that only the United States engages in policy, there is no retaliation to U.S. policy, and that subsidies do not stimulate increased monopoly in the output or labor markets. Nevertheless, the results effectively illustrate the points that gains from STPs are likely to be small unless there are large labor rents to be captured and that the optimal policy may be promotion rather than protection.

IV. Labor Market Imperfections and International Trade

The incorporation of labor market imperfections has affected both the discussions of strategic trade policy and the development of the modern theory explaining the pattern and gains from trade. This section will outline several areas in which abandoning the assumption of competitive labor markets has led to qualifications of the standard results of theoretical trade models.

The effect of unionized labor on the basic results of trade theory is reviewed first. The general question of interest is how the presence of a labor union affects the political economy of protectionism. That is, what is labor's interest in protectionism and under what circumstances will a consensus for protectionism develop within an industry? This framework is then used to consider how the presence of a labor union affects the ability of an economy to adjust to changing comparative advantage. These models provide an explanation for the surprising observation that the union wage premium sometimes rises in declining industries.

The Political Economy of Protectionism and a Unionized Sector

Recent experience with appeals for protection suggests that the appeal will be supported by all factors of production within a sector. This unanimity runs counter to the Stolper-Samuelson Theorem which concludes that protection benefits factors of production rather than industries. According to this theorem, protection of a capital intensive industry lowers the wage and increases the return to capital. Thus, the owners of labor and capital should not agree on which industry to protect.

This unanimity has previously been explained by short run models in which factors are sector specific, but the existence of imperfect labor markets provides an alternative view. Hill (1984) finds that import protection may be sought by unionized labor in a capital intensive industry if the import protection allows the union to increase the union wage premium over the nonunion wage.

Hill considers a standard two-good two-factor model in which one sector has a unionized labor force. The mark-up of the optimal union wage over the nonunion wage follows the monopoly pricing rule and is inversely related to the elasticity of the demand for labor in the unionized sector. The elasticity of demand for labor in the unionized sector varies positively with labor's cost share and, therefore, with the wage-rent ratio (as long as the elasticity of substitution between capital and labor is less than unity).

Consider now the effect of a tariff induced increase in the domestic market price of the unionized good. According to the Stolper-Samuelson Theorem, an increase in the output price of the unionized sector will raise the return to the factor used intensively in that sector. If the unionized sector is capital intensive, then the wage-rent ratio will fall in both sectors. Labor, then, is worse off in terms of both goods.

However, the decline in the wage-rent ratio will also raise the mark-up of the union wage over the nonunion wage. For sufficiently small values of the elasticity of substitution between capital and labor, the gap between the union and nonunion wage may rise enough that the real income of union members actually rises, thus making support for protection unambiguously in the union's interest. As a result, we may find both factors of production in the unionized sector supporting protection.

The Hill model is, of course, vulnerable to the same criticism applied to the Brander and Spencer (1988) model of union behavior. If Hill had used an efficient contract framework, then the union would benefit as long as the rents to the protected industry rose by enough to offset the lower competitive wage rate resulting from protection.

Labor Unions and Changing Comparative Advantage

Trade economists have also used unionization to help explain why an economy might adjust slowly to declining competitiveness and increased imports. Grossman (1984) considers the contribution of a seniority system for hires and layoffs to slow union wage adjustment in the face of declining demand. His model is similar to Hill's, but Grossman assumes an extreme production technology in order to focus on the effect of union behavior on wage demands.

The union is modeled as setting wages by majority vote, so that the expected utility of the median voter is maximized. Union members are employed in order of seniority, with the most senior hired first or laid-off last. The seniority of the median voter is assumed to depend on the size of the union. The smaller the union the higher the seniority

ranking of the median voter, and the greater the probability of getting hired for each wage demand. Thus, the smaller the union, the higher the union wage demanded.

Grossman uses this framework to analyze the impact of an increase in international competition that reduces the world price of the union good. The decline in price reduces the probability that the median voter will be employed at the current wage, and will tend to reduce the union's wage demand. However, the deterioration in the industry's competitive position will also worsen the most junior union member's employment prospects. As a result, the union will shrink and the seniority rank of the median member will rise. It is theoretically possible for the seniority rank of the median member to rise sufficiently that the wage demand actually increases.

Staiger (1988) has shown that the union wage may rise in the face of intensified international competition if import penetration leads domestic production to become more capital intensive. Increased capital intensity lowers labor's cost share, which causes the elasticity of demand for labor to fall and raises the optimal mark-up of the union wage over the nonunion wage.

Empirical evidence supports this conclusion. Lawrence and Lawrence (1985) point out that U.S. auto and steel workers receive a wage premium over the manufacturing average that is significantly higher than that received by their Japanese counterparts. They also report that during the 1970s, the compensation of steel and auto workers increased 30 and 15 percent more, respectively, than the average of the 57 3-digit SIC industries that they studied.

These seemingly large wage differentials are often used to explain the loss of U.S. competitiveness, but models from international trade suggest that the causality runs in the opposite direction. Loss of international competitiveness raises the union wage. However, it is again worth noting that these models rely on union behavior which does not maximize the present value of the union's share of the industry's quasi-rents.

V.   International Factor Mobility and Labor Migration

The proposition that international trade will equalize the returns to factors across countries, is one of the major results of the traditional HOS trade theory. When factor-prices are not equalized, the owners of a country's relatively abundant factor will face a strong incentive to move to a country where it yields a higher return. Although this incentive exists for the owners of all factors of production, labor movements provide its most dramatic and wrenching expression.

Much of the recent U.S. interest in international factor mobility has been generated by the case of the United States and Mexico, with a labor flow from Mexico to the United States and a capital flow out of the United States. The difficult question faced by economic policy analysts becomes, "is it better for the United States to allow labor inflows and prevent capital outflows, or should the United States prohibit labor inflows and promote capital outflows?"[13]

The Factor-Price Equalization Theorem is fairly fragile, and can fail to hold simply if there are more inputs in an economy than outputs. As a result, a modified HOS model with two factors of production, but only one good, has become a common framework for analyzing international factor mobility.

Failure of factor-price equalization in the HOS model implies that producers in the two countries face different relative factor prices and thus adopt different techniques of production. The use of two different production techniques will not be as efficient as a single technique since isoquants are assumed to be strictly convex. This inefficiency will leave the world inside its production possibility frontier.

In the context of the perfectly competitive full employment HOS model, international factor mobility will equalize factor returns across national borders, moving the world economy toward the production possibility frontier. Free factor trade will be mutually beneficial for both countries, and since capital and labor are treated symmetrically, it will

not matter which factor migrates.[14] Certain types of market failure that qualify these conclusions are discussed in the following sections.

Market Power in Factors

A large country with international market power can usually do better than free trade as long as its trading partner does not retaliate. This is the case in factors markets as well as goods markets. Hence, the United States might actually gain by limiting the export of capital to the rent-maximizing monopsony level by imposing a capital export tax.

U.S. residents could also extract foreign rents by controlling the immigration of labor. Note, however, that the restriction would have to take the form of a tax on immigrants, not the form of an immigration quota. An immigration quota would simply transfer the rents associated with the exercise of U.S. market power to the immigrant, so that the welfare of current U.S. residents would not increase.[15]

Introducing the exercise of market power destroys the symmetry of the model, so that labor imports and capital exports will generate different results. An intriguing argument first made by Ramaswami (1968), and later formalized by Calvo and Wellisz (1983), demonstrates that importing labor is superior to exporting capital!

The argument in favor of labor imports is most easily made by considering each policy in turn. First, consider the capital export case. Let U.S. capital move to Mexico, subject to an optimal capital export tax. This policy leaves the return to capital in Mexico above the U.S. rate, and the return to labor in Mexico below the U.S. rate.

Now consider the creation of an enclave in the United States. This enclave would contain U.S. capital repatriated from Mexico, and all Mexican workers employed by this capital. The actual national location of this capital and labor would not effect the welfare of the two countries, given the existence of the enclave. Thus, the enclave policy has the same welfare implications for both countries as the capital export policy.

However, the creation of an enclave would not be the welfare maximizing policy for the United States. Since the capital-labor ratio in the enclave would be lower than in the

rest of the country, two different techniques of production are being used to produce the same good. Output in the United States would be increased if the barriers creating the enclave were removed and a single technique of production were adopted. The United States could guarantee that previous residents receive all of the output increase by taxing away the increased wages of enclave laborers.[16]

The point of this exercise is to show how the restricted capital export policy can be viewed as employing U.S. capital with different techniques of production at home and abroad. There will be gains to be made by transferring capital and labor to the United States so that the techniques of production can be unified.

Jones, Coelho, and Easton (1986) have pointed out that there is no reason to limit the import of capital (and the labor it employs) to American owned capital. The movement of a bundle of Mexican capital and labor into the U.S. enclave will produce the same result as before. Once again, total U.S. production can be increased by unifying the production process in the enclave with the production process in the rest of the United States.

The efficiency gains from the shift of Mexican capital and labor to the United States could again be captured by taxation. A tax on immigrant labor would leave Mexican workers with the same after-tax wage as they would receive in Mexico. Mexican capital would have to be subsidized in order to receive the same return as it would receive in Mexico. The tax on immigrant labor and the subsidy to Mexican capital would hold the factor payments to Mexican capital and labor constant, leaving any increased production accruing to U.S. owned factors of production and to the U.S. government.

The labor import policy requires a discriminatory tax on immigrant labor which would generally be considered to be morally undesirable and politically unacceptable. Calvo and Wellisz (1983) show that the same results can be affected through a government-formed capital export cartel. This capital export cartel would follow two operating principles. First, the cartel would exercise its market power by hiring labor in Mexico at the rent-maximizing monopsony rate. Second, the cartel would export capital

only up to the point where the return to capital in the two countries will be equalized. Equalizing the return will guarantee that all U.S. capital uses the same technique of production, whether in the United States or Mexico.

Labor Market Imperfections

Many of the political objections to labor migration stem from problems generated by factor market imperfections. Imperfections in the labor market could significantly change the results of the preceding models and alter the optimal ranking of policies. For example, Brecher and Choudhri (1987) conclude that when there is a real minimum income guarantee, any labor immigration will lower national welfare.

The model of Brecher and Choudhri contains a minimum income guarantee that is provided through a package of unemployment compensation and welfare payments. The minimum real wage pegs the marginal product of labor, and determines labor employment and output for each level of the capital stock. Given labor employment and the capital stock, the level of GNP is also fixed. Since total employment and output are fixed, each immigrant displaces one native worker but has no effect on total output. Any positive factor payment to immigrant labor will accordingly lower the output available for native consumption.

The Brecher and Choudhri framework contains an incentive for capital exports only if the average product of capital at home is lower than the marginal product of capital abroad. Exporting a unit of capital leaves some domestic labor unemployed and causes domestic production to fall by the average product of capital. By comparison, the capital export earns the marginal product of capital in the foreign country. As long as the domestic average product of capital is less than the foreign marginal product of capital, the capital export generates a net national gain.

However, the Ramaswami argument can be equally well applied to the Brecher and Choudhri result that labor immigration is never welfare improving for a minimum wage economy. Repatriating capital and the foreign labor that it employed to a domestic enclave

would certainly have no effect on domestic welfare. Moreover, further gains would be possible if a single production process were adopted economy wide, though this would require that the minimum income guarantee scheme be replaced by a wage subsidy paid exclusively to nationals.

The Brecher and Choudhri result is further qualified if the assumption that migrant and native workers are perfect substitutes in production is relaxed. An industry which is losing its comparative advantage might increase the employment of unskilled immigrant labor to hold down production costs. This could increase home welfare by saving the jobs of skilled native labor.

Ethier (1985) has derived some interesting results on the relationship between factor substitutability and optimal migration. Consider, for example, a decline in demand for the export good which is accompanied by a decline in the real wage for migrant labor. This type of secular decline in the commodities market and the migrant labor market could occur if the host country's export market is the same as the market from which it hires migrant labor.

The introduction of this correlation will cause a decline in export demand to have both positive and negative influences on the employment of native labor. On the one hand, the fall in the cost of migrant labor will induce firms to substitute migrant workers for native workers. The higher the elasticity of substitution (s) between migrant and native labor the larger the employment decline.

On the other hand, the fall in the cost of migrant labor will tend to lower the cost of production, raise output, and increase the employment of native workers. The extent of this output increase will depend on the elasticity of demand for the firm's product. High values of the elasticity of demand (h), will increase the level of output and the demand for native labor. In fact, if $h > s$, the welfare of native workers will be increased by the reduced probability of layoff under adverse conditions. However, if demand is

insufficiently elastic, or migrant and native labor are very substitutable, then h < s. The substitution effect will dominate and native workers will be worse off in this case.

Strategic Trade Policy and International Capital Flows

The analysis presented above has emphasized the interests of the capital abundant country in its decision to import the scarce factor, labor. These results do not apply to the decision faced by a labor abundant country with unemployment. Das (1981) has analyzed the case in which the labor abundant country has unemployment and sets a real minimum wage. Recall that in the absence of unemployment, a labor abundant country has an incentive to exercise its market power by taxing capital inflows. However, in the presence of unemployment, it is possible that the optimal policy is a subsidy to capital inflows that will increase employment.

There are many cases when a government could attack an unemployment problem by a policy of attracting foreign capital. Brander and Spencer (1987) compare an optimal tariff and an optimal production tax given the existence of unemployment. They analyze the optimal policy response when a foreign firm is considering whether to supply the home country market from a plant located in the foreign country or from a plant located in the home country. Typically, foreign investment in the home country will be deterred by high production taxes in the home country, but promoted by a high import tariff.

The presence of high tariffs may not stimulate foreign direct investment, however, if the firm believes that once the capital is in place, the government will then replace the import tariff with a production tax. In order to induce foreign direct investment, the government must credibly precommit to a policy which will make foreign direct investment the profit-maximizing choice for the foreign firm.

The firm will prefer foreign direct investment only if it believes that its profits under an optimal production tax will always be greater than under an optimal import tariff. Remarkably, this proves to be the case. The government's motivation for taxing the foreign firm is to extract economic rents earned by the firm. If the firm undertakes foreign

direct investment, taxing the firm will lead to lower firm output and higher unemployment. In contrast, if the foreign firm supplies the market through exports, raising an import tariff leads to no unemployment penalty since production is taking place in the foreign country. Consequently, the optimal production tax is lower than the optimal import tariff and the foreign firm will prefer foreign direct investment. The host government is able to credibly precommit to the production tax because of the unemployment associated with a tax-induced reduction in output.

VI. International Trade and the Acquisition of Human Capital

The factor proportions theory of the determinants of international trade predicts that a country will export the good that uses intensively its relatively abundant factor. For example, the United States is relatively abundantly endowed with human capital, so its export bundle will require more human capital to produce than its import bundle.

To the extent that education contributes to the development of human capital, the forces of international trade can have an effect on the decision to acquire an education. Interestingly, interaction between the trade and education sectors may actually have the effect of widening the education disparity between two trading nations. Trade could cause a decline in the human capital stock of the human capital scarce country, and an increase in the human capital abundant country. If there are social benefits attendant to a high level of education in the population, international trade may be detrimental to the human capital scarce country. Some trade models that incorporate human capital acquisition will be used to illustrate the possibilities.

The Acquisition of Human Capital

Recently, Findlay and Kierzkowski (1983) and Borsook (1987) have worked on the interaction of human capital acquisition[17] and the factor-proportions theory of international trade. Both papers assume that individuals are faced with the choice of earning the wage paid to unskilled labor, or investing in an education that leads to the

higher wage paid to skilled labor. Education is assumed to be produced using physical capital specific to the education sector of the economy. (Education capital used to produce education services should not be confused with the human capital embodied in an educated worker.) The output of the educational sector is increasing in the number of people seeking eduction but the educational production function is subject to diminishing marginal returns. Individuals will seek education if it produces a discounted net present value of earnings that is greater than or equal to the discounted present value of unskilled worker earnings.

This familiar human capital model is imbedded in a standard HOS trade model in which skilled and unskilled labor are used to produce two goods. At each set of relative wages, good 1 is produced with relatively more skilled labor per unit of unskilled labor than good 2. Goods prices are given by the terms of trade on the world market, and wages are determined by the zero-profits condition.

The Heckscher-Ohlin Theorem for such a world becomes, "the country which is abundantly endowed with education capital will export the skill intensive good." An increase in a country's stock of education capital will reduce its marginal product and lower the cost of an education. As additional unskilled workers find it profitable to obtain an education, the number of unskilled workers declines. Both output and exports of the skill intensive good will rise, output of the other good will fall, and imports of the other good will rise.

One important conclusion from this model is that workers in the skill abundant country do not gain from trade, since all gains accrue to the owners of education capital. Prior to the opening of trade, the skill-intensive good is relatively cheap in the education capital abundant country, and the other good is relatively expensive. The opening of trade will relieve the relative scarcity of the good with the lower skill content, and its price will fall.

Application of the Stolper-Samuelson Theorem shows that the wage of unskilled labor must fall and the wage of skilled workers must rise, since the opening to trade

causes a price increase for the skill intensive good in the education capital abundant country. The wage gap will increase the demand for education, which will raise the cost of education, thereby lowering the life-time earnings of skilled workers to the new lower level of unskilled workers. Thus, both skilled and unskilled labor are worse off. However, the increase in the number of people seeking an education will increase the marginal productivity of education capital so that the return to education capital owners will increase. The opposite occurs in the country for which education capital is scarce.

A second and more important conclusion from this model is that trade increases the stock of skilled labor in the education capital abundant country, and lowers the stock of skilled labor in the other country. In other words, international trade depresses the incentive to obtain an education in the skill scarce country. This change in the skilled labor stock accentuates the differences in endowment that existed prior to the opening of trade.

Heterogenous Ability

Findlay and Kierzkowski used the simplifying assumption that all individuals are identical. The introduction of heterogeneous abilities complicates the model but provides a more realistic representation of the process of human capital acquisition. Borsook (1987) introduces heterogeneity by allowing for a continuum of abilities throughout the population. The amount of skill acquired from a given amount of education is assumed to depend on the innate ability of the individual.

The worker at the educational margin will be indifferent between acquiring an education and remaining unskilled. The conditions which determine the educational margin in this model are basically the same as those for the previous case. The difference is that the net earnings of the infra-marginal skilled worker exceed those of the skilled worker at the margin. This follows from the assumption that a dollar's worth of expenditure on education will purchase more skill units for the worker with greater innate ability.

An important implication of this extension is that international trade will not be sufficient to generate the Pareto Optimal level of education for the world as a whole. This can be illustrated by considering two identical countries that face the same prices on the world market. Holding world prices fixed, allow the stock of education capital to increase in one country. The increase in the capital stock must cause the marginal product of education capital to fall, so that the cost of education capital will fall. As a result, some less innately able workers will now find it worthwhile to obtain an education, and the equilibrium return to capital will be lower in this country.

A lower return to education capital in the capital abundant country implies that the marginal worker receiving an education in the education capital abundant country is less innately able than the marginal skilled worker in the capital scarce country. Policy intervention in the education market, therefore, could be Pareto improving from a world point of view. Alternatively, students from the capital scarce country will find it worth their while to attain an education in the education capital abundant country.

A last point to note is that trade leaves the mean skill level of the distribution of skilled workers in the education capital abundant country, higher than in the labor abundant country. While trade equalizes the cost of a skill unit between the two countries, the cost of education capital in the education capital abundant country is lower than in the education capital scarce country. Therefore, net earnings of skilled workers are higher in the education capital abundant country.

VII. Conclusions

The study of market imperfections has been a dominant theme in international economics over the last decade. This area had previously received little attention because the earliest trade theorems made a strong case that border controls were rarely the first best response to market failure. Although it was recognized that import controls could be used to exercise international market power associated with a country's size, international economists generally rejected this as a serious policy option. The optimal tariff was

considered to be a 'beggar thy neighbor' policy that would move the world economy below its production possibility frontier.

The focus on general equilibrium analysis, Pareto optimality, and national interest has lead trade economists to analyze economic issues somewhat differently than labor economists. Trade economists have been willing to sacrifice many details of individual behavior and market function for the "greater" goal of obtaining general equilibrium results. A notable example is the way union behavior is represented in the few trade models that include it at all.

The attention given national advantage can seem abstract and somewhat removed from the human side of real world issues. For example, the trade economists' preoccupation with the exercise of monopsony power when analyzing immigration issues must strike the labor economist as simply bizarre.

When the 'new' international economics is placed in proper perspective, it becomes apparent that many of the conclusions of the 'old' international analysis continue to hold. Deardorff and Stern (1987) argue that the motivation of many of the strategic trade polices is simply the traditional exercise of market power. An obvious example is the taxation of imports from a foreign monopolist. The essential objective of the policy is to lower the price received by the foreign monopolist for its exports.

Another idea recycled by the strategic trade proponents is the notion that market efficiency can be improved by subsidizing the producers in an imperfectly competitive market. The same optimal policy prescription that has never been attractive enough for domestic application becomes more palatable when the competing firm is in a foreign country.

Nevertheless, the new international analysis has clarified the issues involved in various trade policies. It has resulted in a rethinking of our policy of protection for the domestic automobile industry. Previously, auto protection was thought to reduce national welfare, and was justified as temporary support to ease the movement of workers to other

industries. The analysis of Katz and Summers and Dixit makes a serious case for preserving auto industry jobs in order to retain rents inherent in the industry. Auto protection may actually be welfare improving. A similar reclassification applies to some export subsidies.

It remains difficult to conceive of a practical scheme to identify the 'strategic' industries that would benefit from intervention. The ex post identification of successes must be balanced by a host of failures. Moreover, policy games between governments are complex, and analytical solutions for even simple games are difficult to obtain. Computer simulations offer opportunities for utilizing more complicated models, but thus far the models have not proven to be robust. Small changes in model parameters will often shift the optimal policy from a tax to a subsidy. In spite of the lessons of the 'new' international economics, the belief in the optimality of free-trade remains strong among trade economists.

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FOOTNOTES

*The authors have benefitted from the comments of Solomon Polachek, Jeffrey Pliskin, and an anonymous referee on an earlier draft of this paper.

[1]Discussions of the assumptions and qualifications of these theorems are available in standard textbooks such as Chacholiades (1979).

[2]Since it is not possible to mention all the contributors to this area of research, we have attempted a representative selection of the most visible and provocative contributors. Kierzkowski (1984), Helpman (1984), Dixit (1987), and Helpman and Krugman (1985, 1989) provide excellent overviews of imperfect competition, strategic interaction, and international trade theory and policy.

[3]In particular, see Dixit and Stiglitz (1977) and Spence (1976). For a review of strategic industrial organization, see in Tirole (1989).

[4]Examples include Eastman and Stykolt (1967), Economic Council of Canada (1975), and Wonnacott and Wonnacott (1967).

[5]The effects of multilateral free trade on Canada provide a reasonable approximation to the effects of U.S.-Canada bilateral tariff removal because the United States, Canada's largest trade partner, accounts for 80 percent of Canada's trade.

[6]The presence of market imperfections such as wage rigidity or inter-industry factor immobility sometimes serve as a basis for advocates of protectionism. These policies, however, are often ill-advised since they are rarely a first best policy. The best policy for correcting market imperfections which cause loses from international trade usually involves a direct intervention in the affected market rather than at the border.

[7]A Stackelberg leader calculates its profit maximizing level of output incorporating the information that its competitor will behave in a Cournot manner.

[8]This point was noted by an anonymous referee.

[9]Similar results were obtained by Matsuyama (1987).

[10]For examples of models which incorporate an efficient bargaining environment, see Brown and Ashenfelter (1986) or Card (1986).

[11]See also Dickens and Lang (1988).

[12]Schultze (1989) and Topel (1989) express doubts about the ability of the analysis to capture important unobserved differences.

[13]Problems associated with illegal immigration are discussed by Ethier (1986) and Bond and Chen (1987).

[14]For a demonstration of the mutual gains from international factor mobility see Ruffin (1984), though this point was first made by MacDougall (1960).

[15]This case is analogous to the difference between an import quota and a voluntary export restraint in the market for goods.

[16]The wage paid in the enclave is the same as the wage received in Mexico, so enclave labor would not have an incentive to return to Mexico under this scheme.

[17]These papers incorporate views on human capital acquisition similar to those of Mincer (1958), Schultz (1961), and Becker (1962).

REFERENCES

Baldwin, John R., and Paul K. Gorecki. The Role of Scale in Canada/U.S. Productivity Differences in the Manufacturing Sector, 1970-1979. Toronto: University of Toronto Press, 1986.

Becker, Gary S. "Investment in Human Capital: A Theoretical Analysis," Journal of Political Economy, LXX (October, 1962), 9-49.

Bond, Eric W., and Tain-Jy Chen. "The Welfare Effects of Illegal Immigration," Journal of International Economics, XXIII (November, 1987), 315-328.

Borsook, I. "Earnings, Ability and International Trade," Journal of International Economics, XXII (May, 1987), 281-295.

Brander, James A. "Intra-Industry Trade in Identical Commodities," Journal of International Economics, XI (February, 1981), 1-14.

Brander, James A. and Barbara J. Spencer. "Export Subsidies and International Market Share Rivalry," Journal of International Economics, XVIII (February, 1985), 83-100.

Brander, James A. and Barbara J. Spencer. "Tariff Protection and Imperfect Competition." In Henryk Kierzkowski, ed., Monopolistic Competition and International Trade. Oxford: Clarendon Press, 1984, pp. 194-206.

Brander, James A. and Barbara J. Spencer. "Unionized Oligopoly and International Trade Policy," Journal of International Economics, XXIV (May, 1988), 217-235.

Brander, James A. and Barbara J. Spencer. "Foreign Direct Investment with Unemployment and Endogenous Taxes and Tariffs," Journal of International Economics, XXII (May, 1987), 257-279.

Brecher, Richard A. and Ehsan U. Choudhri. "International Migration Versus Foreign Investment in the Presence of Unemployment," Journal of International Economics, XXIII (November, 1987), 329-342.

Brown, James N., and Orley Ashenfelter. "Testing the Efficiency of Employment Contracts," Journal of Political Economy, XCIV (June, 1986), S40-S87.

Calvo, Guillermo, and Stanislaw Wellisz. "International Factor Mobility and National Advantage," Journal of International Economics, XIV (February, 1983), 103-114.

Card, David. "Efficient Contracts with Costly Adjustment: Short-Run Employment Determination for Airline Mechanics," American Economic Review, LXXVI (December, 1986), 1045-1071.

Chacholiades, Miltiades. International Trade Theory and Policy. New York, NY: McGraw-Hill Book Company, 1978.

Das, Satya P. "Effects of Foreign Investment in the Presence of Unemployment," Journal of International Economics, XI (May, 1981), 249-257.

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. 15-72.

Dickens, William T. and Kevin Lang. "Why It Matters What We Trade: A Case for Active Policy." In Laura d'Andrea Tyson, William T. Dickens, and John Zysman, eds., The Dynamics of Trade and Employment. Cambridge, MA: Ballinger Publishing Co., 1988, pp. 87-112.

Dixit, Avinash. "Optimal Trade and Industrial Policies for the US Automobile Industry." In Robert C. Feenstra, ed., Empirical Methods for International Trade. Cambridge MA: MIT Press, 1988, pp. 141-65.

Dixit, Avinash. "Strategic Aspects of Trade Policy." In Truman F. Bewley, ed., Advances in Economic Theory − Fifth World Congress. Cambridge: Cambridge University Press, 1987, pp. 329-362.

Dixit, Avinash and Joseph E. Stiglitz. "Monopolistic Competition and Optimum Product Diversity," American Economic Review, LXVII (June, 1977), 297-308.

Eastman, H.C., and S. Stykolt. The Tariff and Competition in Canada. Toronto: Macmillan, 1967.

Economic Council of Canada. Looking Outward, A New Trade Strategy for Canada. Ottawa: Information Canada, 1975.

Ethier, Wilfred J. "Illegal Immigration: The Host-Country Problem," American Economic Review, LXXVI (March, 1986), 56-71.

Ethier, Wilfred J. "International Trade and Labor Migration," American Economic Review, LXXV (September, 1985), 691-707.

Findlay, Ronald and Henryk Kierzkowski. "International Trade and Human Capital: A Simple General Equilibrium Model," Journal of Political Economy, XCI (December, 1983), 957-978.

Grossman, Gene M. "International Competition and the Unionized Sector," Canadian Journal of Economics, XVII (August, 1984), 541-556.

Harris, Richard. "Applied General Equilibrium Analysis of Small Open Economies with Scale Economies and Imperfect Competition," American Economic Review, LXXIV (December, 1984), 1016-1032.

Helpman, Elhanan. "Increasing Returns, Imperfect Markets, and Trade Theory." In Ronald W. Jones and Peter B. Kenen, eds., Handbook of International Economics, Vol. I. Amsterdam: Elsevier Science Publishers B.V., 1984, pp. 325-365.

Helpman, Elhanan. "International Trade in the Presence of Product Differentiation, Economies of Scale and Monopolistic Competition: A Chamberlin-Heckscher-Ohlin Approach," Journal of International Economics, XI (August, 1981), 305-40.

Helpman, Elhanan and Paul R. Krugman. Market Structure and Foreign Trade. Cambridge, MA: The MIT Press, 1985.

Helpman, Elhanan and Paul R. Krugman. Trade Policy and Market Structure. Cambridge, MA: The MIT Press, 1989.

Hill, John K. "Comparative Statics in General Equilibrium Models with a Unionized Sector," Journal of International Economics, XVI (May, 1984), 345-356.

Jones, Ronald W., Isaias Coelho, and Stephen T. Easton. "The Theory of International Factor Flows: The Basic Model," Journal of International Economics, XX (May, 1986), 313-327.

Katz, Lawrence F. and Lawrence H. Summers. "Industry Rents: Evidence and Implications," Brookings Papers on Economic Activity: Microeconomics, 1989, pp. 209-275.

Kierzkowski, Henryk. Monopolistic Competition and International Trade. Oxford: Clarendon Press, 1984.

Krugman, Paul R. "Increasing Returns, Monopolistic Competition, and International Trade," Journal of International Economics, IX (November, 1979), 469-479.

Krugman, Paul R. "Scale Economies, Product Differentiation and the Pattern of Trade," American Economic Review, LXX (December, 1980), 950-959.

Krugman, Paul R. "Import Protection as Export Promotion." In Henryk Kierzkowski, ed., Monopolistic Competition and International Trade. Oxford: Clarendon Press, 1984, pp. 180-193

Lancaster, Kelvin. Variety, Equity, and Efficiency. New York: Columbia University Press, 1979.

Lancaster, Kelvin. "Intra-Industry Trade under Perfect Monopolistic Competition," Journal of International Economics, X (May, 1980), 151-175.

Lawrence, Colin and Robert Z. Lawrence. "Manufacturing Wage Dispersion: An End Game Interpretation," Brookings Papers on Economic Activity, 1: 1985, pp. 47-106.

MacDougall, George D. A. "The Benefits and Costs of Private Investment from Abroad: A Theoretical Approach," Economic Record, XXXVI (March, 1960), 13-35.

Markusen, James R. "Trade and Gains from Trade with Imperfect Competition," Journal of International Economics, XI (November, 1981), 531-551.

Matsuyama, Kiminori. "Export Subsidies as an Outcome of Management-Labor Conspiracy," Discussion paper, Department of Economics, Northwestern University, 1987.

Mincer, Jacob. "Investment in Human Capital and Personal Income Distribution," Journal of Political Economy, LXVI (August, 1958), 281-302.

Ramaswami, V. K. "International Factor Movement and the National Advantage," Economica, XXXV (August, 1968), 309-310.

Ruffin, Roy J. "International Factor Movements." In Ronald W. Jones and Peter B. Kenen, eds., Handbook of International Economics, Vol. I. Amsterdam: Elsevier Science Publishers B. V., 1984, pp. 255-256.

Schultz, Theodore W. "Investment in Human Capital," American Economic Review, LI (March, 1961), 1-17.

Schultze, Charles L. "Comment on Industry Rents: Evidence and Implications," Brookings Papers on Economic Activity: Microeconomics, 1989, pp. 280-283.

Spence, Michael E. "Product Selection, Fixed Costs, and Monopolistic Competition," Review of Economic Studies, XLIII (June, 1976), 217-236.

Staiger, Robert W. "Organized Labor and the Scope of International Specialization," Journal of Political Economy, XCVI (October, 1988), 1022-1047.

Tirole, Jean. The Theory of Industrial Organization. Cambridge, MA: The MIT Press, 1989.

Topel, Robert H. "Comment on Industry Rents: Evidence and Implications," Brookings Papers on Economic Activity: Microeconomics, 1989, pp. 283-288.

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

Wonnacott, Ronald J. Canada's Trade Options. Ottawa: Information Canada, 1975.

Wonnacott, Ronald J. and Paul Wonnacott. Free Trade Between the United States and Canada. Cambridge: Harvard University Press, 1967.
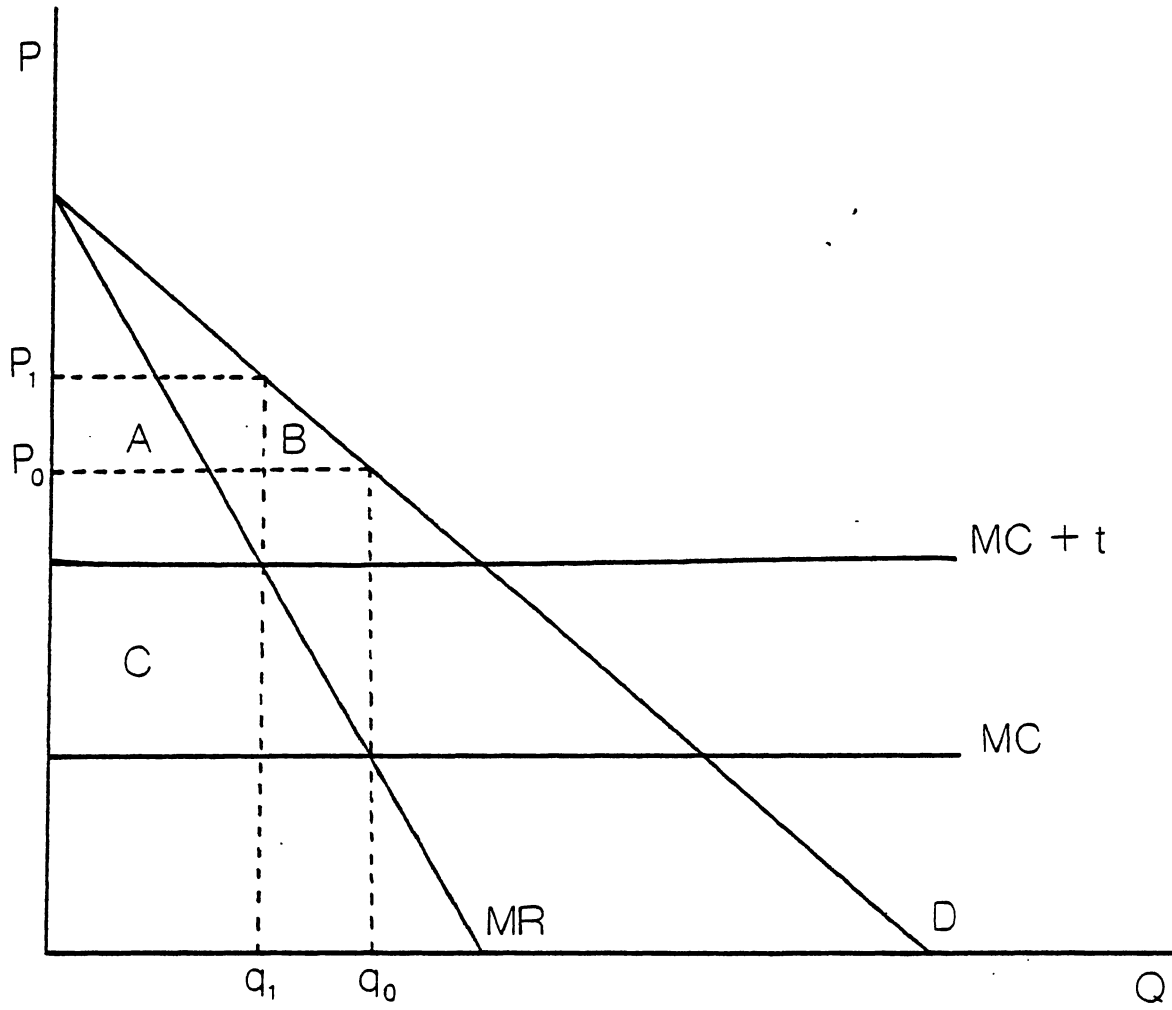
Figure 1