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TRADE CREATION AND TRADE DIVERSION IN THE ENLARGED EEC AND EFTA

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Bettina Cecilia McConnell

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Mordechai Kreinin
Major professor

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By

Bettina Cecilia McConnell

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ABSTRACT

TRADE CREATION AND TRADE DIVERSION IN THE ENLARGED EEC AND EFTA

By

Bettina Cecilia McConnell

Whenever two or more countries join together to form a free trade area or a customs union, the question arises--has world efficiency improved? This thesis examines this question in detail with respect to the enlarged integrated area of Western Europe. The enlarged area was formed by combining the European Economic Community (EEC) and the European Free Trade Association (EFTA).

To study the static effects of economic integration on world efficiency, trade creation and trade diversion are defined. Then, trade creation and trade diversion are estimated for manufactured commodity imports for the two importing countries, the EEC and EFTA (which formed the enlarged integrated area in manufactured commodities only). Because none of the estimation methods are without bias, six methods were selected to bind the trade creation and trade diversion estimates between upper and lower bounds. These methods include four import growth approaches--control group and domestic import growth approaches--and two regression approaches. They were chosen because the necessary data

were available, the estimates are comparable across approaches and each approach normalizes the trade creation and trade diversion estimates.

To estimate trade creation and trade diversion, imports are divided into ten manufactured commodity groups: textiles, clothing, paper products, rubber products, chemicals, petroleum products, non-metallic minerals, basic metals, transportation equipment and engineering products. For each estimation approach, the trade creation and trade diversion effects in each commodity group are estimated separately for the EEC and EFTA; then, the results are summed by commodity group. The results of each estimation approach demonstrate that trade creation exceeds trade diversion. Thus, economic integration has led to a more efficient allocation of world economic resources; but, this does not occur without trade diversion costs to the non-partner countries.

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INTRODUCTION

On January 1, 1972 the process to enlarge the economically integrated area of Western Europe by combining the European Economic Community (EEC) and the European Free Trade Association (EFTA) as a free trade area in manufactured commodities began. On July 1, 1977 the transition ended.

To what extent did this enlarged free trade area result in trade creation and trade diversion? This thesis uses six approaches to estimate trade creation and trade diversion which resulted from enlarging the economically integrated area of Western Europe and to bind these estimates between upper and lower bounds.

Jacob Viner introduced the concepts of trade creation and trade diversion. The static welfare gain which is caused by substituting partner country imports for domestic production and which leads to more efficient resource allocation is trade creation. Trade diversion is the static welfare loss resulting from the substitution of partner imports for imports from the non-partner. This causes resources to be allocated less efficiently. Chapter 1 discusses Viner's model and its critics, who emphasize consumption and production effects of economic integration--effects omitted by Viner. A partial

equilibrium model is then used to show the trade creation and trade diversion effects of economic integration. Then, a general equilibrium model shows how the Theory of Second Best can be applied to the economic integration issue.

Beginning with the European Coal and Steel Community of the 1950's, regional economic integration has become increasingly prevalent as evidenced by such examples as the EEC, EFTA, the Central American Common Market (CACM) and the Latin American Free Trade Area (LAFTA). Economic integration may be motivated by economic considerations--to allocate resources more efficiently, to improve competition or to enjoy economies of both large scale production and also distribution among the integrating countries. On the other hand, it may be motivated by economic and political considerations and be seen as the first step towards complete economic, political and military integration among countries. Whatever the motivation, trade creation and trade diversion will occur.

A variety of estimation techniques can be used to determine the trade creation and trade diversion resulting from economic integration. Ex-ante estimates are made before integration takes place to determine the expected trade creation and trade diversion of a proposed integration plan. Alternatively, ex-post estimates are made after the transition process is completed. Chapter 2 presents a review of these approaches and of the empirical estimates which have been made.

To estimate the trade creation and trade diversion of enlarging the integrated area in Western Europe, six estimation approaches are used. These six approaches have been selected because the necessary data are available, the estimates are comparable and a hypothetical growth trend--expected if economic integration had not occurred--is incorporated in each estimate. The enlarged integrated area is divided into two countries, the original EEC and the original EFTA. Because the EEC and EFTA have formed a free trade area for trade in manufactured commodity imports, to estimate trade creation and trade diversion, manufactured commodity imports are divided into ten commodity groups. (The commodity groups and the SITC components of each group are given in Appendix A.) Chapter 3 discusses the six estimation approaches.

The empirical results appear in Chapters 4 and 5. The trade creation and trade diversion estimates determined by projecting an expected import growth rate are offered in Chapter 4. Chapter 5 contains the regression estimates of trade creation and trade diversion. A summary of the results and the size of the estimates relative to total trade appear in Chapter 6.

CHAPTER 1

A REVIEW OF THE THEORETICAL LITERATURE: THE WELFARE EFFECTS OF REGIONAL ECONOMIC INTEGRATION

1.1 Introduction: Economic Integration

Economic integration occurs when two or more countries agree to eliminate all trade barriers among themselves while maintaining trade restrictions on imports from other countries. Integration can take the form of either a free trade area or a customs union. In a free trade area, partner countries agree to eliminate trade restrictions on imports from each other, while each partner retains its independent national policy over imports from all non-partner countries. A customs union's partners agree not only to eliminate trade restrictions on imports from each other, but also to levy a common external tariff (CET) on imports from all non-partner countries. (Often the CET is some average of the partner countries' tariffs; therefore, it is not necessarily equal to the pre-integration tariff of any one partner country.) Following integration, imports from partner countries are often referred to as "internal imports" and imports from non-partners, "external imports."

1.2 Welfare Effects of Economic Integration: Trade Creation and Trade Diversion

Analysis of welfare changes due to economic integration rests on the following assumptions: a)no country is a large enough buyer or seller of a commodity to influence its price on the world market; b)price equals marginal cost; c)there is full employment of all economic resources at all times; d)exchange rates are fixed; e)each country maintains domestic economic stability; f)all tariff revenues are returned to consumers; g)there are no externalities; h)tariffs on imports are the only trade restrictions; and, i)there are no transportation costs. Given these assumptions, welfare changes due to economic integration are divided into static and dynamic welfare effects.

The dominant static welfare effects are trade creation and trade diversion, lost government revenues, and the terms of trade effect. This thesis concentrates on the trade creation and trade diversion effects of economic integration. An explicit account of the government revenue and terms of trade effects will be disregarded. The dynamic effects are changes in the rate of growth of gross national income and output and changes in relative factor endowments. The dynamic effects are realized in the long-run and are a result of changes in factor endowment and/or technology. Change in relative factor endowment results from a change in relative factor prices; however, there is no way to account for this dynamic effect of economic integration.

The static effects are once-and-for-all changes in output--changes in resource allocation which result from changes in relative output prices, with technology, plant size and the capital stock of each country held constant. After economic integration, the price of domestic output relative to the price of imports from partner countries and the price of imports from partner countries relative to the price of imports from non-partner countries change. Imports from partner countries, no longer subject to tariffs, become less expensive relative to domestically produced output and relative to imports from non-partner countries. In response to relative price changes, the static effects of economic integration occur immediately as desired changes in imports. These static effects can only be measured over time when resources are reallocated to accomodate the desired changes. In this way, empirical estimates of the static welfare effects will always include some of the dynamic effects of integration.[1]

Viner's Approach to Static Welfare Effects

Jacob Viner identified two of the static welfare effects of economic integration, trade creation and trade diversion.[2] Trade creation, the static welfare gain of economic integration, results from substitution of partner country imports for domestic output as the tariff declines to zero. It is favorable because it causes a more efficient allocation of resources. Trade diversion, the static welfare

loss, results from substitution of partner country imports for imports from the non-partner country as the tariff declines to zero. It is unfavorable because it causes a less efficient allocation of economic resources.

In addition to the assumptions stated above, Viner's analysis assumes a Ricardian constant cost model with demand for all commodities perfectly price inelastic and production of a single commodity Q such that domestic output of Q and imports of Q are homogeneous. Given these assumptions, demand for Q is satisfied by either domestic production or imports. A commodity is produced domestically or is imported, depending only on relative prices: the lowest priced producer supplies the entire domestic market. The price of domestically produced output is the resource cost of producing that output. The price of imports is the resource cost of production plus the tariff.

Before economic integration, domestic producers satisfy demand if the price of producing the commodity domestically is less than the price of importing it and paying the exporting country's production cost plus the tariff. This may result in a misallocation of resources if the exporting country is a lower resource cost producer. If the commodity is imported, the decision to purchase imports from Country B or Country C is determined by relative prices. Before economic integration, when imports from Countries B and C are subject to the same ad valorem tariff, the lowest resource cost producer supplies the domestic Country A.

After economic integration, the price of imports from the partner country falls relative to the price of domestic output and relative to the price of imports from the non-partner. In the domestic country, there is substitution away from domestic output and towards imports from the partner country (trade creation) or substitution away from imports from the non-partner country and towards imports from the partner country (trade diversion).

To illustrate Viner's concept of trade creation and trade diversion, let Q be a (homogeneous) commodity produced in Countries A, B, and C. Assume that Country A is the highest cost producer of Q, Country B is the lowest cost producer, and Country C is the intermediate cost producer. Prior to economic integration, Countries B and C are subject to the same ad valorem tariff when Q is imported by Country A. Because the tariff increases the price of Q imported by Country A above the domestic production cost, domestic producers supply the market and imports are excluded. When Countries A and B form a free trade area or a customs union, the tariffs on imports into Country A from Country B are eliminated, and vice versa. Q is produced at a lower resource cost in Country B relative to the cost of Country A producing Q domestically. Therefore, eliminating the tariff lowers the price of Q in Country A; consumers substitute away from Q produced domestically and towards the commodity Q produced by, and imported from, Country B. Trade creation occurs as producers in B increase production of Q, and,

producers in A reduce its production. Trade creation is complete when the partner completely replaces the domestic producer. Given the perfectly price inelastic demand, there is no change in the total quantity of Q consumed. The volume of imports increases, and, world resources are allocated more efficiently.

Alternatively, assume that Country B is the intermediate cost producer and Country C is the lowest cost producer of Q. Therefore, if the cost of producing Q domestically is greater than the price of importing Q from Country C, and, if Countries B and C are subject to the same ad valorem tariff on Q imposed by Country A, then Country C will supply Q to Country A. Economic integration between Countries A and B reduces the price of Q imported from Country B below the price of Q imported from Country C (the most efficient producer, who is still subject to the tariff restriction). Consumers substitute Q produced by the partner country B, for Q produced by Country C. Resources are allocated less efficiently. Trade diversion occurs--the static cost of economic integration. Given the constant cost assumption, trade diversion is complete when imports are reallocated away from the non-partner country and toward the partner country.

According to this analysis, economic integration is either trade-creating or trade-diverting. If the value of trade created exceeds that of trade diverted, then economic integration is trade-creating or welfare-increasing. If the

opposite is true, economic integration is trade-diverting or welfare-decreasing. The welfare gain (loss) results from changes in economic efficiency as resources are reallocated away from less (more) efficient producers to more (less) efficient producers.

Viner's critics argue that his restrictive assumptions must cause trade-diverting economic integration to be welfare-decreasing.[3] If either the assumption of fixed proportions in consumption, fixed production and consumption coefficients, or a fixed volume of imports is relaxed, then trade-diverting economic integration may be welfare-increasing because such integration can have consumption and production effects. An expanded definition of trade diversion recognizes these consumption and production effects.

The Consumption and Production Effects of Economic Integration

The consumption effects.[4] A general equilibrium model with three countries, two commodities and a linear transformation function, can be used to demonstrate that a trade-diverting integrated area may be welfare-increasing. This result depends on the relative strengths of two opposing consumption effects. The first consumption effect--inter-country substitution--occurs as Country A substitutes imports from partner Country B--the higher resource cost producer--for imports from the non-partner Country C--the lower resource cost producer. This is the welfare-decreasing, trade diversion, effect. The second consumption effect--

inter-commodity substitution--occurs because economic integration eliminates the disparity between the domestic and international price ratios on all commodities traded among the partner countries. When this occurs, consumers in Country A substitute between commodities, i.e., they substitute a relatively lower priced commodity from Country B for a different but higher priced commodity of Country A. Viner's distinction between trade creation and trade diversion is less satisfactory when such inter-commodity substitution is considered. Richard Lipsey summarizes this distinction as follows:

> A more satisfactory distinction is one between inter-country substitution and inter-commodity substitution. Inter-country substitution would be Viner's trade creation and trade diversion, when one country is substituted for another as the source of supply for some commodity. Inter-commodity substitution occurs when one commodity is substituted, at least at the margin, for some other commodity as a result of a relative price shift.[5]

If inter-country substitution is negative, representing a trade-diverting integrated area according to Viner's definition, welfare can increase provided gains from inter-commodity substitution between the partner countries exceed losses from inter-country substitution.

The production effect.[6] The preceding analysis examines the role substitution in consumption plays in increasing welfare in a trade-diverting integrated area, but, it is an incomplete analysis because welfare gains possible with variable production coefficients are insufficient to cause a trade-diverting integrated area to reduce welfare

if there is substitution among production methods and if the volume of imports is not constant. Variable production coefficients and fixed consumption proportions accompanied by a change in the volume of imports may result in a trade-diverting integrated area being welfare-increasing.

Trade-diverting economic integration has three effects. First, trade diversion causes a terms of trade loss for the domestic country as imports are reallocated from the lower resource cost non-partner country to a higher resource cost partner country. Second, as the price ratio in the domestic country moves towards the international price ratio, domestic consumption changes. This increases welfare in the domestic country. Third, given the price changes, Country A's domestic industries reallocate resources from the production of Country B's exports to the production of their own, more efficiently produced, exports. Now, if the consumption coefficients are fixed and, therefore, the consumption effect is zero, then a trade-diverting integrated area can be welfare-increasing provided the production gain is positive and larger than the terms of trade loss. The only sufficient conditions for a trade-diverting integrated area to be welfare-decreasing is that consumption and production coefficients be fixed or that the volume of imports before and after integration be unchanged.[7]

Harry Johnson argues that relaxing Viner's strict assumptions and incorporating consumption and production effects into the definition of trade diversion renders

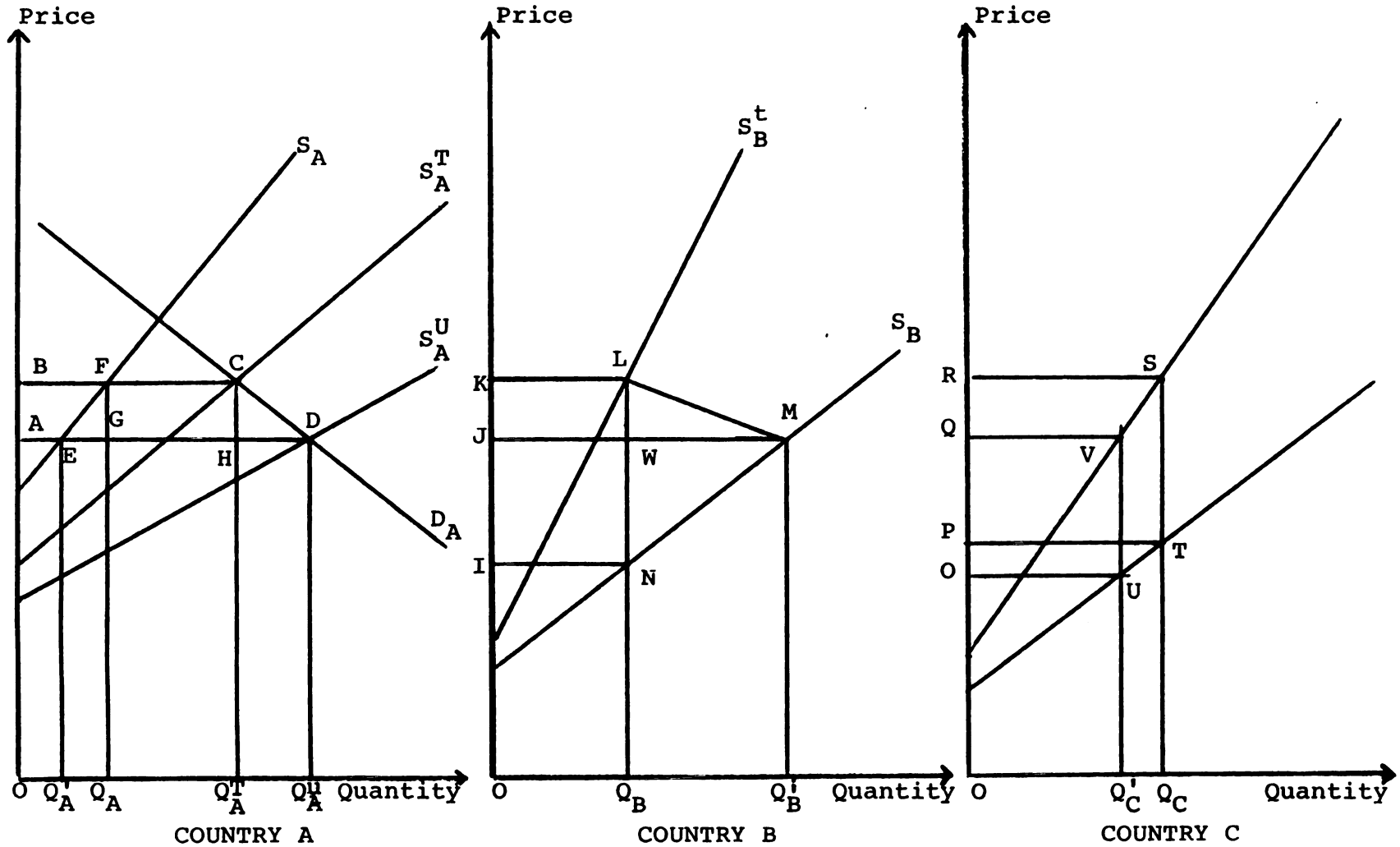
Viner's concept of trade diversion meaningless because increases in the volume of imports are included in these definitions of trade diversion.[8] Johnson argues that it is more in keeping with Viner's intent to define trade diversion as the "diverting of initially existing trade" i.e., not allowing for a change in the volume of trade, and "trade creation as involving additional trade even if it is new trade in an existing product whose source is switched as a result of the customs union" or free trade area.[9] In this case, an excess of trade diversion over trade creation will always cause welfare-decreasing integration and an excess of trade creation over trade diversion will result in a welfare-increasing integrated area.

In sum, whether an integrated area is trade-creating or trade-diverting is indeterminate a priori; empirical analysis is required.

1.3 Partial Equilibrium Model of Trade Creation and Trade Diversion

Figure 1-1, reproduced from Mordechai E. Kreinin, International Economics: A Policy Approach, is a static, partial equilibrium model of the trade creation and trade diversion that occur with economic integration.[10] It is a one commodity, three country model. Q represents the output in an increasing cost industry and has a demand elasticity greater than zero in absolute value. A, B, and C represent three different countries (or three different groups of countries). D_A is the demand for Q in Country A,

FIGURE 1-1.--Trade Creation and Trade Diversion: A Partial Equilibrium Model



the domestic country; S_A, S_B, and S_C are the supply curves for Q in A, B, and C (each also represents the marginal cost of producing Q). Notice that C is the lowest resource cost producer of Q and that A is the highest resource cost producer. S_A^T is the sum of S_A, S_B^t, and S_C^t. S_C^t and S_B^t are the relevant supply curves when A imposes an ad valorem tariff on imports of Q from B and C. After A and B form the integrated area, the relevant supply curve in Country A is S_A^U, the sum of S_A, S_B, and S_C^t.

Prior to integration, total consumption in A is OQ_A^T at price OB, of which OQ_A is supplied by A, and OQ_B is supplied by B and OQ_C is supplied by C. Tariff revenues to A are (IKLN) collected on B's imports and (PRST) collected on C's imports into A. After A and B form the integrated area, the resulting changes in production, consumption and tariff revenues generate welfare changes. S_A^U becomes the supply curve in A. Price falls to OA. This causes consumption in A to increase to OQ_A^U. The price reduction also causes production effects in A, B, and C. Given the lower price, domestic production is reduced to OQ_A' and C reduces production to OQ_C'. Output in B expands to OQ_B' to accomodate the increased quantity demanded in A and reduced production in both A and C. Thus, in A, production and consumption effects operate to increase A's imports from B (trade creation) and to reduce A's imports from C (trade diversion). Total tariff revenues are reduced from [(IKLN) + (PRST)] to (OQVU). Economic integration leads to welfare gains of:

Increased consumer surplus in A (ABCD)

Increased producer surplus in B (IJMN)

The welfare losses are:

Decreased producer surplus in A (ABFE)

Decreased producer surplus in C (OPTU)

Net revenue loss to A (OQVU)-[(IKLN)+(PRST)]

The change in consumer and producer surpluses in A leaves a net gain of (EFCD) in A before accounting for the revenue loss. This gain is equivalent in area to [(JKLM) + (QRSV)], of which (JKLW) and (QRSV) are revenue losses; this leaves a net gain of (LMN) to be valued against the net welfare loss of (VSTU). The value of the welfare gain, (LMN), represents trade creation. The welfare loss, (VSTU), is trade diversion. The sum of the welfare gain and loss represents the net effect of economic integration. A priori it cannot be determined whether the gain exceeds the loss or vice versa. Empirical estimates are necessary to determine the trade creation and trade diverison effects of economic integration, and therefore, whether economic integration yields a net welfare gain.

This analysis not only demonstrates that a priori the net welfare change is indeterminate, but it also shows the importance of relative price elasticities, ceteris paribus. The more price elastic is domestic demand, D_A, the more responsive are domestic consumers to price changes; therefore, the consumption component of trade creation (LWM) is relatively larger. The more price inelastic is the domestic

supply, S_A, the less responsive are domestic producers to changes in relative prices; therefore, the reduction in high cost domestic production is relatively smaller with economic integration. The more price elastic is partner supply, S_B, the more responsive are these producers to relative price changes and the producer surplus component of trade creation (WMN) is relatively larger. Also, the more price elastic is the non-partner supply, S_C, the greater is the response to relative price changes and the reduction in output is larger; therefore, the trade diversion component (UVST) of welfare is larger too.

The above analysis is applicable for all output Q when a free trade area is formed and for any output Q when the customs union adopts partner Country A's tariff. Otherwise, when a customs union partner adjusts to the CET, S_C^t shifts. If A must increase its tariff on imports of Q from C, S_C^t shifts back, and ceteris paribus, trade diversion (VSTU) increases, which increases the relative loss due to economic integration. If A reduces its tariff on output from C, S_C^t shifts down, and ceteris paribus, trade diversion (VSTU) diminishes in size, and therefore, increases the relative gain or decreases the relative loss due to economic integration.

1.4 General Equilibrium and the Theory of Second Best[11]

The a priori indeterminate welfare results of economic integration can be explained in a general

equilibrium framework according to the Theory of Second Best. The general equilibrium model is a three country, A, B, C, two commodity, X, Y, model which uses community indifference curves of the domestic country A to demonstrate welfare changes with economic integration. It is assumed that all tariff revenues are returned to consumers.

Figure 1-2 shows the welfare effect of economic integration between A and B in Country A. PP is the product transformation curve in A for commodities X and Y. CC is the free-trade price ratio available for trade with Country C. BB is the free-trade price ratio available for trade with Country B. Before economic integration, given that B and C are subject to the same tariff on X, A will trade with the lowest cost producer of X, Country C. Producers and consumers in A make decisions based on tariff inclusive price ratios TT and T'T', respectively. Country A produces at P_0 and consumes on indifference curve I_0I_0 at W_0. (W_0 is on CC because A must trade its exportable commodity Y for X at the price ratio determined by CC, but consumers in A make decisions based on the domestic price ratio T'T', parallel to TT.)

After the preferential tariff reduction between A and B, A will trade with B along BB. Economic integration reduces the price of X from B, along BB, below the price of X from C, along TT. Given the new price ratio, A achieves a new equilibrium with production at P_1 and consumption, W_1. W_1 is on a new and higher indifference curve I_1I_1, beyond the

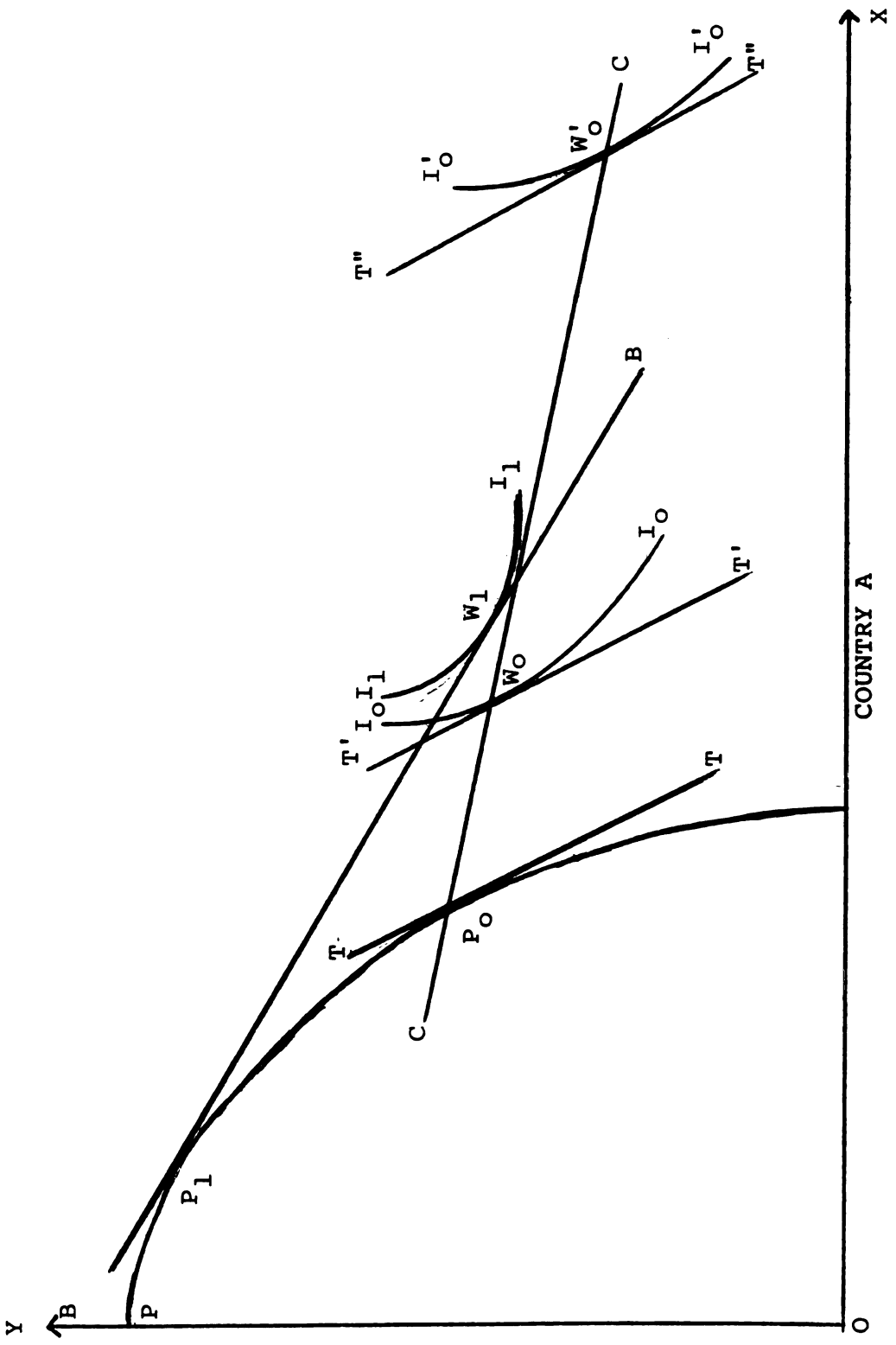


FIGURE 1-2.--Welfare Effects in a General Equilibrium Model

former trade boundary given by CC. W_1 is superior to W_0; welfare has improved with economic integration.

This result is not a necessary conclusion of economic integration. If the initial consumption equilibrium was W_0', a level on CC not attainable on BB, then, economic integration could reduce welfare, I_1I_1 $I_0'I_0'$. This demonstrates that eliminating one market imperfection (the tariff on imports of X from B) while retaining another imperfection (the tariff on imports of X from C), will not necessarily increase A's welfare. In fact, economic welfare may even be reduced. This is an example of the Theory of Second Best.

The General Theory of Second Best can be summarized as follows: given the constraints of the Pareto optimum problem (fixed resources, fixed technology, fixed tastes and preferences) and given the existence of additional constraints (tariffs on imports from B and C), if any one of the additional constraints were relaxed, welfare would not necessarily increase by moving to the now attainable Pareto optimum. A priori the change in welfare is unknown.

A customs union which eliminates the tariff on A's imports of X from B while it retains the tariff on A's imports of X from C will not necessarily result in a welfare maximum or improved welfare at P_1 and W_1, the new Pareto optimum. Under certain conditions (if consumption were initially at W_0'), deviating from the now attainable Pareto optimum (P_1 and W_1) may result in a higher level of welfare

(W_0'). This is the result of two opposing consumption effects. Economic integration increases trade between A and B which increases welfare. Simultaneously, the already restricted trade between A and C is reduced; this reduces welfare. A priori the net welfare effect is indeterminate.

1.5 Rationale for Economic Integration

The analysis given in Sections 1.3 and 1.4 is an incomplete presentation of the static welfare effects of economic integration. It begins with the assumption that economic integration will occur, and then discusses the static welfare gains and losses due to increased consumption and production efficiencies. This analysis, however, omits discussion of the possible economic rationale for forming an integrated area--whether there is any economic rationale for forming an integrated area if the opportunity for a unilateral tariff reduction exists. In fact, if a country really favors free trade, it should be willing to eliminate all trade barriers instead of following a preferential tariff reduction policy. This is the argument pursued in the unilateral tariff reduction literature which demonstrates its superiority over preferential tariff reductions.[12]

The assumptions of this literature are a)the domestic country, Country A, is unable to influence its terms of trade, while the partner and non-partner countries dominate trade; b)changes in world welfare depend on welfare changes in the integrated area only; c)there are no

transportation costs between C and the partner countries; and, d)C does not impose tariffs on imports from A or B. The unilateral tariff reduction literature was originally formulated as a partial equilibrium model but has been expanded to a general equilibrium model.

Partial Equilibrium Analysis

C. Cooper and B. Massell present a partial equilibrium model which compares the welfare changes of a unilateral tariff reduction policy to those of a preferential tariff reduction policy.[13] The consumption and production effects increase welfare under both policy approaches due to the reduction in the relative price of imports. Country A's consumption of imports increases. The effects are greater with a unilateral tariff reduction policy because relative prices of imports from Countries B and C are not distorted. This means that a unilateral tariff reduction policy generates only a trade-creating effect due to the tariff reduction. The preferential tariff reduction policy causes trade diversion in addition to trade creation. This leads to the conclusion that an appropriate unilateral tariff reduction policy does not result in a misallocation of resources and is preferred to a preferential tariff reduction policy if the goal is to allocate resources more efficiently. The conclusion of the unilateral tariff reduction literature is that, based on efficient resource allocation, there is no economic rationale for economic integration, given the trade

diversion component, and therefore, economic integration must occur for non-economic reasons. Harry Johnson argues that it is the trade diversion component which causes a preferential tariff reduction to be preferred to a unilateral tariff reduction. When trade diversion occurs, Country A increases imports from Country B without any production losses of its own, and, when trade diversion possibilities are exhausted, preferential tariff reductions ensure Country B the entire increase in Country A's imports.[15] (Country B's exports would increase less with a unilateral tariff reduction of Country A.[16])

A second argument against the tariff reduction literature is that the assumptions bias the results.[17] The analysis neglects the role of exports and does not consider existing tariff and transportation costs when A exports to, or imports from, the non-partner country C, which, in the unilateral tariff reduction literature analysis is assumed to fix the terms of trade.

General Equilibrium Analysis

The argument that a unilateral tariff reduction policy is preferable to a preferential tariff reduction policy can be presented in a general equilibrium framework using a three commodity, three country model and a non-linear transformation function.[18] Countries A and B, seeking to maximize joint welfare, form a customs union with Country C representing the non-partner countries. The model assumes that A is unable to affect its terms of trade

which are fixed and determined by C. C has no transportation costs nor does C levy a tariff on imports from A or B. A imports only one commodity from B. After economic integration, the prices in A for the three commodities remain unchanged although prices in B change, and, there are no gains from economies of scale or changes in the terms of trade. The conclusion is that a preferential tariff reduction policy does not generate benefits greater than those of a unilateral tariff reduction policy.

When changes in the tariff are large (as is true with the formation of a customs union or a free trade area), even if B must compensate A for all of its losses due to reduced tariff revenues (a result characteristic of the unilateral tariff reduction literature due to the assumptions), B could gain at least as much be pursuing an independent tariff reduction policy. A will be neither better nor worse off under this policy. The problem with a customs union or free trade area is that it eliminates tariffs on intra-area trade only. This will not necessarily improve welfare. For Country B, acting independently, eliminating all tariffs will maximize welfare. Once intra-area tariffs are eliminated, the integrated area can act as a single country and should establish an optimum tariff on all non-partner imports. Of course, this assumes passive behavior by all non-partner countries.

This general equilibrium result is biased. The model neglects the role of non-partner country tariffs,

transportation costs, terms of trade changes and the importance of the size of the non-partner relative to the integrated area. These assumptions of the model preclude any mutually beneficial trade between members of the integrated area. If these assumptions are relaxed, then trade between any two partner countries is more attractive and will result in increased welfare as the partner countries offer each other the ability to save--save the tariff revenues that would have been paid to Country C for its exports and save the transportation cost that would have been paid on Country C's exports.[19] Trade between a partner and non-partner country becomes less attractive and less likely to increase welfare as much as the unilateral tariff reduction models predict once the assumptions are relaxed, and, the savings possibilities are considered.

The role of exports and terms of trade changes in a preferential tariff reduction model can be demonstrated in the following general equilibrium framework: let Countries A and B form an integrated trading area while Country C represents the non-partner country. Commodities are divided into commodity aggregates where ". . . any set of commodities the price of which changes as a distinct group must be regarded as a separate commodity aggregate."[20] The commodity aggregates are X_1 produced in A and exported to B and C; X_2 produced in A and after integration exported only to B; Y_1 produced in B and exported to A and C; Y_2 produced in B and after integration exported only to A; and Z produced in C and exported to A and B.

Economic integration causes production and consumption effects which lead to a reallocation of resources in Country A. The production effect occurs when A responds to changes in relative prices by reallocating resources from the production of the importable commodity aggregates to the production of exportable commodity aggregates. The consumption effect is analogous to the production effect and includes the inter-commodity substitution. Consumers substitute relatively inexpensive importables for exportables. Substitution also occurs among the importable commodity aggregates and exportable commodity aggregates; resources are allocated more efficiently. Because all commodity aggregates are exportables to one of the three countries, the terms of trade effect for any member of the integrated area occurs as import diversion--the partner country reallocates its exportables (Y_2) completely away from the non-partner country and towards the domestic country which improves the terms of trade for member countries.

In addition to ignoring the effects of exports and terms of trade changes, the unilateral tariff reduction literature assumes that the non-partner is large relative to the partner countries. Relaxing these assumptions means that an integrated area can achieve welfare gains not possible with a unilateral tariff reduction policy. When the non-partner is small and therefore cannot set prices for the partner countries, the non-partner no longer

dominates trade. With a preferential tariff reduction policy, the partners can now realize welfare gains due to increased intra-area trade. Trade creation and a more optimal allocation of resources result. The welfare gains are due to increased efficiency as resources are reallocated. In fact, these are the welfare gains initially proposed by Viner.[21]

1.6 Dynamic Effects of Economic Integration

The dyanmic effects of economic integration are realized in the long-run as changes in the level of employment, the rate of growth of gross national income and output, and changes in relative factor endowments. These changes are attendant upon the increased market size due to economic integration. They are caused by a change in the allocation of resources which leads to changes in production and an outward shift of the product transformation curve. The dynamic welfare effects can increase, reduce, or reverse the static welfare effects of economic integration. The dynamic benefits and costs are observed as changes in income, the realization of economies of large scale production, increased competition and changes in the pattern of investment expenditures.

A direct dynamic benefit realized by member countries as a result of economic integration is increased income. This occurs as the increased intra-area demand for exports increases the demand for productive factor inputs which increases remuneration to these factors and increases

income. Non-partner countries benefit indirectly from the increased income in the integrated area because the increased income leads to an increase in the quantity of total imports demanded from both partner and non-partner countries. This also increases income in non-partner countries. However, there is the contractionary impact of trade diversion on incomes of non-partner countries.[22]

Economies of large scale production is a second dynamic welfare benefit realized in response to the increased demand for output by the integrated area. This results from the use of new technologies, standardization of output and longer production runs. Proponents argue that these advantages are not attainable prior to integration because the market area is too small. Expanding the size of the market allows each firm in the industry to produce a larger quantity of output at a lower per unit cost. The counter argument is that each domestic country of the integrated area is a sufficiently large market area to realize the economies of large scale production prior to economic integration. Economic integration may not result in increased economies of scale.

A third dynamic welfare benefit attributable to economic integration is increased competition among partner country firms. The larger market area should be able to support a larger number of competing and efficiently operating firms in each industry than could any individual country prior to integration. The problem is that firms

must be able and willing to infringe on another's market area. If the willingness is not present (say, because of fears of retaliation or because of collusive practices), then this effect will remain unexploited.[23]

The fourth dynamic effect is increased investment. There are two dynamic gains attributable to reallocation of investment funds. First, domestic industries will no longer need to invest in partner countries to avoid tariffs; investment can occur in the most profitable and efficient partner country. Second, economic integration reduces the risk and uncertainty of foreign investments. Investments in a foreign country, who is now a partner, are made with reduced risk that changes in commercial policy will render an unprofitable return on the investment. There is an investment cost of economic integration. Diverting investment funds from a relatively more efficient non-partner country to a relatively less efficient partner country (or, in a free trade area, diverting funds from a higher tariff, efficient partner country into a lower tariff but inefficient partner country) results in a misallocation of investment funds, a dynamic cost of economic integration. The net effect of economic integration on the reallocation of investment funds cannot be determined until the costs and benefits are estimated.

1.7 Conclusion

Economic integration results in static and dynamic welfare gains and losses. A priori the net effect of the static or dynamic welfare changes due to economic integration is indeterminate. Empirical analysis is necessary to determine the effect of economic integration. The following chapter surveys the empirical literature and discusses welfare estimation techniques which can be used to estimate the static effects of economic integration on world efficiency.

NOTES--CHAPTER 1

[1]EFTA Secretariat, "The Trade Effects of EFTA and the EEC 1959-1967," (Geneva, 1967), p. 3.

[2]J. Viner, The Customs Union Issue, (New York: Carnegie Endowment for International Peace, 1950), p. 154.

[3]J. Bhagwati, "Trade Diverting Customs Unions and Welfare Improvement: A Clarification," Economic Journal 81 (September 1971): 508-87; J. Bhagwati, "Trade Diverting Customs Unions and Welfare Implications: A Reply," Economic Journal 83 (September 1973): 895-97; F. Geherls, "Customs Union from a Single Country Viewpoint," Review of Economic Studies 24 (1956-57): 61-4; A. Kirman, "Trade Diverting Customs Unions and Welfare Improvement: A Comment," Economic Journal 83 (September 1973): 890-94; M. Krause, "Recent Developments in Customs Union Theory: An Interpretive Survey," Journal of Economic Literature 10 (June 1972): 413-36; R. Lipsey, "The Theory of Customs Unions: Trade Diversion and Welfare," Econometrica 24 (February 1957): 40-6; R. Lipsey, "The Theory of Customs Unions: A General Survey," Economic Journal 70 (September 1960): 496-513.

[4]Geherls, "Customs Union from a Single Country Viewpoint"; Krause, "Recent Developments"; Lipsey, "The Theory of Customs Unions: A General Survey."

[5]Lipsey, "The Theory of Customs Unions: A General Survey."

[6]Bhagwati, "Trade Diverting: A Clarification"; Bhagwati, "Trade Diverting: A Reply"; Kirman, "Trade Diverting: A Comment."

[7]Bhagwati, "Trade Diverting: A Reply," p. 897.

[8]H. Johnson, "Trade Diverting Customs Unions: A Comment," Economic Journal 84 (September 1974): 618-21.

[9]Ibid., p. 619.

[10]M. E. Kreinin, International Economics: A Policy Approach, 3rd. ed., (New York: Harcourt, Brace and Jovanovich, 1979), pp. 450-51.

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[12]E. Berglas, "Preferential Trading Theory: The n Commodity Case," Journal of Political Economy 87 (April 1979): 315-32; C. Cooper and B. Massell, "A New Look at Customs Union Theory," Economic Journal 75 (December 1965): 742-47; L. Krause, "Recent Developments"; P. Wonnacott and R. Wonnacott, "Is Unilateral Tariff Reduction Preferable to a Customs Union? The Curious Case of the Missing Foreign Tariffs: Or, Beware of the Large Country Assumption," (Working paper 79-24, University of Maryland Department of Economics and Bureau of Business Research).

[13]Cooper and Massell, "A New Look."

[14]Ibid.

[15]Krause, "Recent Developments," p. 427.

[16]Ibid.

[17]Wonnacott and Wonnacott, "Is Unilateral Tariff Reduction Preferable?"

[18]Berglas, "Preferential Trading Theory."

[19]Wonnacott and Wonnacott, "Is Unilateral Tariff Reduction Preferable?"

[20]P. Collier, "The Welfare Effects of Customs Unions: An Anatomy," Economic Journal 89 (March 1979), p. 91.

[21]Wonnacott and Wonnacott, "Is Unilateral Tariff Reduction Preferable?"

[22]Viner, The Customs Union Issue, pp. 41-55.

[23]M. Kreinin, "On the Dynamic Effects of a Customs Union," Journal of Political Economy 72 (1964): 193-95.

CHAPTER 2

A REVIEW OF THE EMPIRICAL LITERATURE

2.1 Introduction

Trade creation and trade diversion, the static welfare effects of economic integration, can be forecast before integration occurs using ex-ante estimation methods or after the integration process is completed using ex-post estimation methods. Ex-ante methods estimate the anticipated welfare effects given a proposed, but not fully operating, integrated area. Ex-post methods estimate actual welfare effects of an operating integrated area.

2.2 Ex-Ante Methodology

Ex-ante models are forecasting models because the trade creation and trade diversion estimates are made before integration occurs or before the process is completed. To estimate trade creation, it is necessary to forecast country i's expected total imports ($_{t_2}\hat{\hat{M}}_i^T$), imports from both partner and non-partner countries in the post-integration year t_2 if integration occurs; and, to forecast i's expected total imports, ($_{t_2}\bar{\hat{M}}_i^T$), in t_2 if the integrated area had not been established. To estimate trade diversion, i's expected external imports, imports from the non-partner country, given the occurance of economic integration, are forecast,

$({}_{t_2}\hat{\hat{M}}_i^X)$; and, i's expected external imports if the integrated area had not been established, $({}_{t_2}\bar{\hat{M}}_i^X)$, are forecast. The difference between $({}_{t_2}\hat{\hat{M}}_i^T)$ and $({}_{t_2}\bar{\hat{M}}_i^T)$ is the forecasted trade creation (TC) of the proposed economic integration.

$$TC = ({}_{t_2}\hat{\hat{M}}_i^T - {}_{t_2}\bar{\hat{M}}_i^T) \tag{2.1}$$

The difference between the forecast and the expected value of external imports is trade diversion (TD),

$$TD = ({}_{t_2}\hat{\hat{M}}_i^X - {}_{t_2}\bar{\hat{M}}_i^X) \tag{2.2}$$

The static effect of economic integration depend upon the sum of these two effects: the increase in total imports from partner and non-partner countries which occurs because of economic integration (trade creation) and the reduction in non-partner, external imports given economic integration (trade diversion).[1]

$({}_{t_2}\hat{\hat{M}}_i^T)$ is forecast estimating import demand in country i by applying the import price elasticity estimate to intra-area tariff rate changes.[2] To forecast $({}_{t_2}\hat{\hat{M}}_i^X)$, the import price elasticity of substitution parameter is applied to the tariff rate on non-partner imports. $({}_{t_2}\bar{\hat{M}}_i^T)$ and $({}_{t_2}\bar{\hat{M}}_i^X)$ are forecast using an import demand equation with relative price and income elasticity parameters, assuming that, in the absence of economic integration, import demand parameters would have been unchanged from a pre-integration base year.[3]

Empirical Ex-Ante Estimates

A review of the ex-ante empirical methods is provided in Table 2-1. The most commonly used ex-ante methods are defined, accompanied by a description of their advantages and disadvantages. All of the ex-ante empirical estimation methods use elasticities to forecast future import values. These elasticities can be either assumed known a priori, or they can be estimated as part of the model.

A priori elasticity estimates are used when the ex-ante model is a general equilibrium or matrix model.[4] In this framework, one variable is changed (e.g., tariffs among partner countries are eliminated) to forecast the effect of economic integration on trade flows and the terms of trade. This method has the advantage of incorporating the terms of trade effect into the trade creation and trade diversion estimates. The disadvantage is that trade creation may be understated because there is no means to account for increased specialization in production when tariffs are eliminated and resources are reallocated.[5]

Elasticity values do not need to be assumed known. An alternative ex-ante model, the price elasticities approach, estimates elasticities using import, relative price, production and consumption data.[6] This model was used to forecast the effects of the Kennedy Round of tariff reductions and how enlarging the European Economic Community affected the EEC's, United Kingdom's, Continental

TABLE 2-1.--Annotated List of Selected Ex-Ante Estimation Approaches

Technique	Definition	Advantages	Disadvantages
General Equilibrium/ Matrix Model	A data flow model which uses an import-export matrix to estimate expected imports and exports without integration. Then, by changing tariffs among partners, the model estimates expected imports and exports with integration.	Incorporates terms of trade changes, exports and supply considerations.	Uses a priori price and price substitution elasticity estimates; understates trade creation (because this model cannot account for increased specialization in production when resources are reallocated)
Price Elasticity	A non-regression model which uses price elasticity of total imports and the price substitution elasticities between partner and non-partner imports to estimate trade creation and diversion.	Estimates directly both price and price substitution elasticities and also trade creation and trade diversion.	Model criticized for being too simple and overstating trade diversion. However, it presents a reasonable ex-ante approximation of the displacement of non-partner imports with economic integration.
Import demand-- Regression Approach	An import demand equation in which all price and price substitution elasticities are estimated directly and used to estimate expected imports, with and without integration.	Price and price-substitution elasticities are estimated directly.	Multicolinearity can occur and difficult to adjust for.

EFTA and Ireland's semimanufactured and finished manufactured commodity imports. Base year import data of each importing country (or group of countries) were used to estimate both the price elasticity of demand for total imports $(\eta_m)_k$ in commodity group k and also the price elasticity of substitution between the partner and non-partner countries $(s_{jj'})_k$ (where j is the exporting partner country and j' is the exporting non-partner country) for the commodity k.

The trade creation estimate uses the price elasticity of demand for total imports and the percentage change in domestic prices given economic integration, the trade creation formula is

$$TC = \eta_{mk}(t/t+1)_k \qquad (2.3)$$

where t is the pre-integration tariff on commodity group k. If the trade creation estimate is positive, then economic integration is expected to increase i's total imports. If the trade creation estimate is negative, economic integration is expected to reduce i's total imports. The trade diversion estimate uses the import price elasticity of substitution between partner and non-partner imports

$$TD = (s_{jj'})_k t_k. \qquad (2.4)$$

If this is greater than zero, then economic integration is expected to cause country i to reduce imports from

non-partner countries. If the trade diversion estimate is less than zero, economic integration is expected to cause country i to increase imports from non-partner countries.

A criticism of this ex-ante method may be that the trade diversion formula is too simple and, thus, overstates trade diversion. However, the simple formula is a reasonable ex-ante approximation of the displacement of non-partner imports with a discriminatory tariff policy.[8] The empirical values of this and other ex-ante approaches are presented in Table 2-2.

The advantage of ex-ante estimates is that they provide insight into the expected benefits and costs of a proposed integration plan. This is of particular interest to non-partner countries who want to know how their exports, balance of payments and terms of trade will be affected by economic integration. The disadvantage of ex-ante methods is that there is no mechanism to improve these estimates given new historical experience.[9] Ex-post methods remedy this disadvantage.

2.3 Ex-Post Methodology

Ex-post methods estimate trade creation and trade diversion after integration is completed. To determine the trade creation due to economic integration, an estimate of i's expected total imports (imports from partner and non-partner countries) in the absence of economic integration at post-integration time t_2 is needed. $({}_{t_2}\hat{M}_i^T)$ is the expected value of i's total imports in the absence of

TABLE 2-2.--Annotated Review of the Ex-Ante Empirical Literature[a]

Author	Methodology	Area	Year	Trade Creation Commodities: All	Trade Creation Commodities: Manuf.	Trade Diversion Commodities: All	Trade Diversion Commodities: Manuf.	Comments
Goodman (1963)	Trade Matrix	----	----	---	---	---	---	Theoretical analysis that uses maximum likelihood estimates to predict trade flow parameters.
Balassa & Kreinin (1967)	Price elasticity	Industrial Countries[b]	1960 (base)					Results show that a 50% reduction in tariffs under MFN rules will lead to a 10% increase in manufactured commodity and industrial materials trade among industrial countries. Results show benefits to individual countries of Kennedy Round trade liberalization proposals.
		I[c]			-0.026[e]			
		II[d]			-0.026[e]			
		EEC I[c]			-0.116[e]			
		EEC II[d]			-0.001[e]			
		UK I[c]			0.010[e]			
		UK II[d]			0.029[e]			
		EFTA I[c]			0.001[e]			
		EFTA II[d]			0.003[e]			
Balassa & Kreinin (1967)	Price elasticity	Industrial Countries[b]	1960 (base)					See Balassa & Kreinin (1967), above.
		I[c]			0.251[f]			
		II[d]			0.326[f]			
		EEC I[c]			0.074[f]			
		EEC II[d]			0.031[f]			
		UK I[c]			0.056[f]			
		UK II[d]			0.056[f]			
		EFTA I[c]			0.024[f]			
		EFTA II[d]			0.026[f]			

TABLE 2-2.--Continued

Author	Methodology	Area	Year	Trade Creation Commodities: All	Trade Creation Commodities: Manuf.	Trade Diversion Commodities: All	Trade Diversion Commodities: Manuf.	Comments
Kreinin (1973)	Price elasticity	EEC	1970 (base)		5.34[g]		3.84	Elasticities are not given a priori but are estimated by the model; estimates are for semi-manufactures and finished manufactured commodities.
		Continental EFTA & Ireland	1970 (base)		1.66[g]			
		UK	1970 (base)		1.06[g]			
Resnick & Truman[k] (1975)	Price elasticity--Import demand regression approach	EEC[i]	1968		0.30[h]			Multiple regression approach, in which the authors make several ad hoc adjustments to arrive at the results.
		EFTA	1968		0.20[h]			
		EEC[i]	1968		1.40[j]			
		EFTA	1968		0.10[j]			

[a]Trade creation and trade diversion values are in billion US dollars.

[b]US, Canada, EEC, Continental EFTA, and Japan.

[c]Estimates made with assumption that Western Europe export prices of manufactured commodities will increase by one-third of the tariff.

[d]Estimates made with assumption that Western Europe export prices of manufactured commodities are not changed.

[e]Balance of payments effects of a 50% reduction in tariffs among industrial countries.

[f]Welfare effects of implementing the Kennedy Round proposed tariff reductions.

[g]Change in each area's total imports with enlarged integration in Western Europe.

[h]Kennedy Round change in intra-area imports in constant 1968 dollars.

[i]Enlarged EEC of Nine countries.

[j]Change in imports from the enlarged integration area in Western Europe.

[k]S. Resnick and E. Truman, "An Empirical Examination of Bilateral Trade in Western Europe," in European Economic Integration, ed. B. Balassa (Amsterdam: North Holland Pub. Co., 1975), p.47.

economic integration. Subtracting the expected value of total imports ($_{t_2}\hat{M}_i^T$) from the actual post-integration value ($_{t_2}M_i^T$) is the effect of economic integration. That is, trade creation (TC) is

$$TC = (_{t_2}M_i^T - _{t_2}\hat{M}_i^T) \tag{2.5}$$

Trade diversion is determined by estimating the importing country's expected external imports in the absence of economic integration at the post-integration time t_2, ($_{t_2}\hat{M}_i^X$). The expected value of external imports at t_2 ($_{t_2}\hat{M}_i^X$), less the actual value, ($_{t_2}M_i^X$) is the trade diversion (TD) effect of economic integration

$$TD = (_{t_2}\hat{M}_i^X - _{t_2}M_i^X). \tag{2.6}$$

The static effect of economic integration depends upon the sum of these two effects: the increase in total imports from partner and non-partner countries which occurs because of economic integration (trade creation) and the reduction of imports from the non-partner country given economic integration (trade diversion).[10]

Ex-post values of trade creation and trade diversion are residual estimates of trade flow changes. These methods estimate the value of actual imports left-over after subtracting hypothetical imports--imports expected if integration had not occurred.

Empirical Ex-Post Estimates

Ex-post estimates use one of two techniques: base year import estimates or import demand regression estimates of trade creation and trade diversion. Base year import estimates select a pre-integration year as the base year. Country i's base year total imports or external imports represent the normal value of pre-integration imports. To determine the hypothetical value of imports (in the absence of integration) in the post-integration year t_2, unadjusted base year imports may be used, or, base year imports may be adjusted by the anticipated import growth rate. This adjusted or unadjusted base year value represents i's expected imports. Trade creation is estimated as the difference between i's actual value of total imports in the post-integration year and the expected value. Trade diversion is the difference between the expected value of i's external imports at t_2 and the actual value.

Ex-post methods which use the base year method to estimate expected imports are the import growth rate approaches, which use either the domestic country or another country as the control, the growth of import shares in apparent consumption approach. Table 2.3 defines these approaches and presents their advantages and disadvantages. Empirical estimates using these methods are given in Table 2-4.

TABLE 2-3.--Annotated List of Selected Ex-Post Estimation Approaches

Technique	Definition	Advantages	Disadvantages
Import Demand Equations, one national variable--domestic income, total domestic expenditure	Uses only one domestic independent variable to estimate expected imports in the absence of economic integration.	Estimates import demand as a function of domestic demand determinants; provides an example of importing country behavior without trade liberalization.	Ignores supply and demand considerations in third countries (ROW countries)[a]; ignores the role of relative prices.
Import Demand, multiple regression	Pre-integration time series approach to estimate coefficients, then actual post-integration values of independent variables are used to estimate imports in antimonde.	Significance tests on role of each independent parameter in estimating import demand; estimates import demand as a function of domestic demand determinants.	See above; assumes estimation parameters are constant between pre- and post-integration years despite changes in level of economic activity unless income is one of the independent variables.
Import growth-- Control country	Uses another country with similar income growth as control to estimate antimonde.	Can be adjusted for differences in income growth, price competitiveness, and exchange rates to reduce biases; normalized.	Ignores supply considerations in exporting country and supply and demand considerations in third country.
Domestic Control	Uses pre-integration import growth of the domestic country as the control.	Uses constant dollar value imports to reduce inflationary bias.	See above; does not adjust for changes in the level of economic activity.

TABLE 2-3.--Continued

Technique	Definition	Advantages	Disadvantages
Gravitational model estimation of import demand	Isolates effects of major variables (population and income of importer, distance and other trade resistance variables) on import demand which is the dependent variable determined as a multiplicative function of potential trade flows; often estimated in cross-section or with pooled cross-section and time series data.	Explicitly incorporates the effects of trade barriers, demand and supply conditions, the interrelatedness of countries; not a mechanical approach.	Estimates trade creation and trade diversion with fixed parameters even though the model demonstrates parameters change over time; a cross-section analysis; does not respond to cyclic pressures on trade flows.
Import Shares	Estimates hypothetical partner and non-partner import shares relative to a cumulative measure of trade, e.g., total imports, total trade; in the importing country as a function of domestic demand variables.	Incorporates domestic variables in estimating share changes.	Neglects supply considerations; see Import Demand Equation, one national variable, above.

TABLE 2-3.--Continued

Technique	Definition	Advantages	Disadvantages
Import Shares in Apparent Consumption	Estimates partner and non-partner shares relative to domestic consumption variable: apparent consumption.	Apparent consumption deflates imports for changes in inflation.	Neglects supply considerations; see Import Demand Equation, one national variable, above.

[a]E.g., if exogenous factors (weather) cause non-partner production to fall which forces an increase in trade among partner countries, this is estimated as trade diversion even though non-trade factors caused the reduced trade.

TABLE 2-4.--Annotated Review of the Ex-Post Empirical Literature[a]

Author	Methodology	Area	Year	Trade Creation Commodities: All	Trade Creation Commodities: Manuf.	Trade Diversion Commodities: All	Trade Diversion Commodities: Manuf.	Comments
Balassa (1967)	Import growth adjusted	EEC	1965		1.9		0.1	Anti-monde assumes no change in income elasticity with integration; assumes no change in relative prices, relative exchange rates or growth rates attributable to integration; results biased if assumptions are violated.
Kreinin (1969)	Import demand regression with more than one national variable	EEC (1953-1961)	1962	0.02		0.05		Import demand is the dependent variable with real income and relative prices the independent variables; too few annual observations result in poor price coefficient estimates; estimates made before integration process completed; quarterly observations may yield improved results.
			1963	0.05		0.02		
			1964	0.03		0.04		
			1965	0.05		0.02		
		(1953-1962)	1963	0.08		0.01		
			1964	0.07		0.02		
			1965	0.04		0.09		
		EFTA (1954-1962)	1965	0.05		0.03		

TABLE 2-4.--Continued

Author	Methodology	Area	Year	Trade Creation Commodities: All	Trade Creation Commodities: Manuf.	Trade Diversion Commodities: All	Trade Diversion Commodities: Manuf.	Comments
Truman (1969)	Import share approach (multiple regression)	EEC	1968		9.2		-0.1[c]	Import shares are the dependent variable with income, relative prices and tariff adjustemnts as independent variables; time series is short--6 degrees of freedom--coefficients often insignificant; not normalized.
Truman (1969)	Import share approach (multiple regression)	EEC	1968		2.5		0.5	Multiple regression as above incorporates time series and cross section data; not normalized.
Truman (1969)	Import shares in apparent consumption	EEC	1958 1960		6.7 3.1		0.6 1.9	Shares not normalized changes in cyclical conditions ignored.
Wilford (1970)	Import Share	CACM[b]	1968	0.01		0.01		See Balassa (1967)
Williamson & Botrill (1971)	Import share	EEC	1969		8.3		3.5	Uses the ROW as the control to estimate anti-monde import shares; estimates depend on already knowing their relative size; does not provide new information.

TABLE 2-4.--Continued

Author	Methodology	Area	Year	Trade Creation Commodities: All	Trade Creation Commodities: Manuf.	Trade Diversion Commodities: All	Trade Diversion Commodities: Manuf.	Comments
EFTA Secretariat (1972)	Import shares in apparent consumption	EEC	1965		1.7		0.6	Anti-monde estimates of import shares in apparent consumption are projected according to the simple linear trend that past behavior projects future import behavior assumes anti-monde values of apparent consumption equal actual observed values given integration; results not normalized
			1966		2.2		0.7	
			1967		2.3		0.9	
		EFTA	1965		0.7		0.5	
			1966		0.9		0.7	
			1967		1.3		0.9	
Kreinin (1972)	Import growth-adjusted: control group	EEC	1969/1970					Anti-monde values are normalized to adjust for expected growth and changes in relative prices; then, adjusted to account for different growth and competitive position of normalizer and integrated area.
		US control			8.5		1.7	
		UK control			16.0		-2.8[c]	
		Japan control			20.5		-4.2[c]	
		US control & adjusted			7.2		2.4	
Verdoorn & Schwartz (1972)	Gravitational model: cross-section	EEC and EFTA	1968		10.1		1.1	Introduce importance of promotional effect and reduced risk to increase import demand; cross-section cannot respond to changes in economic activity.

TABLE 2-4.--Continued

Author	Methodology	Area	Year	Trade Creation Commodities: All	Trade Creation Commodities: Manuf.	Trade Diversion Commodities: All	Trade Diversion Commodities: Manuf.	Comments
Aitken (1973)	Gravitational model: cross-section	EEC and EFTA	1967	9.2		0.6		Incorporates supply and demand behavior; cross-section problem--cannot respond to changes in economic activity.
Aitken & Lowry (1973)	Gravitational model cross-section	CACM[d]	1967	0.2		---		See Aitken (1973)
		LAFTA[e]	1967	0.36		---		
Sellekaerts (1973)	Import demand: regression with one national variable, real income	EEC	1972				-24.6[c]	Dummy variable used to separate pre-integration from post-integration import behavior; if import behavior changes significantly with integration; demonstrates that income elasticity varies between pre- and post-integration years; estimate depend on level of economic activity.

TABLE 2-4.--Continued

Author	Methodology	Area	Year	Trade Creation Commodities: All	Trade Creation Commodities: Manuf.	Trade Diversion Commodities: All	Trade Diversion Commodities: Manuf.	Comments
George, Reiling, & Scaperlanda (1973)	Import demand regression with one national variable	LAFTA[f]	1969	2.6		3.7		The independent variables are income, amount of foreign exchange, dummy for integration; because LAFTA is composed of developing countries quantity of foreign exchange determines ability to import.
Prewo (1974)	Import share	EEC	1970	19.8	18.0	-2.5[b]	-3.1[b]	Anti-monde based on demand and supply considerations; not normalized.
Balassa (1975)	Import growth-adjusted	EEC	1970	11.3	11.4	0.3	0.1	Update of Balassa (1967)
Resnick & Truman (1975)	Import share approach; input/output matrix	EEC and EFTA	1968		1.8		3.0	Stagewise approach estimate of import shares in anti-monde; in attempt to eliminate multicolinearity between income and prices authors make several ad hoc adjustments to arrive at reasonable results.
Truman (1975)	Import share approach	EEC and EFTA	1968		3.0		2.0	See Truman (1969), import shares.

TABLE 2-4.--Continued

Author	Methodology	Area	Year	Trade Creation Commodities: All	Trade Creation Commodities: Manuf.	Trade Diversion Commodities: All	Trade Diversion Commodities: Manuf.	Comments
Kreinin (1980)	Import growth control group	EEC and EFTA[h]	1977/ 1978		28.0		---	Adjusts import growth for behavior of control; anti-monde based on growth of normalizer.
	Imports-to-apparent consumption	EEC and EFTA[h]	1977/ 1978		28.0		---	
	Import growth: share of non-partner imports in total imports	EEC and EFTA[h]	1977/ 1978		---		5.0	Adjusts import growth for behavior of control; anti-monde based on growth of normalizer.
	Import growth: share of non-partner in total imports	EEC and EFTA	1977/ 1978		---		3.0	

[a]Trade creation and trade diversion values in billion US dollars.

[b]Central American Common Market.

[c]External trade creation.

[d]Integrated area uses all the Latin American and Caribbean countries.

[e]Latin American Free Trade Area.

[f]Integrated area includes Brazil, Chile, Mexico, Paraguay, Uruguay; after 1961 it includes Columbia, and Equador. Associated countries are Bolivia and Venezuela.

[g]S. Resnick and E. Truman, "An Empirical Examination of Bilateral Trade in Western Europe," in European Economic Integration, ed. B. Balassa (Amsterdam: North Holland Pub. Co., 1975), p. 47.

[h]Trade creation and trade diversion of expanded integration in Western Europe.

The second ex-post technique, the import demand regression approach selects some pre-integration years as normal years. Import demand equations for total imports and non-partner imports are estimated. The estimated parameters are expected to be constant in the post-integration years in the absence of economic integration. Post-integration values of income and relative prices are substituted into the estimated equations. The estimated import value in the post-integration year t_2, $({}_{t_2}\hat{M}_i^T)$, is the expected value of external imports in the absence of economic integration. The difference between the actual value of total imports (given that economic integration occurs) and the expected value is the trade-creating effect of economic integration. The difference between the expected value of external imports and the actual value, given economic integration, is the trade diversion estimate. Table 2-3 defines the methods which use this technique: the multiple regression import demand equation, the gravitational method and the import shares approach. Empirical estimates using these techniques are given in Table 2-4.

Chapter 3 presents a detailed discussion of the import demand equation with one national variable, the import demand multiple regression method, the control country import growth method, the import shares in apparent consumption method, and the domestic import

growth method. Following a description of each estimation technique, a discussion of how trade creation is separated from trade diversion is presented.

The remaining ex-post methods defined in Table 2-3, the gravitational models and the import share methods, are not estimated because their estimates are biased. Gravitational models estimate import demand parameters using cross-section data, which does not respond to cyclic pressures on trade flows and, this biases trade creation and trade diversion values. Import share methods omit relative price changes; therefore, this method also yields biased values for trade creation and trade diversion. Chapter 3 presents a more detailed discussion of these methods and their biases.

2.4 Dynamic Effects of Economic Integration

In addition to the statis effects, it is possible to establish a theoretical framework to estimate the dynamic income growth effects of economic integration. Economic integration causes changes in the rate of growth of gross national output and income, and changes in relative factor endowments. In two separate models, E. Denison and L. Krause describe the income-growth effect as the sum of the rate of growth of business investment and increased productive efficiency attributable to economic integration.

In the absence of economic integration, the growth rate of the capital stock is assumed constant. Because economic integration increases the demand for domestically produced output, the demand for factors of production increases, including added investment in plant and equipment.

Economic integration also causes increased economic efficiency. The importing country reduces production of outputs where it lacks a comparative advantage relative to its partner and increases production of outputs in which it enjoys a comparative advantage over its partner. This reallocation of resources increases domestic economic efficiency and increases real domestic income.

Krause estimates the hypothetical growth rate of the capital stock in the absence of economic integration by using an unspecified conversion factor to adjust the pre-integration ratio of business investment relative to gross domestic product.[12] The difference between the hypothetical growth rate and the actual growth rate of income during the post-integration years is the growth rate of the capital stock attributable to economic integration. Increased economic efficiency is estimated as the cost savings attributable to economic integration. This cost savings is estimated by adjusting the difference between the hypothetical and the actual ratios of imports to gross domestic product by the pre-integration tariff. The sum of these two effects is the dynamic integration effect.

$$\dot{Y}_i = \dot{I}_i + \dot{E}_i \qquad (2.7)$$

where $\dot{Y}$ = the annual change in the rate of growth of income

$\dot{I}$ = the annual change in the rate of growth of business investment

$\dot{E}$ = the annual change in efficiency (cost savings)

i = the importing country

with

$$\dot{I}_i = [(\text{growth in K})(\%\text{K share in NI})] \qquad (2.7a)$$

$$\dot{E}_i = ([M_i^T/GDP_i)_{t_2} - (M_i^T/GDP_i)_{t_1}]\%)(t) \qquad (2.7b)$$

where M^T = total imports
NI = national income
GDP = gross domestic product
K = capital stock
t = tariff rate (average, in percent) prior to economic integration
t_1 = pre-integration year
t_2 = post-integration year

This estimates the dynamic income effect of economic integration. Gross domestic product is used to measure the output of production facilities within the integrated area's territorial boundaries. To estimate trade flows and trade flow changes, this is a more relevant concept than gross national product which measures the output of all domestically owned production facilities regardless of location. Both authors acknowledge that data necessary to estimate the hypothetical growth values are not readily available, errors are significant and results are not comparable among countries (even within the same integrated area), due to inter-country differences in the definition and collection of investment data.

Chapter 3 presents a more detailed discussion of the static, ex-post approaches used to estimate trade creation and trade diversion resulting from the enlarged integrated area in Western Europe. Chapters 4 and 5 present the trade creation and trade diversion estimates of the methodologies discussed in Chapter 3. To estimate these effects, it is assumed that other trade liberalization schemes implemented during the years 1966-1978, i.e., the Kennedy and Tokyo Rounds and GATT trade liberalization policies, apply equally to all countries and therefore, do not bias the results.[13]

NOTES--CHAPTER 2

[1]M. Kreinin, "Trade Creation and Trade Diversion by the EEC and EFTA," Economia Internazionale 22 (May 1969), p. 274.

[2]M. Kreinin, "The Effects of the EEC on Imports of Manufactures," Economic Journal 82 (September 1972), p. 897.

[3]Ibid.

[4]L. Goodman, "Statistical Methods for the Preliminary Analysis of Transactions Flows," Econometrica 31 (January 1963): 197-208.

[5]P. Verdoorn and C. von Bochove, "Measuring Integration Effects: A Survey," European Economic Review 3 (1972): 337-51.

[6]B. Balassa and M. Kreinin, "Trade Liberalization Under the Kennedy Round," Review of Economics and Statistics 49 (May 1967): 125-37; M. Kreinin, "The Static Effects of EEC Enlargement on Trade Flows," Southern Economic Journal 39 (April 1973): 559-68.

[7]C. Clague, "The Static Effects of EEC Enlargement on Trade Flows: A Comment," Southern Economic Journal 42 (April 1976), p. 763.

[8]M. Kreinin, "The Static Effects of EEC Enlargement on Trade Flows: A Reply," Southern Economic Journal 42 (April 1976), p. 764.

[9]J. Williamson and A. Bottrill, "The Impact of Customs Unions on Trade in Manufactures," Oxford Economic Papers 23 (November 1971), p. 326.

[10]Kreinin, "Trade Creation and Trade Diversion."

[11]E. Denison, Why Growth Rates Differ, (Washington D.C.: The Brookings Institution, 1967), pp. 33-44, 133-74. L. Krause, European Economic Integration and the United

States, (Washington D.C.: The Brookings Institution, 1968), pp. 70-73.

[12]Krause, European Economic Integration.

[13]This is not an unreasonable assumption. If these trade agreements are truly multilateral, then they will effect all countries the same way.

CHAPTER 3

METHODOLOGIES FOR ESTIMATING TRADE CREATION AND TRADE DIVERSION

3.1 Introduction

On July 1, 1977 the United Kingdom, Denmark and Ireland acceded to the European Economic Community (EEC) to form an enlarged customs union, the European Community. At the same time, the European Community (EC) member countries and seven of the original nine European Free Trade Association (EFTA) member countries (excluding the United Kingdom and Denmark) became a free trade area in manufactured commodities. This thesis uses six ex-post methods to estimate trade creation and trade diversion in this enlarged free trade area of Western Europe. The six methods are: three control group normalized approaches, a growth-adjusted import approach, an import demand regression approach with one national variable, and an import demand regression with more than one national variable.[1]

These six approaches consider the integrated area to be composed of two "partner countries," the original EEC and the original EFTA. The EEC includes Belgium, France, the Federal Republic of Germany (Germany), Italy, Luxembourg and the Netherlands. EFTA includes Austria, Denmark,

Finland, Iceland, Norway, Portugal, Sweden, Switzerland, and the United Kingdom. All other countries are combined to form the third country, the "non-partner country," or, the rest-of-the-world (ROW).

Imports are divided into two manufactured commodity groups: textiles, clothing, paper products, rubber products, chemicals, petroleum products, non-metallic minerals, basic metals, transportation equipment and engineering products. Appendix A lists each commodity group and the SITC components of that group. This is modelled after the import groups used by M. Kreinin to facilitate meshing apparent consumption data with SITC manufactured commodity import data.[2] Total imports in each commodity group of each partner country are the sum of imports from the other partner country and the non-partner. For example, total imports of textiles by the EEC is the sum of textile imports from EFTA and the ROW. This measure excludes intra-area trade, i.e., trade among EEC members. Total imports of each partner country net of imports from the other partner country measures external or non-partner country imports. Each approach estimates trade creation and trade diversion separately for the original EEC and for the original EFTA. Then, the trade creation or trade diversion estimates are summed for the EEC and EFTA by commodity group to estimate trade creation and trade diversion of the enlarged integrated area of Western Europe.

The above six approaches were selected to estimate trade creation and trade diversion because they satisfy the following criteria: all the necessary data are available; the estimates are comparable; estimates are normalized--each approach incorporates an estimate of the expected post-integration import growth trend when estimating the expected value of imports in the absence of economic integration. Satisfying these criteria allows the quantitative trade creation and trade diversion values to be compared and binds the estimates between upper and lower limits. Normalizing the expected value of imports in the anti-monde eliminates some of the estimation bias.

The methodology of these six approaches are discussed in Sections 3.2 and 3.3. Section 3.4 is a discussion of the data used to estimate trade creation and trade diversion. Chapters 4 and 5 present the empirical results.

3.2 Import Growth Approaches

Control Group Approaches

These approaches select a country or a group of countries as the control and adjust the importing country's base year imports (a year of normal economic activity prior to integration) according to the import growth rate of the control during the post-integration years. An ideal control country has the same import growth rate during the post-integration years that the importing country would have experienced in the absence of economic integration. This

assumes the control and the importing country experience similar domestic income and price conditions (i.e., similar income growth rates and rates of inflation) and stable exchange rates during the post-integration years. Biased trade creation and trade diversion estimates result if these conditions are not met.

In each commodity group, trade creation of each partner country is estimated as the actual, post-integration value of total imports in that commodity group less the expected value of total imports in that commodity group in the absence of economic integration. Economic integration is expected to increase the importing country's total imports in each commodity group; therefore, the change in total imports is expected to be positive when trade creation occurs. Negative trade creation can occur if domestic consumers increase their demand for domestically produced output relative to imports or if they reduce their demand for imports in the post-integration years.[4] However, it is expected that, due to relative price changes economic integration will increase i's total imports in each commodity group. Relative price changes cause imports from partner countries to be underestimated in the anti-monde. This results in an understatement of total imports in the anti-monde and a trade creation estimate greater than zero.

In each commodity group, trade diversion is estimated as the difference between the expected value of

external imports and the actual value in the post-integration year. The trade diversion estimate is expected to be positive. A negative value indicates external trade creation.[5]

To estimate trade creation, one control group approach adjusts each importing country's (i) base year total imports in each commodity group by each control country's (n) import growth rate during the post-integration years. Trade creation (TC) is

$$TC = [{}_{t_2}M^T_{ik} - ({}_{t_1}M^T_{ik})(\dot{M}^T_{nk})_{t_1 t_2}] \qquad (3.1)$$

where M^T = total imports
i = EEC or EFTA
n = control country--US, Japan--or Combined Control-US, Japan and Canada (each control is used vis-a-vis each importing country)
k = commodity group
t_2 = end year or post-integration year
t_1 = base year
$(t_1 t_2)$ = post-integration years

Each importing country's base year value of total imports in each manufactured commodity group k is adjusted by each control country's import growth rate of k between the base year and the post-integration year. The difference between the actual and the expected value of total imports in each commodity group k estimates trade creation. Trade creation is estimated using each control vis-a-vis each import country. Then, for each control, the trade creation results for the EEC and EFTA are summed by commodity group to obtain the trade creation estimate for the enlarged integrated area.

An alternative control group approach adjusts each importing country's base year ratio of total imports-to-apparent consumption for each commodity group k by the total import-to-apparent consumption growth rate of each control country during the post-integration years. Trade creation is

$$TC = [(M^T_{ik}/C_{ik})_{t_2} - (M^T_{ik}/C_{ik})_{t_1}(M^T_{nk}/C_{nk})_{t_1t_2}]({}_{t_2}C_{ik}) \quad (3.2)$$

where the variables are defined as above and C_{ik} and C_{nk} are apparent consumption (domestic production + imports - exports) of the importing country (i) and the control country (n), respectively, in commodity group k. Expected imports are estimated by adjusting the base year total import-to-apparent consumption ratio by the ratio's expected growth rate over the post-integration years t_1t_2. The expected growth rate is the total imports-to-apparent consumption growth rate of the control country during t_1t_2. The percentage point difference between the actual ratio of total imports-to-apparent consumption and the expected ratio (in the post-integration year t_2) is the trade created with economic integration. The value of trade creation is obtained by multiplying this percentage point difference by apparent consumption of the importing country at t_2.

For the control group approach, trade diversion (TD) is estimated as

$$TD = [({}_{t_2}M^T_{ik})(M^X_{ik}/M^T_{ik})_{t_1} - {}_{t_2}M^X_{ik}] \qquad (3.3)$$

where M^X_T = external (ROW) imports
M^T = total imports
i = EEC or EFTA
k = commodity group
t_2 = end year or post-integration year
t_1 = base year

Different from the trade creation estimates which use a non-partner country as the control, trade diversion estimates use the importing country's ratio of external imports to total imports in the base year as the control. This ratio is expected to be constant in the absence of economic integration. The base year ratio of external imports to total imports in each commodity group k adjusted by the value of total imports at t_2 estimates the expected value of external imports in the absence of economic integration. The difference between the expected value and the actual value of external imports is trade diversion. Trade diversion is estimated separately for the EEC and EFTA, and, then, the results are summed by commodity group to obtain an estimate of trade diversion for the enlarged integrated area of Western Europe.

An alternative trade diversion estimate uses the importing country's growth rate of total imports-to-apparent consumption. In this case, trade diversion is

$$TD = [(M^T_{ik}/\dot{C}_{ik})_{t_1}(M^X_{ik}/C_{ik})_{t_1 t_2} - (M^X_{ik}/C_{ik})_{t_2}]({}_{t_2}C_{ik}). \qquad (3.4)$$

In the absence of economic integration, the ratio of external imports-to-apparent consumption in each

commodity group (k) is expected to be a constant proportion of the total imports-to-apparent consumption growth rate in that commodity group. The percentage point difference between expected external imports-to-apparent consumption and actual external imports-to-apparent consumption is trade diversion.[6] The value of trade diversion is obtained by multiplying this percentage point difference by apparent consumption of the importing country at t_2. An advantage of the control group normalized approaches is that trade creation and trade diversion are estimated separately, according to different methodologies.

A second advantage is that adjustments are made to eliminate cyclical income and price biases. Trade creation is adjusted for differences in the rate of income growth, changes in inflation rates and exchange rates between each control and each importing country.[7] If income of the importing country grew faster than that of the control country, the expected value of imports in the absence of economic integration would be too low. This overstates trade creation. If income of the importing country grew more slowly, trade creation would be understated. If the importing country became more price competitive (due to a lower rate of inflation or a more favorable exchange rate change relative to the control country), then, in the absence of economic integration, the export growth rate of the importing country would rise and the import growth rate would decline. This understates

trade creation. If the importing country became less price competitive relative to the control country (due to a higher inflation rate or a relatively unfavorable exchange rate change), trade creation would be overstated. Income and price adjustments can correct these biases.

If, during the post-integration years, the importing country's income grows faster than that of the control, the control understates expected import growth. This overstates trade creation. To adjust this bias, imports into the control country at t_2 are increased by the difference between the income growth rates of the control and the importing country and by the income elasticity of import demand of the control for commodity group k. For example, assume the importing country's income grew 2% faster than the control country's during the post-integration years and that the control country's income elasticity of import demand for commodity k is 1.5. If the control country's income had grown 2% faster--at exactly the same rate as the importing country's--imports of the control in commodity group k would have increased 1.5 times the percentage increase in income or 3%. After adjusting the control country's imports in each commodity group at t_2, the expected growth rate of imports is recomputed and adjusted trade creation is estimated. If the importing country's income grew more slowly, a similar adjustment is made to reduce the control country's import growth.

When the import-to-apparent consumption growth rate is used to estimate expected imports, post-integration imports and apparent consumption values of the control country need to be adjusted. Imports are adjusted by the income growth rate difference and the control country's income elasticity of import demand in commodity group k. Apparent consumption is adjusted by the income growth difference, and by the control country's income elasticity of demand in commodity group k. The growth rate of imports-to-apparent consumption over the post-integration years is recomputed. The adjusted import-to-apparent consumption growth rate of the control country is substituted into (3.2) to estimate adjusted trade creation in each commodity group.

While this process adjusts for differential income growth, the trade creation value still incorporates an inflation and exchange rate bias. If, during the post-integration years, the importing country's importables and exportables became more price competitive relative to those of the control country, then in the absence of economic integration, the importing country's imports would have grown less quickly than predicted by the control. The import growth rate of the control is adjusted by the inflation rate and the exchange rate differences between the control country and the importing country to eliminate this bias.

To adjust for this bias, assume the rate of inflation is 2% lower and the exchange changes 2.5% in favor of the importing country. Therefore, importables are relatively more expensive and exportables are relatively less expensive. Also, assume the control country's price elasticity of import demand in commodity group k is 1.0. Then, the control country's post-integration year imports of commodity k are adjusted by [(2%)(1.0) + (2.5%)(1.0)] or 4.5%. Given this adjustment process, the expected growth rate of imports in each commodity is recomputed and trade creation is re-estimated. If either the exchange rate or the inflation rate move opposite to the above example, a similar adjustment is made to eliminate an overstatement in the trade creation estimate.

The import-to-apparent consumption method adjusts control country imports and apparent consumption by the inflation rate and the exchange rate differences using the price elasticity of import demand of each commodity group. Trade creation is recomputed to eliminate these biases. The adjusted import growth rates, whether based on control country import growth or the import-to-apparent consumption growth rate, reflect more accurately the expected behavior of the importing country in the absence of economic integration.

An alternative to using the import growth rate of another country as the control to estimate the static effects of economic integration, is to use the pre- and

post-integration import growth rates of the importing country itself.

Domestic Import Growth

This approach selects a pre-transition year as the base and adjusts each importing country's base year total and external imports in each commodity group by the pre- and post-integration import growth rates to determine the static effects of economic integration. In the absence of economic integration, the expected value of post-integration year total imports in each commodity group are base year total imports adjusted by the importing country's pre-integration total import growth rate in that commodity group. The expected value of external imports in each commodity group in the post-integration year in the absence of economic integration are the base year imports adjusted by the pre-integration growth rate of external imports. Base year total imports and external imports in each commodity group, adjusted by their respective post-integration import growth rates, estimate the expected value of total and external imports in the post-integration year.

The expected value of total imports given economic integration less their expected value in the absence of economic integration is the trade creation effect of integration. This difference is expected to be positive. The expected value of external imports in the absence of economic integration less their expected value given

economic integration is the trade diversion effect of economic integration. It is expected to be positive when trade diversion occurs. The trade creation and trade diversion effects of economic integration are represented by

$$TC = [({}_{t_1}M^T_{ik})(\dot{M}^T_{ik})_{t_1t_2}] - [({}_{t_1}M^T_{ik})(\dot{M}^T_{ik})_{t_0t_1}] \quad (3.5)$$

$$TD = [({}_{t_1}M^X_{ik})(\dot{M}^X_{ik})_{t_0t_1}] - [({}_{t_1}M^X_{ik})(\dot{M}^X_{ik})_{t_1t_2}] \quad (3.6)$$

where M^T = total imports, constant dollar
M^X = external imports, constant dollar
i = EEC or EFTA
k = commodity group
t_1 = base year
(t_0t_1) = pre-integration years
(t_1t_2) = post-integration years

This approach assumes that the import growth rate during the pre-integration years (t_0t_1) represents normal economic conditions which would have continued, in the absence of integration, through the post-integration years (t_1t_2). The trade creation and trade diversion estimates are unbiased only to the extent that similar economic conditions exist between these two periods.[8] If, for example, more rapid income growth occurred during the pre-integration years relative to the post-integration years, the expected import growth rate in the absence of economic integration would be overstated. This would understate trade creation and overstate trade diversion. Or, if there were relatively slow income growth during the pre-integration years, the expected import growth rate would be

understated, and, in this case, trade creation would be overstated and trade diversion, understated. The trade creation and trade diversion estimates can be adjusted for differences in income growth between the pre- and post-integration years. Imports in the post-integration years are adjusted by the difference between the pre- and post-income growth and the income elasticity of import demand for commodity group k. Then, the import growth rate for the post-integration years is recomputed using the adjusted post-integration import value. Trade creation and trade diversion of each commodity group are re-estimated to adjust for the difference in income growth rates.

A second bias results from the implicit assumption that economic integration will alter the importing country's import behavior in each commodity group. No methodology is built into this approach or the control group approaches which determines whether the trade creation and trade diversion estimates are significantly different from zero. The import demand regression with one national variable addresses this issue by determining for which commodity groups integration alters significantly the import structure of the importing country.

3.3 Import Demand Regressions

Import Demand with One National Variable

To determine whether the import structure of each importing country, the EEC or EFTA, is affected

significantly by economic integration, this approach separates imports into total imports and external imports in each commodity group and regresses the annual import values on annual income for each pre- and post-integration year. Then, the import values are regressed on income and a dummy variable to separate the pre-integration years from the post-integration years. The regression equations are

$$M^{T}_{ikt} = a_1 + a_2 Y_{it} + e_{ik} \tag{3.7a}$$

$$M_{ikt} = b_1 + b_2 Y_{it} + b_3 X_t + b_4 X_t Y_{it} + e_{ik} \tag{3.7b}$$

and

$$M^{X}_{ikt} = a_1 + a_2 Y_{it} + e_{ik} \tag{3.8a}$$

$$M_{ikt} = b_1 + b_2 Y_{it} + b_3 X_t + b_4 X_t Y_{it} + e_{ik} \tag{3.8b}$$

where M^{T}_{X} = total imports, constant dollar
M^{X} = external imports, constant dollar
Y = real income (Gross National Product or Gross Domestic Product)
X = dummy variable; 0 for pre-integration years
1 for post-integration years
i = EEC or EFTA
k = commodity group
t = pre- or post-integration year
e = error term

The dummy variable equations (3.7b) and (3.8b) estimate how the importing country's demand for imports in each commodity group changes with economic integration. In addition to estimating how the import demand curve shifts, (b_3), an estimate is made of how the marginal propensity

to import (b_4) total imports or external imports changes with economic integration.

An F-test is used to determine the significance of the dummy variable equation--whether economic integration alters the import structure of the importing country.[9] For total imports, this test compares the sum of squared errors of the restricted equation (3.7a) with the sum of squared errors of the unrestricted equation (3.7b). For external imports, it compares the sum of squared errors of the restricted equation (3.8a) with the unrestricted equation (3.8b). If the errors are significantly different from each other, then, economic integration is effective in changing the import structure of the importing country. In those commodity groups where the total import structure has changed significantly, trade creation is estimated by regressing pre-integration total imports on pre-integration income according to (3.7b) to determine the expected import structure in the absence of economic integration in each commodity group. Post-integration annual income values are substituted into the fitted equation to project the expected value of total imports. The difference between actual and expected total imports is the trade-creating effect of economic integration.

To estimate trade diversion in each commodity group where the external import structure is changed significantly, (3.8b) is estimated for the pre-integration

years. Then each post-integration income value is substituted into the fitted equation to project expected external imports for that post-integration year in that commodity group. The expected value of external imports less the actual value in each commodity group is the trade-diverting effect of economic integration. Positive trade creation values indicate that economic integration has created trade. Positive trade diversion values indicate that economic integration has diverted trade. It is expected that when economic integration alters the import structure significantly, anti-monde total imports will be too low and anti-monde external imports will be too high.

The advantage of this approach is that trade creation and trade diversion values for consecutive post-integration years can be estimated. This allows an examination of the cumulative effect of economic integration on total imports and external imports in each commodity group, and it provides insight into whether most of the gains from economic integration occur during the initial years.

The disadvantage of this approach is that the model, as formulated by W. Sellekaerts, excludes a price variable.[10] He decided to exclude relative prices because of measurement inaccuracies and measurement difficulties. Excluding relative prices causes some of the integration effect attributable to relative

price changes to be attributed to income and forces some of the price effect into the error term. To overcome this bias and to test the significance of relative prices on total and external imports, a multiple regression import demand equation is estimated.

Import Demand: Multiple Regression

This ordinary least square regression approach incorporates income and relative price parameters as determinants of import demand. Income and price substitution elasticities are estimated. An exchange rate parameter is not incorporated into the import demand equations because the regressions are estimated over the pre-integration years 1966I - 1972IV. Flexible exchange rates began to become effective in 1971III.[11] To incorporate exchange rate changes allows for only six observations--too few for significant analysis.

The regression results provide statistical tests to determine the significance of the income and price parameters in projecting import demand and, therefore, in estimating trade creation and trade diversion *ceteris paribus*. The post-integration income and relative price values are substituted into the anti-monde structure to project expected total imports (3.9a) and external imports (3.9b) in the absence of economic integration.

The regression equations estimated from 1966I - 1972IV are

$$\ln m^T_{it} = c_1 + c_2 \ln Y_{it} + c_3 \ln (P^T_t / P^d_t)_i + e_i \qquad (3.9a)$$

$$\ln m^X_{it} = c_1 + c_2 \ln Y_{it} + c_3 \ln (P^X_t / P^d_t)_i + e_i \qquad (3.9b)$$

where m^T_X = volume index of total imports
m^X = volume index of external imports
Y = index of real income (or other domestic activity variable)
P^T_X = import price index for total imports
P^X = external import price index, weighted average
P^d = domestic price index (wholesale price index)
i = importing country
t = pre-integration years
e = error term

Each regression is estimated individually for each EEC and EFTA member country. Each country's imports are divided into total imports and external imports. In contrast to the preceding methods, imports are not divided into manufactured commodity groups; total and external imports, purged of oil imports, are used. Quarterly observations on the import volume index for the pre-integration years are regressed on quarterly observations of real income (or another domestic activity variable index) and on quarterly observations of relative prices. The income elasticity of import demand (c_2) is expected to be positive and the import price substitution elasticity of demand (c_3) is expected to be negative.[12] Other things equal, the income elasticity of import demand and the import price substitution elasticity of demand for total imports and imports from the non-partner country are assumed to be constant over time.

Given the pre-integration estimates of income and price elasticities for total imports, the post-integration values for real income and relative prices are substituted into the estimated equation (3.9a) to estimate expected total imports in the absence of economic integration for each country. Trade creation is the difference between the actual value of total imports and their expected value.

Regressing non-partner country imports on real income and relative prices, estimates the elasticities expected for external imports in the absence of economic integration. Trade diversion is estimated by substituting post-integration real income and relative price values into the estimated equation (3.9b). This provides an estimate of expected imports from the non-partner country in the absence of economic integration. The difference between the expected value of non-partner imports and the actual value is trade diversion.

The results of this approach are not biased by differences in cyclical trends of the pre-integration relative to the post-integration years. However, when originally used to estimate the integration effects due to the formation of the EEC and EFTA, this approach did not produce the expected results.[13] The import price substitution elasticity coefficients were often of the opposite sign or were not statistically significant. Quarterly observations on income and prices are expected to produce statistically significant results.

These six methods have been selected because they provide comparable estimates of trade creation and trade diversion; the estimates are normalized; and, in each case, the necessary data are available. These considerations are necessary to estimate the trade-creating and trade-diverting effects of economic integration and to bind the estimates between upper and lower bounds.

3.4 Data

The import data were collected from the Organization for Economic Cooperation and Development (OECD) Statistics of Foreign Trade, Series B for 1966 and subsequent years. The quarterly import data were collected from the OECD Statistics of Foreign Trade, Series A for 1966 and subsequent years. Oil imports were purged from these quarterly observations by using unit value indices for SITC 3 obtained from OECD Statistics of Foreign Trade, Series A and B. The United Nations Yearbook of Industrial Production provided the apparent consumption data. Import unit value and volume indices were collected from OECD Statistics of Foreign Trade, Series A and B. An import weighted average of unit value price indices for each member country of the EEC and EFTA was used to deflate nominal import values for the domestic import growth and import demand regression with one national variable approaches. The domestic wholesale price index data were collected from the United Nations Statistical Yearbook.

Values of gross domestic product were collected from the United Nations Yearbook of National Accounts Statistics, Volume II, which also provided values for the GDP deflator. The International Financial Statistics of the International Monetary Fund provided the effective exchange rate values. From these data, average annual growth rates were estimated for income, inflation and effective exchange rates of each importing country and each control. (An import weighted average was used to obtain these growth rates for the combined control.) Kreinin's estimates of the income elasticity of import demand and price elasticity of import demand for the US and Japan were used to adjust trade creation values using the control group import growth approaches.[14] H. Houthakker and S. Magee's estimates for Canada and the European countries were used to form weighted income and import price elasticities to adjust the combined control and the domestic import growth approaches estimates of trade creation and trade diversion.[15] Finally, the index of industrial production used for the multiple regression estimation equation was obtained from the OECD Index of Industrial Production and the United Nations Statistical Yearbook. For this approach, the import volume index of external imports is an import weighted average of the non-partner country export volume index and the external import price index (P^X) is an import weighted average of the non-partner export price index.

Chapters 4 and 5 present the empirical results from applying the six estimation approaches discussed in this chapter to the data from the sources listed above.

NOTES--CHAPTER 3

[1]B. Balassa, "Trade Creation and Trade Diversion in the European Common Market," Economic Journal 77 (March 1967): 1-21; B. Balassa, "Trade Creation and Trade Diversion in the European Common Market: An Appraisal of the Evidence," in European Economic Integration, ed. B. Balassa (Amsterdam: North Holland Publishing Company, 1975), pp. 79-118; M. Kreinin, "Trade Creation and Trade Diversion by the EEC and EFTA," Economia Internazionale 22 (May 1969): 273-80; M. Kreinin, "Effects of the EEC on Imports of Manufactures," Economic Journal 82 (September 1972): 897-920; M. Kreinin, "Static Effects of EC Enlargement on Trade Flows in Manufactured Products," Kyklos 34 (Winter 1981): 60-71; W. Sellekaerts, "How Meaningful Are Empirical Studies on Trade Creation and Trade Diversion?" Weltwirtschaftliches Archiv 109 (May 1973): 519-55.

[2]Kreinin, "Effects of the EEC," p. 920.

[3]Kreinin, "Static Effects of EC Enlargement," p. 60.

[4]E. Truman, "The Effects of European Economic Integration on the Production and Trade of Manufactured Goods," in European Economic Integration, B. Balassa (ed.) (Amsterdam: North Holland Publishing Company, 1975) p. 6.

[5]Ibid.

[6]There is only one trade diversion estimating equation. The estimate of trade diversion using imports-to-apparent consumption reduces to (3.3). The growth rate of total imports is:

$$[(M^T_{ik}/C_{ik})_{t_2}/(M^T_{ik}/C_{ik})_{t_1}](M^X_{ik}/C_{ik})_{t_1}].$$

This reduces to:

$$[(M^T_{ik}/C_{ik})_{t_2}][(M^T_{ik})_{t_1}][M^X_{ik}]_{t_1}$$

Rewriting (3.4) with this term:

$$([(M^T_{ik}/C_{ik})_{t_2}][M^T_{ik}]_{t_1}[M^X_{ik}]_{t_1} - [M^X_{ik}/C_{ik}]_{t_2})({}_{t_2}C_{ik})$$

which equals

$$[({}_{t_2}M^T_{ik})(M^X_{ik}/M^T_{ik})_{t_1} - {}_{t_2}M^X_{ik}]$$

when $({}_{t_2}C_{ik})$ is distributed over both terms in the equation above.

[7]Trade diversion is not adjusted because the domestic country is the control, and income or price competitive adjustments would be applied equally to the external and total imports; therefore (3.3) would remain unchanged.

[8]Sellekaerts, p. 526.

[9]Ibid., p. 524.

[10]Ibid., pp. 537-41.

[11]D. Warner and M. Kreinin, "Determinants of International Trade Flows," paper presented to the Workshop on Production and Trade in a World with Internationally Mobile Factors of Production, Stockholm, Sweden; August 4-15, 1980.

[12]Questions have been raised regarding the role of the homogeneity assumption of output and its influence on the relative price coefficient. This assumption constrains the relative price coefficient to be -1. D. Warner and M. Kreinin tested this assumption by estimating the partial correlation coefficient between the two price variables. For all European countries in their sample, this correlation coefficient was always less than 0.95 percent, except for Germany (D. Warner and M. Kreinin, "Determinants of International Trade Flows").

[13]Kreinin, "Trade Creation and Trade Diversion."

[14]M. Kreinin, "Disaggregated Import Demand Functions--Further Results," Southern Economic Journal 40 (July 1973): 19-25.

[15]H. Houthakker and S. Magee, "Income and Price Elasticities in World Trade," Review of Economics and Statistics 51 (May 1969): 111-125.

CHAPTER 4

TRADE CREATION AND TRADE DIVERSION USING THE IMPORT GROWTH APPROACHES

4.1 Introduction

The preceding chapter discusses six approaches which are used to estimate trade creation and trade diversion due to enlarging the integrated area of Western Europe. This chanter presents the trade creation and trade diversion values obtained from the import growth approaches. Chapter 5 presents the results using the import demand regression approaches.

4.2 Import Growth Estimates of Trade Creation and Trade Diversion: Control Groups

These approaches have two advantages. First, separate methodologies are used to estimate trade creation and trade diversion; second, the trade creation values (which use a country or group of countries other than the integrating area as the control) are adjusted to account for differences in income growth, inflation rate and exchange rate changes which occur between the importing country and the control. The control group import growth values of trade creation and trade diversion are presented first followed by the control group import-to-apparent consumption growth results.

Control Group Import Growth

Equations (4.1) and (4.2) estimate trade creation and trade diversion

$$TC = [{}_{t_2}M^T_{ik} - ({}_{t_1}M^T_{ik})(\dot{M}^T_{nk})_{t_1 t_2}] \qquad (4.1)$$

$$TD = [({}_{t_2}M^T_{ik})(M^X_{ik}/M^T_{ik})_{t_1} - {}_{t_2}M^X_{ik}] \qquad (4.2)$$

where M^T_X = total imports
M^X = external (ROW) imports
i = EEC or EFTA
k = commodity group
t_2 = end year or post-integration year
t_1 = base year
$(t_1 t_2)$ = post-integration years
n = control country

resulting from the enlarged economic integration of Western Europe. Each equation is estimated separately for each importing country--the EEC and EFTA. Then, the trade creation estimates of both importing countries are summed by commodity group to determine trade created by enlarging the integrated area of Western Europe. Similarly, trade diversion is estimated for each importing country and the results are summed by commodity group to estimate the value of trade diverted given the enlarged integrated area.

EEC total imports in each commodity group excludes intra-area imports (imports among the EEC member countries) but includes internal imports--imports from the partner country EFTA--and external imports--imports from the ROW.[1] External imports in each commodity group are imports from the non-partner country, ROW, only. For EFTA, total imports in each commodity group--again excluding

intra-area imports--are the sum of imports from the partner country, the EEC (internal imports), and from the non-partner country (external imports). External imports in each commodity group are imports from the non-partner only.

Trade creation estimates use three controls vis-a-vis each importing country: the US, Japan and a combined control--the US, Japan and Canada. Based on income growth, inflation and exchange rate changes, these three countries prove to be reasonable controls for the EEC and EFTA. Between 1970/71 and 1977/78 the US, Japan and the combined control experienced rates of changes similar to those of the EEC and EFTA. The differences in income growth of Table 4-1 show that the US grew slightly less and Japan and the combined control slightly more than the EEC. Table 4-2 shows that all three controls grew slightly more than EFTA. Overall, the combined control is the best control for the EEC, and, the US is the best control for EFTA based on similar income growth rates.

Changes in price competitiveness are measured by differences between the inflation rate changes and the effective exchange rate changes of each control vis-a-vis each importing country. Inflation rate changes--measured by the percentage change in the gross domestic product price deflator--in the three controls was slightly lower than that of the EEC or EFTA (see Tables 4-3 and 4-4). The differences in effective exchange rate changes indicate less favorable import price changes for the US, more

TABLE 4-1.--EEC and Control Group Income Growth 1970/71 - 1977/78[a]

Year	EEC	US	Japan	Combined Control[b]
1970/71-1977/78	2.81	2.3	4.05	3.05
Growth Rate Differences, 1970/71-1977/78	----	0.51[c]	-1.24[d]	-0.24[e]

[a]Income growth is estimated as average annual percentage changes.

[b]Estimated as an import weighted average of average annual percentage changes in the US, Japan and Canada.

[c][(EEC income growth) - (US income growth)].

[d][(EEC income growth) - (Japan income growth)].

[e][(EEC income growth) - (Combined control income growth)].

Sources: Data for the income growth rates are from the United Nations Yearbook of National Accounts Statistics, Vol. II, various issues.

TABLE 4-2.--EFTA and Control Group Income Growth 1970/71 - 1977/78[a]

Year	EFTA	US	Japan	Combined Control[b]
1970/71-1977/78	1.95	2.33	4.05	3.05
Growth Rate Differences 1970/71-1977/78	----	-0.35[c]	-2.10[d]	-1.11[e]

[a]Income growth is estimated as average annual percentage changes.

[b]Estimated as an import weighted average of average annual percentage changes in the US, Japan and Canada.

[c][(EFTA income growth) - (US income growth)].

[d][(EFTA income growth) - (Japan income growth)].

[e][(EFTA income growth) - (Combined control income growth)].

Sources: Data for the income growth rates are from the United Nations Yearbook of National Accounts Statistics, Vol. II, various issues.

TABLE 4-3.--EEC and Control Group Inflation Rate and Effective Exchange Rate Changes, 1970/71-1977/78[a]

	EEC	US	Japan	Combined Control
Inflation Rate, 1970/71-1977/78	113.3	107.7	112.6	110.0[b]
Growth Rate Differences, 1970/71-1977/78	-----	-6.2[d]	-0.7[e]	-3.3[f]
Effective Exchange Rate Growth, 1970/71-1977/78	2.4	-12.5	15.5	3.2[c]
Growth Rate Differences, 1970/71-1977/78	-----	-14.9[d]	13.1[d]	0.8[e]

[a]Price competitiveness changes are estimated as average annual percentage changes.

[b]Weighted average of average annual percentage changes in US, Japan, and Canada's rates of inflation.

[c]Weighted average of average annual percentage changes in US, Japan, and Canada's effective exchange rate changes.

[d][(US average annual change) - (EEC average annual change)].

[e][(Japan average annual change) - (EEC average annual change)].

[f][(Combined Control average annual change) - (EEC average annual change)].

Sources: Data for inflation and effective exchange rate growth differences are from the United Nations Yearbook of National Accounts Statistics, Vol. II, various issues; International Monetary Fund International Financial Statistics, various issues.

TABLE 4-4.--EFTA and Control Group Inflation Rate and Effective Exchange Rate Changes, 1970/71-1977/78[a]

	EFTA	US	Japan	Combined Control
Inflation Rate, 1970/71-1977/78	113.5	107.7	112.6	110.0[b]
Growth Rate Differences, 1970/71-1977/78	-----	-6.4[d]	-0.9[e]	-3.5[f]
Effective Exchange Rate Growth 1970/71-1977/78	14.0	-12.5	15.5	3.2[c]
Growth Rate Differences, 1970/71-1977/78	-----	-28.5[d]	1.5[e]	-10.8[f]

[a]Price competitiveness changes are estimated as average annual percentage changes.

[b]Weighted average of average annual percentage changes in US, Japan and Canada's rates of inflation.

[c]Weighted average of average annual percentage changes in US, Japan and Canada's effective exchange rate changes.

[d][(US average annual change) - (EFTA average annual change)].

[e][(Japan average annual change) - (EFTA average annual change)].

[f][(Combined control average annual change) - (EFTA average annual change)].

Sources: Data for inflation and effective exchange rate growth differences are from the United Nations Yearbook of National Accounts Statistics, Vol. II, various issues; International Monetary Fund International Financial Statistics, various issues.

favorable import price changes for Japan and mixed results for the combined control, relative to each importing country, the EEC and EFTA. Based on changes in price competitiveness, Japan is the best control for the EEC. For the combined control, the income and price-competitiveness changes tend to have off-setting influences on import behavior and therefore represent expected import growth of the enlarged integrated area in the absence of economic integration.[2]

To estimate trade diversion, the control is the importing country's base year ratio of external imports to total imports in each manufactured commodity group. The trade creation and trade diversion estimates, use the 1970/71 average as the base year (t_1) and the end year (t_2) is the 1977/78 average. Averages are used to reduce the effects of special conditions in any one year.[3] The estimates are not extended to 1979 because the most recent SITC revision became effective with the foreign trade statistics of 1979. This changes the composition of the commodity groups, and, comparisons between 1970/71 and 1978/79 become less meaningful.

The trade creation estimates for the enlarged integrated area appear in Table 4-5. Trade creation estimates were obtained separately for the EEC and EFTA according to (4.1) and then summed by commodity group. The US control shows trade creation due to economic integration occurring for imports of textiles, clothing, paper

TABLE 4-5.--Trade Creation for the Enlarged Integrated Area: Control Group Import Growth[a]

Commodity	US[b]			Japan[b]			Combined Control[b]		
	Unadjusted[c]	Adjusted Income[d]	Adjusted Price[e]	Unadjusted[c]	Adjusted Income[d]	Adjusted Price[e]	Unadjusted[c]	Adjusted Income[d]	Adjusted Price[e]
Textiles	7.96	7.97	7.90	-2.87	-2.45	-2.85	5.76	6.45	5.63
Clothing	4.05	3.91	4.02	-5.72	-5.31	-5.72	2.33	3.43	2.16
Paper Products	4.96	4.94	4.92	-8.03	-7.33	-8.00	2.99	3.71	2.40
Rubber Products	-0.28	-0.37	-0.28	-1.81	-2.74	-1.94	0.01	0.09	0.10
Chemicals	-1.16	-0.60	-1.25	0.75	1.20	0.84	0.83	1.03	0.41
Petroleum Products	-5.20	-5.21	-5.26	7.46	7.63	7.46	0.98	0.09	-1.21
Non-Metallic Minerals	0.22	0.12	0.21	-2.16	-1.89	-2.16	0.97	1.32	0.57
Basic Metals	0.58	0.63	0.50	1.64	2.04	1.67	0.95	2.09	0.93
Transportation Equipment	8.77	8.52	8.71	21.34	21.51	21.36	12.73	14.56	12.68
Engineering Products	3.73	3.12	3.50	20.90	22.05	20.95	3.92	4.01	3.82
Total	23.63	23.03	22.97	31.50	34.71	31.65	31.47	36.78	27.09

[a]Trade creation estimates are in billion US dollars.

[b]Control country or group.

[c]Trade creation unadjusted for changes in income growth or price competitiveness between the enlarged integrated area and the control.

[d]Trade creation adjusted for changes in income growth between the enlarged integrated area and the control.

[e]Trade creation adjusted for changes in price competitiveness between the enlarged integrated area and the control.

Sources: Data for trade creation estimates are from the OECD, Statistics of Foreign Trade, Series B, (Paris), various issues, 1970-1978; M. Kreinin, "Disaggregated Import Demand--Further Results," Southern Economic Journal 40 (July 1973): 19-25; H. Houthakker and S. Magee, "Income and Price Elasticities of World Trade," Review of Economics and Statistics 51 (May 1969): 111-25; data from Tables 4-1 - 4-4.

products, non-metallic minerals, basic metals, transportation equipment and engineering products. In each case, given economic integration, the expected post-integration value of imports is less than the actual post-integration value. Alternatively, expected imports exceed slightly actual imports for rubber products, chemicals and petroleum products. The negative trade creation estimates may result from sharp increases in US rubber, chemical and petroleum product imports in 1977/78 compared to only a slight increase in these imports, particularly petroleum product imports, in the enlarged integrated area.[4] Between 1970/71 and 1977/78 the average annual growth rate of US rubber product imports was 20.2% compared to 18.6% for the enlarged area. Over the same years, the average annual growth rate of US chemical imports was 19.5%; the enlarged integrated area's chemical imports grew by 18.9%. And, petroleum product imports grew at an average annual rate of 31.6% in the US, compared to 24.3% in the enlarged area. The total trade creation effect summed over all ten manufactured commodity imports is $23.68 bil.

With Japan as the control, trade creation is estimated for imports of chemicals, petroleum products, basic metals, transportation equipment and engineering products. Negative trade creation occurs for imports of textiles, clothing, paper products, rubber products and non-metallic minerals. Japan's average annual growth rate of imports in each of these commodity group exceeds the

enlarged integrated area's growth rate.[5] From 1970/71 to 1977/78, textile and clothing imports of the enlarged integrated area grew by 14.8% and 19.6% , respectively. Over these years, Japan's textile imports grew by 17.8%, and, clothing imports grew by 34.1%. The relatively slower import growth rate of the enlarged integrated area may reflect recent Generalized System of Preference (GSP) considerations given to textile and clothing imports from developing countries, and the restrictive application of these non-tariff rules by the EEC and EFTA.[6] Japan's paper product imports grew at an average annual rate of 22.3% compared to the enlarged area's growth rate of 16.8%. And, Japan's rubber and non-metallic mineral imports grew by 24.4% and 22.7%, respectively, compared to 18.6% and 16.8%, respectively, for the enlarged integrated area. Trade creation, summed over all ten commodity groups, is $31.50 bil. This estimate is similar to that of the combined control which estimates trade creation of $31.47 bil. Trade creation is estimated in all ten manufactured commodity groups.

Because the trade creation values are not adjusted for differences in the income growth rates of each importing country vis-a-vis each control and because they are not adjusted for changes in the relative price competitiveness of each importing country vis-a-vis each control, they are biased. The trade creation values adjusted for differences in income growth rates determine

more accurately the integration effects of enlarging the integrated area. Given the income growth differences between each importing country and each control, and, given the income elasticity of import demand in the US, Japan and the combined control for manufactured commodities, each control country's 1977/78 imports in each manufactured commodity group are adjusted. Trade creation is re-estimated; and, the income-adjusted values appear in Table 4-5. For the US control, income-adjusted trade creation falls to $23.03 bil.; for Japan, income-adjusted trade creation increases to $34.71 bil.; and, for the combined control, it increases to $36.78 bil.

These trade creation estimates adjust for the income bias, but they still incorporate the inflation and exchange rate bias. If, during the post-integration years, exportables and importables of each importing country had become more price competitive relative to those of the control then the growth rate of total imports would have been less than that of the control. This under-states trade creation. Tables 4-3 and 4-4 give differences in inflation and effective exchange rate changes of each importing country vis-a-vis each control. These differences estimate changes in the relative price competitiveness of exportables and importables of each importing country vis-a-vis each control. These differences along with the price elasticity of import demand for each control in each commodity are necessary

to estimate the expected value of imports in each commodity group if prices in the control and the importing country had changed at the same rate. Expected imports are adjusted; and, trade creation is re-estimated. The price-adjusted trade creation results appear in Table 4-5. US control trade creation falls to $22.97 bil.; for Japan, it increases to $31.65 bil.; and for the combined control, price-adjusted trade creation is $27.09 bil.

These trade creation estimates use another country's import growth rate as the control. Trade diversion estimates use each importing country's base year ratio of external imports to total imports in each commodity group as the control. Then, the results for each importing country are summed by commodity group. Trade diversion values are given in Table 4-6. Trade diversion is estimated in each commodity group for a total trade diversion of $7.88 bil., much less than all of the trade creation estimates. The largest values of trade diversion occur for chemicals ($1.59 bil.), textiles ($1.49 bil.) and basic metals ($1.43 bil.). Trade diversion has an adverse effect on developing countries and North America and Japan. The developing countries provide 52.3% and 55.2% of the enlarged integrated area's external imports of textiles and basic metals, respectively; and, North America and Japan provide 61.8% of the external chemical imports.[7]

TABLE 4-6.--Trade Diversion for the Enlarged Integrated Area: Control Group Import Growth[a]

Commodity	Trade Diversion
Textiles	1.49
Clothing	0.79
Paper Products	0.14
Rubber Products	0.23
Chemicals	1.59
Petroleum Products	1.22
Non-Metallic Minerals	0.51
Basic Metals	1.43
Transportation Equipment	0.08
Engineering Products	0.40
Total	7.88

[a]Trade diversion estimates are in billion US dollars.

Source: Data for trade diversion estimates are from the OECD Statistics of Foreign Trade, Series B, (Paris), various issues, 1970-1978.

The trade creation estimates of this approach use the control country's total imports in the relevant commodity group to estimate the importing country's import growth rate and the expected value of imports in the anti-monde. An alternative approach estimates expected imports relative to the domestic expenditure variable apparent consumption.

Control Group Import-to-Apparent Consumption Growth

This approach uses the ratio of total imports-to-apparent consumption to eliminate the domestic cyclical-income biases of the previous approach. Trade creation is estimated according to

$$TC = [(M^T_{ik}/C_{ik})_{t_2} - (M^T_{ik} / C_{ik})_{t_1} (\dot{M^T_{nk}/C_{nk}})_{t_1 t_2}] ({}_{t_2}C_{nk}) \quad (4.3)$$

Here, the variables are defined as above and C_{ik} and C_{nk} are apparent consumption (domestic production + imports - exports) of the importing country and the control country in commodity group k.

Trade creation is estimated separately for the EEC and EFTA vis-a-vis the three controls given above. The base year is 1970/71 and the end year is 1977/78 for each commodity group given in Appendix A. Table 4-7 shows that for the enlarged integrated area unadjusted trade creation using the US control is $28.43 bil. Trade creation occurs for imports of textiles, clothing, paper products, non-metallic minerals, basic metals, transportation equipment,

TABLE 4-7.--Trade Creation for the Enlarged Integrated Area: Import-to-Apparent Consumption[a]

Commodity	US[b]			Japan[b]			Combined Control[b]		
		Adjusted			Adjusted			Adjusted	
	Unadjusted[c]	Income[d]	Price[e]	Unadjusted[c]	Income[d]	Price[e]	Unadjusted[c]	Income[d]	Price[e]
Textiles	5.99	5.94	5.96	-2.46	-2.36	-2.42	6.04	6.39	5.81
Clothing	2.77	2.83	2.72	-1.96	-1.86	-0.73	2.85	3.61	2.64
Paper Products	3.78	3.87	3.76	-8.76	-8.64	-8.69	1.31	1.36	1.25
Rubber Products	-1.24	-1.24	-1.24	-1.26	-1.24	-1.25	-0.23	-0.18	-0.30
Chemicals	-4.86	-4.28	-6.53	2.51	2.49	2.56	5.68	6.15	5.53
Petroleum Products	-6.24	-6.22	-6.26	6.30	6.42	6.32	-1.13	-1.16	-1.50
Non-Metallic Minerals	2.23	2.21	2.24	-0.97	-0.93	-0.95	2.29	2.56	1.92
Basic Metals	4.37	4.34	3.78	3.99	4.52	4.09	0.49	0.80	0.47
Transportation Equipment	5.37	4.07	3.43	18.99	18.97	18.02	5.83	7.20	5.76
Engineering Products	16.33	16.00	14.27	17.91	17.32	17.03	5.26	5.36	5.25
Total	28.43	27.52	22.09	34.29	34.69	33.98	28.39	32.09	26.83

[a]Trade creation estimates are in billion US dollars.

[b]Control country or group.

[c]Trade creation unadjusted for changes in income growth or price competitiveness between the enlarged integrated area and the control

[d]Trade creation adjusted for changes in income growth between the enlarged integrated area and the control.

[e]Trade creation adjusted for changes in price competitiveness between the enlarged integrated area and the control.

Sources: Data for trade creation estimates are from the OECD, Statistics of Foreign Trade, Series B, (Paris), various issues, 1970-1978; M. Kreinin, "Disaggregated Import Demand--Further Results," Southern Economic Journal 40 (July 1973): 19-25; H. Houthakker and S. Magee, "Income and Price Elasticities of World Trade," Review of Economics and Statistics 51 (May 1969): 111-25; data from Tables 4-1 - 4-4.

engineering products. Negative trade creation occurs for imports of rubber products, chemicals and petroleum products. Negative trade creation was estimated for these commodity groups previously, using (4.1) and the US control (see Table 4-5). With Japan the control, trade creation is $34.29 bil. Trade creation is estimated for chemicals, petroleum products, basic metals, transportation equipment and engineering product imports. Negative trade creation is estimated for paper products, rubber products, and non-metallic mineral imports. Negative trade creation was estimated for these commodity groups using (4.1) and Japan as the control (see Table 4-5).

The combined control estimates trade creation for imports of textiles, clothing, paper products, chemicals, non-metallic minerals, basic metals, transportation equipment and engineering products. The value of trade created using the combined control is $28.39 bil. Negative trade creation is estimated for imports of rubber products and petroleum products. In each case, the imports of the combined control grew faster than the imports of the enlarged integrated area.[8] The rubber product import-to-apparent consumption ratio of the combined control grew at an annual average rate of 19.2% between 1970/71 and 1977/78 compared to 18.2% for the enlarged integrated area. The import-to-apparent consumption ratio of petroleum products grew by 31.6% in the combined control over these same years, compared to 24.3% for the enlarged integrated area. Faster

growth rate of the combined control imports-to-apparent consumption may be the result of sharp increases in petroleum and semi-manufactured (rubber) product imports of the US and Japan.

These trade creation estimates are unadjusted for different income growth rates, inflation rate and effective exchange rate changes. Adjustments for different income growth rates between each importing country and each control are made according to the data in Tables 4-1 and 4-2, and, the income elasticities of import demand for each commodity group. Trade creation is re-estimated. For each control, the estimated value of trade creation increases. The income-adjusted value of trade creation with the US control is $27.52 bil.; with Japan, $34.69 bil.; and, with the combined control $32.09 bil.

These estimates have not been adjusted to account for differences in price competitiveness of each importing country vis-a-vis each control. The data from Tables 4-3 and 4-4 along with price elasticity of import demand for each commodity group are used to make these adjustments. The price-adjusted trade creation values are $22.09 bil. with the US control; $33.98 bil. with Japan; and, $26.83 bil. with the combined control.

To determine the effect of economic integration, the value of trade diversion is necessary. From Table 4-6, trade diversion is $7.88 bil. This is far less than all of the trade creation estimates, indicating the trade-creating effect of economic integration.

Domestic Import Growth Approach

The preceding approaches use the import growth of a control country as the normalizer to estimate manufactured commodity imports in the absence of economic integration. An alternative import-growth approach is to use the pre-integration growth rate of the importing country (the EEC or EFTA) as the normalizer. The estimating equations are

$$TC = [({}_{t_1}M^T_{ik})(\dot{M}^T_{ik})_{t_1t_2}] - [({}_{t_1}M^T_{ik})(\dot{M}^T_{ik})_{t_0t_1}] \quad (4.4)$$

$$TD = [({}_{t_1}M^T_{ik})(\dot{M}^T_{ik})_{t_0t_1}] - [({}_{t_1}M^T_{ik})(\dot{M}^T_{ik})_{t_1t_2}] \quad (4.5)$$

where M^T_X = total imports, constant dollar
M^X = external imports, constant dollar
i = EEC or EFTA
k = commodity group
t_1 = base year
(t_0t_1) = pre-integration years
(t_1t_2) = post-integration years

The importing partner countries are the EEC and EFTA. Total imports and external imports of each importing country are divided into the ten manufactured commodity import groups of Appendix A. The base year (t_1) is 1971/72; the pre-integration years (t_0t_1) are 1966/67-1971/72; and, the post-integration years (t_1t_2) are 1971/72-1977/78. Trade creation and trade diversion are estimated separately for the EEC and EFTA, and, then summed by commodity group to obtain estimates for the enlarged integrated area. The results appear in Table 4-8.

Trade creation is estimated for imports of clothing, paper products, rubber products, chemicals, non-metallic

TABLE 4-8.--Trade Creation and Trade Diversion of the Enlarged Integrated Area: Domestic Import Growth[a]

Commodity	Trade Creation		Trade Diversion	
	Unadjusted	Adjusted[b]	Unadjusted	Adjusted[b]
Textiles	-0.82	-0.36	0.06	0.28
Clothing	0.49	1.09	1.07	1.32
Paper Products	1.93	2.60	1.44	1.65
Rubber Products	0.15	0.24	0.06	0.07
Chemicals	0.54	1.41	-0.16	0.02
Petroleum Products	-2.24	-1.33	1.52	1.61
Non-Metallic Minerals	0.12	0.20	0.08	0.11
Basic Metals	0.39	0.63	-0.40	-0.25
Transportation Equipment	3.70	4.29	1.38	1.62
Engineering Products	5.01	5.60	-0.93	-0.39
Total	9.27	14.37	4.12	6.04

[a]Trade creation and trade diversion estimates in billion US dollars.

[b]Trade creation adjusted for changes in income growth between pre- and post-integration years.

[c]Trade diversion adjusted for changes in income growth between pre- and post-integration years.

Source: Data for trade creation and trade diversion estimates are from the OECD Statistics of Foreign Trade, Series A, (Paris), various issues, 1966-1978; OECD Statistics of Foreign Trade, Series B, (Paris), various issues, 1966-1978.

minerals, basic metals, transportation equipment, and engineering products. Negative trade creation occurs for imports of textiles and petroleum products. In each case, actual post-integration imports are less than the expected value based on pre-integration import growth. The reduction in textile imports may be a result of expanding the size of the integrated area and the General Agreement on Tariffs and Trade, Generalized System of Preferences rules which were designed to increase developing country exports of textiles but which, when applied and subject to EEC and EFTA restrictions, had the opposite effect.[11]

Summing the trade creation estimates over the ten manufactured commodity groups shows that trade creation is $9.27 bil. in constant 1975 US dollars (excluding petroleum products, trade creation increases to $11.51 bil.). Adjusting these estimates for differences in the importing country's income growth rate between the pre- and post-integration years, increases trade creation. During 1966/67 - 1971/72, EEC income grew at an annual average rate of 5.45% and EFTA income grew at an annual average rate of 4.85% compared to income growth rates of 2.81% for the EEC and 1.95% for EFTA between 1971/72 and 1977/78. The income-adjusted trade creation value increases to $14.37 bil.

Equation (4.5) provides the trade diversion estimates. Trade diversion occurs for textile, clothing, paper product, rubber product, petroleum product,

non-metallic mineral, and transportation equipment imports. Negative trade diversion occurs for imports of chemicals, basic metals and engineering products. That is, the expected value of external imports is less than the actual value based on the post-integration import growth rate in each of these commodity groups. For chemicals, negative trade creation is $0.16 bil.; but, when imports are adjusted by differences in income growth rates, this changes to trade diversion of $0.02 bil. Basic metals and engineering products have negative trade diversion values of less than $1.0 bil.; which become less negative when external imports are adjusted by income growth differences. The unadjusted value of trade diversion is $4.12 bil. and increases to $6.04 bil. when adjusted for differences in income growth rates.

The largest values of trade diversion--adjusted and unadjusted--are for paper products, petroleum products, and transportation equipment imports. This has adverse effects on North America and Japan, and developing countries.[12] North America and Japan provide 73.9% of the enlarged integrated area's external transportation imports, while developing countries provide 34.2% of the external paper product imports and 80.8% of the external petroleum product imports.

The control group estimation approaches, while they allow for income and price adjustments, do not provide information for statistical tests to determine the

significance of the trade creation and trade diversion estimates. Import demand regressions provide information for these tests. Chapter 5 presents the estimation results for the single domestic variable and the multiple regression import demand equations.

NOTES--CHAPTER 4

[1]M. Kreinin, "Static Effects of EC Enlargement on Trade Flows in Manufactured Products," Kyklos 34 (Winter 1981), pp. 61-64.

[2]Ibid.

[3]Ibid., p. 60.

[4]General Agreement on Tariffs and Trade, International Trade 1977/78, (Geneva, 1978): 71-76. The import growth rates are based on data from Organization of Cooperation and Development (OECD), Statistics of Foreign Trade, Series B, (Paris), various issues, 1970-1977.

[5]OECD, Statistics of Foreign Trade, Series B, (Paris), various issues, 1970-1977.

[6]M. Kreinin and J. Finger, "A Critical Survey of the New International Economic Order," Journal of World Trade Law 10 (November/December 1976): 493-512; T. Murray, "How Helpful is the Generalized System of Preferences to Developing Countries?" Economic Journal 83 (July 1973).

[7]General Agreement on Tariffs and Trade (GATT), Appendix Tables A19 and A20, International Trade 1979/80, (Geneva, 1980).

[8]The average annual percentage growth rates are based on data from OECD Statistics of Foreign Trade, Series B, (Paris), various issues 1970-1977; and United Nations Index of Industrial Production, New York, 1970-1977.

[9]GATT, 1977/78, pp. 71-76.

[10]Kreinin and Finger, "A Critical Survey"; and Murray, "How Helpful?"

[11]GATT, 1979/80, p. 75.

[12]GATT, Appendix Tables A19 and A20, 1979/80.

CHAPTER 5

TRADE CREATION AND TRADE DIVERSION USING IMPORT DEMAND EQUATIONS

5.1 Import Demand Regression Estimates with One National Variable

The estimation approaches of Chapter 4 assume that the import structure of each importing country for each manufactured commodity group must change with economic integration. Import demand regression estimates with a single national variable determine whether economic integration significantly changes that structure by estimating the following import demand equations for total imports and external imports, respectively:

$$M^T_{ikt} = a_1 + a_2 Y_{it} + e_{ik} \tag{5.1a}$$

$$M^T_{ikt} = b_1 + b_2 Y_{it} + b_3 X_t + b_4 X_t Y_{it} + e_{ik} \tag{5.1b}$$

and

$$M^X_{ikt} = a_1 + a_2 Y_{it} + e_{ik} \tag{5.2a}$$

$$M^X_{ikt} = b_1 + b_2 Y_{it} + b_3 X_t + b_4 X_t Y_{it} + e_{ik} \tag{5.2b}$$

where M^T = total imports, constant dollar
M^X = external imports, constant dollar
Y = real income (Gross National Product or Gross Domestic Product)
i = dummy variable; 0 for pre-integration years
1 for post-integration years

i = EEC or EFTA
k = commodity group
t = pre-integration and post-integration years
e = error term

This approach estimates trade creation using total imports, (5.1a) and (5.2a), and, trade diversion using external imports (5.1b) and (5.2b), for the two importing countries, the EEC and EFTA, in each commodity group. Total imports and external imports are divided into the ten manufactured commodity import groups of Appendix A. (5.1a) and (5.2a) are fitted for annual observations from 1966-1978 on imports and income. (5.1b) and (5.2b) divide 1966-1978 into pre-integration years 1966-1972 and post-integration years 1972-1978. An F-test is used to determine whether economic integration significantly changes import behavior in each commodity group between these two time periods. If a statistically significant structural change occurs for total imports, then (5.1b) is re-estimated for 1966-1972 to establish the pre-integration import structure expected to prevail throughout the post-integration years. Substituting real income for 1977 and 1978 into the fitted equations projects the expected value of total imports for each year in each commodity group. The actual value of total imports less the projected value is the estimated trade creation effect of economic integration. It is expected to be positive when trade creation occurs. Trade creation estimates are made for the EEC and for EFTA, separately, then summed by commodity group.

Applying the same process to (5.2a) and (5.2b) determines whether a statistically significant change occurs for external imports in each commodity group, given economic integration. The expected value of external imports less the actual value is the estimated trade-diverting effect of economic integration. This estimate will be positive when trade diversion occurs. Trade diversion is estimated separately for the EEC and EFTA, then summed by commodity group.

The regression results for EEC total and external imports appear in Appendix B, Table B-1, and the results for EFTA total and external imports appear in Appendix B, Table B-2. The trade creation and trade diversion estimates for 1977 and 1978, based on these regressions and summed by commodity group, appear in Table 5-1. Only total imports of textiles and basic metals are not affected significantly by economic integration; all other commodity groups are affected significantly by economic integration for a total trade creation value of $25.86 bil. for 1977 and $38.49 bil. for 1978. Transportation equipment is the commodity group most affected by enlarging the integrated area of Western Europe. This is most beneficial to the EEC and EFTA which provide the enlarged integrated area with 67.2% and 17%, respectively, of the total transportation equipment imports.[1]

Trade diversion for 1977 is $10.78 bil. and $13.34 bil. for 1978. This is less than the trade creation

TABLE 5-1.--Trade Creation and Trade Diversion of the Enlarged Integrated Area: Import Demand Regression with One National Variable[a]

Commodity	1977 Trade Creation	1977 Trade Diversion	1978 Trade Creation	1978 Trade Diversion
Textiles	----	0.91	----	0.23
Clothing	4.98	3.46	5.30	3.59
Paper Products	2.89	1.05	5.72	0.39
Rubber Products	0.42	----	0.69	----
Chemicals	5.44	0.35	6.25	0.97
Petroleum Products	2.95	0.96	4.02	1.00
Non-Metallic Minerals	0.26	0.37	0.57	0.18
Basic Metals	----	-0.76	----	-0.75
Transportation Equipment	5.59	1.42	8.62	3.24
Engineering Products	3.33	3.02	7.32	4.49
Total	25.86	10.78	38.49	13.34

[a]Trade creation and trade diversion estimates are in billion US dollars.

Sources: Data for trade creation and trade diversion estimates are from OECD Statistics of Foreign Trade, Series B, (Paris), various issues, 1966-1978; Appendix Tables B1 and B2.

estimate for each year. The only commodity group not affected significantly by economic integration is the rubber product import group. Basic metals is the only group with negative trade diversion which may be explained by increased production during the later 1970's.[2] The commodity groups most adversely affected by enlarging the integrated area of Western Europe are clothing and engineering products. North America and Japan provide the enlarged integrated area with 74.6% of the external engineering product imports and the developing countries provide 60% of the external clothing imports. Japan's exports of engineering products to Western Europe increased during 1977 and 1978.[3]

These estimates indicate that trade creation increases over time. However, because these estimates have been made shortly after the completion of the transition process, it may be that in future years a larger cumulative effect will be estimated.

Although this approach eliminates the income bias, the relative price bias remains. To adjust for this, the multiple regression import demand approach regresses the import volume index on a domestic activity parameter (in this case the index of industrial production) and a relative price parameter to establish the import structure of the domestic country for total manufactured imports prior to economic integration.

5.2 Import Demand Multiple Regression Estimates of Trade Creation and Trade Diversion

In contrast to the preceding approaches, this approach does not disaggregate total imports into commodity groups. Rather, total imports of each importing country are divided into two groups: total imports and external imports. Imports are purged of oil imports using the import unit value indices from the Organization for Economic Co-Operation and Development Statistics of Foreign Trade, Series A and B for commodity group SITC 3.

This approach estimates the expected imports for five of the EEC countries (Belgium-Luxembourg is considered one country) and eight of the EFTA countries according to[4]

$$\ln m^{T}_{ik} = c_1 + c_2 \ln Y_{it} + c_3 \ln (P^{T}_{t}/P^{d}_{it}) + e_i \qquad (5.3a)$$

$$\ln m^{X}_{ik} = c_1 + c_2 \ln Y_{it} + c_3 \ln (P^{X}_{t}/P^{d}_{it}) + e_i \qquad (5.3b)$$

where m^{T} = volume index of total imports
m^{X} = volume index of external imports
Y = index of real income (or other domestic activity variable)
P^{T}_{X} = import price index for total imports
P^{d} = external import price index, weighted average
P^{d} = domestic price index (wholesale price index)
i = importing country
t = pre-integration years
e = error term

The import volume index of total imports (purged of oil imports) is regressed on the index of real income or the industrial production index and on the ratio of the import price index to the domestic country's wholesale price index. The industrial production index is used for all thirteen

countries. The income and price elasticity estimates are based on 28 quarterly observations from 1966I-1972IV. An exchange rate variable is not included because the pre-integration import structure of each country is estimated from 1966I-1972IV. Floating exchange rates did not begin to become effective until 1971III.[5]

This approach has two advantages over previous estimates. First, it incorporates a relative price variable. Second, given that total imports are used, estimates of trade creation and trade diversion for 1979 can be made.

For each country, two regressions are estimated. For example, an estimate of the income and the relative price elasticity for France's total imports and an estimate of these elasticities for France's external imports is made. Then, the estimated income and relative price elasticities are used to project expected total imports and expected external imports in the absence of economic integration for eight quarters: 1978I-1979IV. To estimate imports in the post-integration period, the income and price indices for each quarter 1978I-1979IV are substituted into the fitted equations.

Table 5-2, Parts A and B present the regression estimates (Part A) and the trade creation and trade diversion estimates (Part B) for each EEC and EFTA country. Part A shows that the income elasticity of import demand is positive and significant for each EEC country except for total imports of the Netherlands. The Netherlands' income

TABLE 5-2.--Import Demand Multiple Regression, 1966I-1972IV
Part A

Importing Country	Exporter	Constant	Y	Relative Price	R^2
Belgium	M^T	-10.13	2.50[a]	-0.50	89.2
	M^X	-5.96	1.55[a]	-0.18	81.9
France	M^T	-0.46	0.85[a]	-1.78[a]	87.0
	M^X	-2.03	1.84[a]	-0.66[b]	79.5
Germany	M^T	-1.00	1.20[a]	-2.70[a]	93.2
	M^X	-3.27	0.82[a]	-1.91[a]	93.6
Italy	M^T	0.01	0.70[a]	-2.40[a]	93.1
	M^X	-4.78	1.18[a]	-0.26[b]	92.3
Netherlands	M^T	-4.60	-0.40	-0.42	95.1
	M^X	-3.78	1.37[a]	-1.03	90.8
Austria	M^T	-4.80	1.13[a]	-0.18	74.4
	M^X	-5.40	1.00[a]	-3.20	74.1
Denmark	M^T	1.40	0.80[a]	-0.50[b]	91.3
	M^X	0.21	0.64[a]	-0.04[b]	90.5
Finland	M^T	-1.30	0.30[b]	0.63	30.0
	M^X	-1.22	1.17[b]	-0.36	13.0
Norway	M^T	-6.34	1.39[a]	0.26	77.2
	M^X	-5.96	1.52[a]	-0.95[a]	72.4
Portugal	M^T	-3.60	1.10[b]	0.70	90.4
	M^X	-3.40	0.69[a]	0.15	89.8
Sweden	M^T	-3.02	0.67[a]	-0.52[b]	64.5
	M^X	-1.79	2.49[a]	-0.92	43.7
Switzerland	M^T	-5.84	1.67[a]	-1.27[a]	93.1
	M^X	-6.45	1.54[b]	-0.28	92.0
United Kingdom	M^T	1.40	0.45	1.34[a]	58.4
	M^X	0.56	0.44	0.30	64.2

[a] t-statistic significant at 5% level.

[b] t-statistic significant at 10% level.

Sources: Data for estimating the import demand equations is from OECD, Statistics of Foreign Trade, Series A, (Paris), various issues, 1966-1979; OECD, Statistics of Foreign Trade, Series B, (Paris), various issues, 1966-1979; United Nations, Yearbook of National Accounts Statistics, (New York), various issues, 1966-1979.

TABLE 5-2.--Continued.

Part B[a]

Importing Country	Trade Creation 1978 I	II	III	IV	Trade Diversion 1978 I	II	III	IV	Trade Creation 1979 I	II	III	IV	Trade Diversion 1979 I	II	III	IV
Belgium	0.3	0.29	0.36	0.34	0.13	0.12	0.14	0.16	0.4	0.35	0.47	0.5	0.17	0.16	0.21	0.26
France	0.6	0.9	1.3	1.3	0.12	0.35	0.39	0.42	1.5	1.5	0.6	1.6	0.52	0.54	0.67	0.62
Germany	0.6	0.9	1.1	1.2	0.6	0.6	0.7	0.8	1.4	1.4	1.6	1.7	0.8	0.8	0.11	0.6
Italy	0.65	0.65	0.7	0.4	0.2	0.19	0.33	0.53	0.5	0.5	0.5	0.5	0.34	0.45	0.5	0.6
Netherlands	0.25	0.3	0.36	0.3	0.15	0.18	0.21	0.21	0.5	0.4	0.5	0.5	0.22	0.23	0.3	0.28
Austria	0.4	0.8	0.9	1.0	0.1	0.1	0.2	0.3	1.3	1.5	1.8	2.0	0.2	0.38	0.3	0.3
Denmark	0.1	0.17	0.2	0.1	0.1	0.1	0.19	0.15	0.3	0.12	0.3	0.4	0.11	0.13	0.15	0.11
Finland	0.1	0.1	0.1	0.1	0.2	0.3	0.4	0.6	0.3	0.4	0.4	0.5	0.4	0.5	0.8	1.0
Norway	0.2	0.3	0.2	0.3	0.1	0.1	0.04	0.04	0.1	0.4	0.3	0.4	0.04	0.1	0.03	0.07
Portugal	-0.3	-0.3	-0.3	-0.3	0.1	0.2	0.3	0.5	-0.9	-0.9	-0.9	-0.7	0.4	0.4	0.3	0.5
Sweden	-1.2	-1.3	-1.5	-0.2	0.05	0.03	0.01	0.03	-1.4	-1.4	-1.9	-1.6	0.06	0.1	0.4	0.8
Switzerland	2.7	2.7	3.1	3.4	0.9	0.9	1.1	1.1	3.8	3.5	4.0	3.8	1.1	1.1	1.3	1.6
United Kingdom	-0.1	-0.2	-0.7	-0.14	0.2	0.26	0.11	0.22	-0.1	-0.4	0.2	0.2	0.29	0.3	0.4	0.17
Total	4.3	5.81	5.82	7.8	2.95	3.43	4.12	5.06	7.7	7.37	8.87	9.8	4.65	5.19	5.47	6.91

[a]Trade creation and trade diversion estimates are in billion US dollars.

Sources: Data for trade cration and trade diversion estimates are from OECD, Statistics of Foreign Trade, Series A, (Paris), Various issues, 1966-1979; TABLE 5-2, Part A.

elasticity estimate is negative but insignificant for total imports. For each of the EEC countries with a significant income elasticity, the elasticity is greater than 0.5 but less than 2.5.[6] The relative price elasticity is more volatile. It is occasionally insignificant and/or has the incorrect sign (e.g., Belgium, the Netherlands).

The income and relative price elasticity results for the EFTA countries are similar. The income elasticity is positive and significant for total and external imports for all of the EFTA countries except for total imports and external imports of the United Kingdom. Here, the income elasticity estimates are positive but insignificant. The income elasticity estimates are always less than 2.0, and, except in the case of Finland, greater than 0.5. The price elasticity estimates are more volatile. This elasticity has the incorrect sign for Finland's, Norway's, Portugal's and the United Kingdom's total imports and for Portugal's and the United Kingdom's external imports. In these cases, it is also insignificant, with the exception of the United Kingdom's total imports.

Trade creation and trade diversion corresponding to these equations are given in Table 5-2, Part B. Part B shows a few instances of negative trade creation--trade creation values less than zero. However, when the trade creation values are summed over all the Western European countries belonging to the enlarged integrated area, trade creation is positive and increasing over time. The effect

of economic integration is to increase the integrated area's imports from $24.24 bil. in 1978 to $33.74 in 1979.

Trade diversion also increases over time. It increases from $15.56 bil. in 1978 to $22.22 bil. in 1979. The net effect of economic integration also increases over time. In 1978, the excess of trade creation over trade diversion is $7.67 bil. By 1979, the excess of trade creation over trade diversion increases to $11.52 bil. The trade diversion estimate does experience an upward bias. Because total imports are used, trade in agricultural products are included. This results in an over estimation of the trade diversion value.

5.3 Conclusion

The above six approaches have estimated the trade creation and trade diversion effects of enlarging the size of the integrated area of Western Europe. A summary of the results along with a discussion of the upper and lower bounds on the estimates of trade creation and trade diversion are presented in Chapter 6.

NOTES--CHAPTER 5

[1]GATT, Appendix Tables A19 and A20, 1979/80.

[2]GATT, 1977/78, pp. 71-76.

[3]Ibid.

4 Iceland is not included because no income activity variable is reported for the years 1966-1971; reporting began in 1972.

[5]D. Warner and M. Kreinin, "Determinants of International Trade Flows," paper presented to the Workshop on Production and Trade in a World with Internationally Mobile Factors of Production, Stockholm, Sweden; August 4-15, 1980, p. 7.

[6]This is similar to the estimates of H. Houthakker and S. Magee, "Income and Price Elasticities in World Trade," Review of Economics and Statistics 51 (May 1969): 111-25.

CHAPTER 6

SUMMARY AND CONCLUSIONS

Tables 6-1 and 6-2 provide a summary of trade creation and trade diversion effects of enlarging the integrated area of Western Europe. Table 6-1 shows that, for each approach, trade creation exceeds trade diversion indicating that enlarging the integrated area of Western Europe has contributed to a more efficient allocation of world resources. Table 6-2 provides a summary of the upper and lower bounds on trade creation and trade diversion. The trade creation results of the five approaches given in Table 6-2 are bunched between $22.09 bil. and $38.49 bil. The trade diversion results are between $7.88 bil. and $22.22. Only the domestic import growth approach estimates of trade creation and trade diversion, adjusted and unadjusted, gives results outside of these bounds. This can be explained by the dissimilar cyclic conditions of the pre-integration relative to the post-integration years for the two importing countries, the EEC and EFTA.

Examining each approach individually demonstrates which manufactured commodity groups have benefitted and which have not benefitted from enlarging the integrated area of Western Europe. The transportation equipment and engineering product commodity groups show the largest

TABLE 6-1.--Summary: Trade Creation and Trade Diversion of the Enlarged Integrated Area[a]

Approach	Trade Creation[b]	Trade Diversion[b]	Percentage of Total Imports Trade Creation	Trade Diversion
Control Group Import Growth		7.88		2.4
		7.88		2.4
US	23.68		7.3	
Japan	31.50		9.7	
Combined Control	31.47		9.3	
Income Adjusted		7.88		2.4
US	23.03		7.1	
Japan	34.71		11.0	
Combined Control	36.78		11.3	
Price Adjusted		7.88		2.4
US	22.97		7.1	
Japan	31.65		9.7	
Combined Control	27.09		9.2	
Control Group Import-to-Apparent Consumption Growth		7.88		2.4
US	28.43		7.5	
Japan	34.29		10.5	
Combined Control	28.39		8.7	
Income Adjusted		7.88		2.4
US	27.52		8.5	
Japan	33.98		10.6	
Combined Control	32.09		10.2	
Price Adjusted		7.88		2.4
US	22.09		7.1	
Japan	33.98		11.1	
Combined Control	26.83		8.2	
Import Demand Regression with One National Variable[c]				
1977	25.86	10.78	13.8	5.8
1978	38.49	13.34	13.6	5.9
Import Demand Multiple Regression				
1978	23.23	15.56[d]	6.7	4.7
1979	33.74	22.22[d]	9.7	5.3

[a]Domestic import growth trade creation and trade diversion estimates are not included in this Table. These estimates are very different from the five approaches given above. This may be due to the different cyclical conditions in the enlarged integrated area in the pre- relative to the post-integration years.

[b]Trade creation and trade diversion estimates are in billion US dollars.

[c]Constant dollar values of trade creation and trade diversion, 1975 base.

[d]Trade diversion may be overstated due to inclusion of agricultural commodities.

TABLE 6-2.--Upper and Lower Bounds on Trade Creation and Trade Diversion

	Upper Bound	Lower Bound
Trade Creation	38.49[b]	22.09
Trade Diversion	22.22	7.88

[a]Trade creation and trade diversion estimates in billion US dollars.

[b]Constant dollar value, 1975 base.

value of trade creation according to all of the estimation approaches. This is most beneficial to the enlarged area which provides itself with 84.2% of the transportation equipment and 75.4% of the engineering product imports.[1] Textiles and clothing imports demonstrate the largest trade diversion. This is the cost of economic integration, borne most heavily by the developing countries which provide the enlarged integrated area with 52.3% of its external textile imports and 60% of its external clothing imports.[2] Keep in mind, however, that these results have been made immediately after the transition process ended. According to the import demand with one national variable approach and the import demand multiple regression approach, the trade-creating effect increases over time. Although trade diversion increases also, the net trade-creating effect increases. These estimates have been made shortly after the completion of the transition process; therefore, it is possible that in future years a larger net trade-creating effect may be estimated.

NOTES--CHAPTER 6

[1]GATT, Appendix Tables A19 and A20, 1979/80.

[2]Ibid.

APPENDICES

APPENDIX A

TABLE A-1.--Manufactured Commodity Groups[a]

Commodity Groups	SITC Categories
Textiles	267, 65
Clothing	61, 83, 84, 85
Paper Products	243, 25, 63, 64, 82, 892, 895
Rubber Products	62
Chemicals	266, 42, 43, 5
Petroleum Products	332
Non-Metallic Minerals	661, 662, 663, 664, 665, 666
Basic Metals	282, 284, 67, 68
Transportation Equipment	73
Engineering Products	69, 71, 72, 812, 86, 891, 893 894, 896, 897, 899

[a]The industry groups and the SITC categories included in each group follow that presented by M. Kreinin, "Effects of the EEC on Import of Manufactures," Economic Journal 82 (September 1972): 920. As with Kreinin's analysis, this has been done to facilitate estimating apparent consumption; and therefore, to maintain consistency among the approaches.

APPENDIX B

TABLE B-1.--EEC Import Demand Regressions

	Commodity	Constant	Y	X	XY	F-Stat.	R^2
Total Imports	Textiles	-8514	13.71[a]				94.4
		-5648	10.37	-7294	7.35	1.71	95.5
		Insignificant F-Stat.					
	Clothing	-16565	22.35[a]				91.2
		-8657	13.20[a]	-27504	26.70[a]	11.33[c]	97.5
		-8657	13.20[a]				87.0
	Paper Products	-12491	19.37[a]				94.4
		-6783	12.74[a]	-16711	16.53[a]	9.72[c]	98.2
		-6783	12.74[a]				93.0
	Rubber Products	-2231	3.16[a]				93.5
		-1183	1.94[a]	-2374[a]	2.43[a]	7.79[d]	97.6
		-1183	1.94[a]				97.6
	Chemicals	-19652	29.81[a]				96.7
		-11985	20.84[a]	-14915[a]	15.62[a]	12.06[c]	99.1
		-11985	20.84[a]				96.0
	Petroleum Products	-5411	7.72[a]				90.3
		-1848	3.55[a]	-6121[a]	6.56[a]	12.09[c]	97.4
		-1848	3.55[a]				95.5
	Non-Metallic Minerals	-3588	5.47				92.8
		-2396	4.09	-4327	4.18	2.46	93.0
		Insignificant F-Stat.					
	Basic Metals	-10303	21.81[a]				90.0
		-8944	20.12[a]	11667	9.70	0.84	91.5
		Insignificant F-Stat.					
	Transportation Equipment	-20630	29.67[a]				89.0
		-15135	23.49[a]	-42096[a]	38.6[a]	5.86[d]	95.2
		-15135	23.49[a]				91.8
	Engineering Products	-47189	67.83[a]				96.9
		-31560	54.29[a]	-20503	30.6	2.96	98.1
		Insignificant F-Stat.					

TABLE B-1.--Continued

	Commodity	Constant	Y	X	XY	F-Stat.	R^2
External Imports	Textiles	-3138	4.28[a]				87.8
		-1231	2.07[a]	-6827	6.61	20.34[c]	97.8
		-1231	2.07[a]				91.8
	Clothing	-7822	9.90[a]				85.9
		-2670	3.92[a]	-16206[a]	15.90[a]	20.43[c]	97.5
		-2670	3.92[a]				69.6
	Paper Products	-2335	4.02[a]				82.3
		22	1.29[a]	-8179[a]	7.94[a]	32.18[c]	97.8
		22	1.29[a]				47.9
	Rubber Products	-421	0.57[a]				57.0
		-122	0.21	-731	0.74	0.83	63.7
		Insignificant F-Stat.					
	Chemicals	-2960	5.02[a]				95.6
		-1947	3.86[a]	-4942[a]	4.66[a]	15.77[c]	99.0
		-1947	3.86[a]				99.1
	Petroleum Products	-2194	3.03[a]				75.3
		-17	0.48	-4590	4.75[a]	7.06[d]	90.4
		-17	0.48				62.7
	Non-Metallic Minerals	-505.8	0.73				86.4
		-228.0	0.414	-1178	1.13	8.01[c]	95.2
		-228.0	0.414				96.3
	Basic Metals	-1228	4.72[a]				68.7
		-2012	5.59[a]	6716	6.20	0.85	73.7
		Insignificant F-Stat.					
	Transportation Equipment	-4297	5.85[a]				82.7
		-2664	4.00[a]	-10334[a]	9.57[a]	4.93	91.8
		-2664	4.00[a]				94.1

[a] t-statistic is significant at 5%

[b] t-statistic is significant at 10%

[c] F-statistic is significant at 1%

[d] F-statistic is significant at 5%

Sources: OECD Statistics of Foreign Trade, Series B, various issues; United Nations Yearbook of National Accounts Statistics, Vols. I and II, various issues.

TABLE B-2.--EFTA Import Demand Regressions

	Commodity	Constant	Y	X	XY	F-Stat.	R^2
Total Imports	Textiles	-1056	7.54				61.1
		637	3.47	-1023	3.05	3.16	77.2
		Insignificant F-Stat.					
	Clothing	-5126	15.92[a]				65.8
		-848	5.74[b]	-19507[a]	40.14[a]	14.13[c]	91.8
		-848	5.74				40.6
	Paper Products	-2746	14.25[a]				61.7
		770	5.83	-7879	17.37	4.39[d]	80.6
		770	5.83				38.7
	Rubber Products	2399	-3.58				7.6
		3603	-6.44	-6320	12.88	0.25	12.5
		Insignificant F-Stat.					
	Chemicals	-7204	25.75[a]				68.7
		117	8.18[a]	-9512	22.96	7.8[d]	85.7
		117	8.18				18.1
	Petroleum Products	-2490	10.35[a]				42.5
		1709	0.26	-1015	4.66	8.17[c]	79.6
		1709	0.26				2.0
	Non-Metallic Minerals	-1213.0	4.09[a]				68.0
		-281.5	1.87[b]	-4220[b]	8.69[b]	6.69[d]	87.1
		-281.5	1.87[b]				50.2
	Basic Metals	-1889	14.33[a]				65.3
		66	9.55[a]	12265	-22.23	2.56	77.8
		Insignificant F-Stat.					
	Transportation Equipment	-10345	33.20[a]				62.2
		-815	10.51	-41839[a]	86.32[a]	12.17[c]	89.8
		-815	10.51				29.0
	Engineering Products	-21826	77.26[a]				72.7
		-6139	39.67[a]	-27191	62.24	5.59[d]	87.8
		-6139	39.67[b]				53.5

TABLE B-2.--Continued

	Commodity	Constant	Y	X	XY	F-Stat.	R^2
External Imports	Textiles	221.6	0.77				14.0
		465.5	0.19	95	-0.03	0.43	21.6
		Insignificant F-Stat.					
	Clothing	-1535.5	4.87[a]				58.7
		77.7	1.02	-5132[b]	10.88[a]	17.24	91.4
		Insignificant F-Stat.					
	Paper Products	2178.8	-1.99				26.2
		2777.2	-3.44[a]	598	-0.76	1.01	39.8
		Insignificant F-Stat.					
	Rubber Products	-102.5	0.36				81.6
		-60.69	0.26	-157	0.33	2.03	87.3
		Insignificant F-Stat.					
	Chemicals	54.2	2.33[a]				48.9
		179.1	1.99[a]	5858[a]	-11.14[a]	4.56[d]	74.6
		179.1	1.99[a]				65.0
	Petroleum Products	56.9	1.41				12.9
		1339.3	-1.65	-3499	7.53	7.13[d]	66.3
		1339.3	-1.65				72.7
	Non-Metallic Minerals	-40.53	0.32[a]				47.2
		31.86	0.15	-337	0.69	1.49	63.2
		Insignificant F-Stat.					
	Basic Metals	2239.4	-1.12				4.6
		778.9	2.32	11471[a]	22.92[a]	6.98[d]	62.6
		778.9	2.32				30.1
	Transportation Equipment	-2360	7.71[a]				80.4
		469.6	0.97	-12216[a]	25.24[a]	12.50[c]	86.9
		469.6	0.97				40.8
	Engineering Products	-5348.0	18.92[a]				79.7
		-2082	11.13[a]	-10424	22.08[b]	6.61[d]	91.8
		-2082	11.13				66.2

[a] t-statistic is significant at 5%

[b] t-statistic is significant at 10%

[c] F-statistic is significant at 1%

[d] F-statistic is significant at 5%

Sources: OECD Statistics of Foreign Trade, Series B, various issues; United Nations Yearbook of National Accounts Statistics, Vols. I and II, various issues.

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