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THE ECONOMIC EFFECTS OF THE SECOND ENLARGEMENT OF THE EUROPEAN COMMUNITIES

By

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ABSTRACT

ECONOMIC EFFECTS OF THE SECOND ENLARGEMENT
OF THE EUROPEAN COMMUNITIES

By

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Ever since Jacob Viner introduced the concepts of trade creation and trade diversion, the net effect on static resource allocation of regional trade integration has been questioned. World economic efficiency will increase if trade creation is greater than trade diversion; otherwise, economic efficiency will decline. This dissertation estimates net trade creation induced by customs union formation between Greece, Spain, and Portugal (the Three) and the European Communities (EC), which is known as the Second Enlargment. Using several ex-ante and ex-post techniques, upper and lower bound estimates of trade creation and trade diversion are derived for disaggregated agricultural and manufactured commodities.

After an extensive review of customs union theory, ex-ante trade models used in estimating regional integration are presented and evaluated. Variations of the price-elasticity and import demand regression approaches are employed to estimate trade creation and trade diversion. These models were selected for three reasons: they allow for commodity disaggregation; each technique permits bilateral trade flow analysis; and ex-post estimates of trade integration in

the literature are consistent with the ex-ante derivations of these models, thereby confirming their reliability. In both techniques, the net result if negative trade creation for total manufactures and agriculture and for the majority of disaggregated commodity groups.

Ex-post estimation follows the ex-ante derivations. Because this estimation procedure requires data for postintegration years, only the case of Greece can be considered, as Spain and Portugal acceded in 1986. Following a review and evaluation of ex-post models, three are chosen for the present study, two normalized import growth approaches and the ex-post import demand regression model. They were selected because they allow for commodity disaggregation and bilateral trade flow analysis. In addition, the two import growth approaches permit price and income adjustments for biases stemming from the use of a control country to estimate antimonde import growth. Net negative trade creation is derived for all three techniques.

In conclusion, the Second Enlargement causes a less efficient allocation of global resources.

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INTRODUCTION

The European Community (EC) is without doubt the largest and most successful customs union today. It came into existence on January 1, 1958, after the Treaty of Rome was ratified by the parliaments of Italy, France, Belgium, Luxembourg, West Germany, and the Netherlands. After a ten-year transition period, the Community became a full customs union; there are no bilateral tariffs within the trading bloc, and a common external tariff is applied to nonpartner imports. In 1973, the United Kingdom, Denmark, and Ireland formally joined the EC; this is known as the First Enlargement. The southern expansion of the European Community to include Greece, Portugal, and Spain is referred to as the Second Enlargement. Greece acceded on January 1, 1981; Spain and Portugal joined five years later.

The object of this dissertation is to estimate the net effect on static economic efficiency of the Second Enlargement. Using several ex-ante and ex-post techniques, trade creation and diversion values are derived for disaggregated manufactured and agricultural commodity groupings. By so doing, several important international commercial policy questions can be addressed. First, it is possible to investigate the effects of economic integration between "unequal partners," that is, industrial and newly industrialized countries, on economic allocative efficiency. Second, the effects on nonpartner

countries can be estimated, which is important for EC trade relations. Finally, the ramifications of accession for the respective economies of the Three, which are at a crucial stage of development, can be assessed. If net trade diversion (creation) obtains, accession will be detrimental (beneficial) to economic growth by decreasing (increasing) the efficiency of domestic resource allocation. However, dynamic effects are excluded from the analysis; their inclusion might mitigate or change the above conclusions.

The first two chapters develop the analytical framework necessary for customs union analysis. Changes in economic efficiency caused by regional integration are a priori indeterminate; there are both positive and negative effects to consider. Beneficial effects stem from equating partner and domestic prices within the customs union, leading to increased specialization in comparative advantage industries. This phenomenon is trade creation. However, customs union formation also implies a distortion in the relationship between partner and nonpartner prices, potentially causing a displacement of lower cost nonpartner imports in favor of higher cost partner imports. A less efficient allocation of resources ensues; this effect is known as a trade diversion. Thus, the total change in economic efficiency depends on whether trade creation or trade diversion is dominant. Chapter I reviews the theoretical axioms of economic integration, while Chapter II considers the rationale for forming customs unions compared to other policy options in static and dynamic contexts.

Ex-ante estimation of the economic effects of the Second Enlargement is the essential aim of Chapter III and Chapter IV. It entails forecasting changes in economic variables before they occur. This approach is applicable to the Second Enlargement because Spain and Portugal acceded only recently. Chapter III reviews ex-ante estimation procedures, presents results obtained using the various ex-ante techniques in the literature, and selects models appropriate to the present study. After summarizing the relevant institutional information, Chapter IV estimates trade creation and trade diversion caused by the Second Enlargement using the price-elasticity approach and the ex-ante version of the import demand regression paradigm.

Chapter V and Chapter VI are concerned with ex-post estimation, that is, the economic analysis of events that have already occurred. At the present time, necessary information for ex-post analysis is only available for the case of Greece. Chapter V reviews, evaluates, and selects ex-post models analogously to the presentation of ex-ante paradigms in Chapter III. Trade diversion and trade creation are estimated in Chapter VI by employing two import growth techniques and the ex-post procedures are compared. Chapter VII summarizes the results of Chapter IV and Chapter VI and suggests some policy conclusions.

CHAPTER I

THE THEORETICAL FOUNDATIONS OF CUSTOMS UNION THEORY: AN OVERVIEW

It is a standard result of international trade theory that free trade in commodities maximizes global efficiency in a distortion-free world. All Pareto efficient conditions are met; free trade is the "first-best" solution. However, a world ridden by multiple distortions (e.g., tariffs, quotas, and exchange control) will not necessarily be moved closer to Pareto optimality by the removal of one distortion. Some Pareto efficient conditions will be established, but others may be disturbed because of the change. The net result could be either a gain or a loss relative to the status quo; a priori we cannot determine which. This is the fundamental result of the General Theory of Second Best.

The formation of a customs union (CU) involves such a trade-off of distortions. It eliminates tariffs between member states, but subjects the rest of the world (ROW) to a common external tariff. An undistorted price relationship is established between home and partner commodity prices, but there is a perversion in price relationships between partner and nonpartner commodity prices. The net effect on welfare is ambiguous.

It is, therefore, necessary to question under what conditions a CU will actually represent a movement toward or away from the Pareto optimum, i.e., free trade. This chapter reviews theoretical models that attempt to elucidate under what circumstances a CU reduces or augments economic efficiency. Section I begins by outlining briefly the logic of the pre-Vinerian analysis of the effects of CUs, followed by a presentation of Viner's critique of that analysis. Section II reviews extensions and critiques of the Vinerian model, and Section 3 presents several approaches to evaluating the welfare effects of CUs. The review involves both partial and general equilibrium paradigms. Finally, a summary is given at the end of the chapter.

Unless otherwise specified, we assume throughout the chapter that: (1) markets are competitive; (2) there is full employment of economic resources at all times; (3) international trade in commodities and services must balance; (4) capital transfers are nonexistent; (5) tariff revenues are redistributed to consumers; and (6) there are no externalities in production or consumption.

I. Viner and the "Oral Tradition"

Prior to Jacob Viner's classic work, The Customs Union Issue (1950), the treatment of CUs was devoid of an explicit economic framework. The consensus was that because CUs involved a partial movement toward a free-trade world, their creation implied an improvement in economic welfare. Viner was the first to demonstrate in an analytical framework the shortcomings of this reasoning.[1] He

argued that if a CU were to represent a step in the direction of free-trade, then by definition it must be the case that postunion commodity purchases are supplied from lower cost sources than was the preunion case. Such a phenomenon will occur in the instances where inefficient domestic (say, Spanish) production previously protected by tariffs contracts as a result of more efficient partner country (say, EC) production. In Viner's terminology, this is "trade creation" and represents a movement toward free trade. However, some protected commodities that were previously imported from a nonpartner country (say, ROW)--the lowest cost producer--will now be imported from the EC, a higher-cost producer. This is "trade diversion" and represents a movement away from free trade since it diverts imports from the lowest cost source. Hence, we cannot determine a priori in which direction the CU causes efficiency to go. The CU will represent a movement toward free trade only if trade creation exceeds trade diversion.

It is apparent that advocates of the oral tradition line of reasoning were overly optimistic with respect to the economic effects of CUs. By introducing the distinction between trade creation and trade diversion, Viner established the foundations upon which the General Theory of Second Best would be built.

II. Extensions and Critiques of Viner

James Meade (1955) was one of the first to extend Viner's results. While accepting the importance of trade diversion and trade creation effects, he questioned the utility of using them to measure

changes in welfare caused by a CU. To do that, it is necessary to evaluate the extent to which costs have been raised on each unit of diverted trade and have been lowered on newly created trade.[2] Meade sought to establish a method by which the trade creation and trade diversion effects could be weighted in deriving a "unique indictor of desirability" for CUs.[3] If there is an ad valorem tariff on a commodity, the price consumers pay and the amount producers receive for the good diverge, the difference being equal to the tariff. In a perfectly competitive world, the price of a good is also a measure of the marginal utility of that good to consumers; conversely, marginal cost represents the marginal disutility to the producers. Now assume that the marginal utility of money is the same for buyers and sellers. If there is a unit increase in expenditures devoted to the good, the net gain to society will be equal to the excess of the utility to consumers over the disutility to producers. The net welfare gain is therefore equal to the size of the tariff.

Suppose that all imports are subject to the same ad valorem tariff. If there is a marginal reduction in the tariff rate for one good, there will be a readjustment in purchases of imports due to the change in relative prices. Since there is an equal welfare gain (loss) in any marginal increase (decrease) in expenditures on any good, the change in welfare to society can be determined by observing the change in the volume of trade. If it increases (decreases), the tariff reduction will have increased (decreased) social welfare. Consequently, the net welfare effect of a CU can be determined by evaluating the change in the volume of international trade.[4]

Another limitation of the Vinerian model is that it concentrates exclusively on production effects, i.e., the intercountry substitution in production of traded commodities. There is no analysis of intercommodity substitution in consumption that follows changes in price signals resulting from CU formation. Combined with the assumption of a linear transformation curve, the fixed coefficient in consumption ensures that a trade-diverting CU (TDCU) will decrease economic welfare. However, if either of these assumptions is dropped, a TDCU may lead to a welfare improvement. The rest of this section demonstrates this possibility.

Figure 1.1 shows graphically Viner's model. The home country, Spain, has a linear transformation curve (AD) between X and Y, the only two goods in this three-country paradigm. In addition, there is a fixed coefficient in consumption; X and Y are always consumed in the proportion defined by the ray OZ. Consumption in autarky is therefore at E. Once free trade is opened, Spain, which is assumed to be small, can trade at the terms of trade of the most efficient producer of the good in which it has a comparative disadvantage. Suppose that ROW offers terms of trade AB and the EC offers AC. Spain trades Y for X with the country offering the best terms of trade, which in this example is ROW. Consumption is at G, where Y_2A of Y is traded for OX_2 of X. More is consumed of both X and Y at G than at E; hence, Spain is unambiguously better off under free trade.

If Spain were to levy a nondiscriminatory <u>ad valorem</u> tariff on both the EC and ROW, the analysis would not be affected. Spain

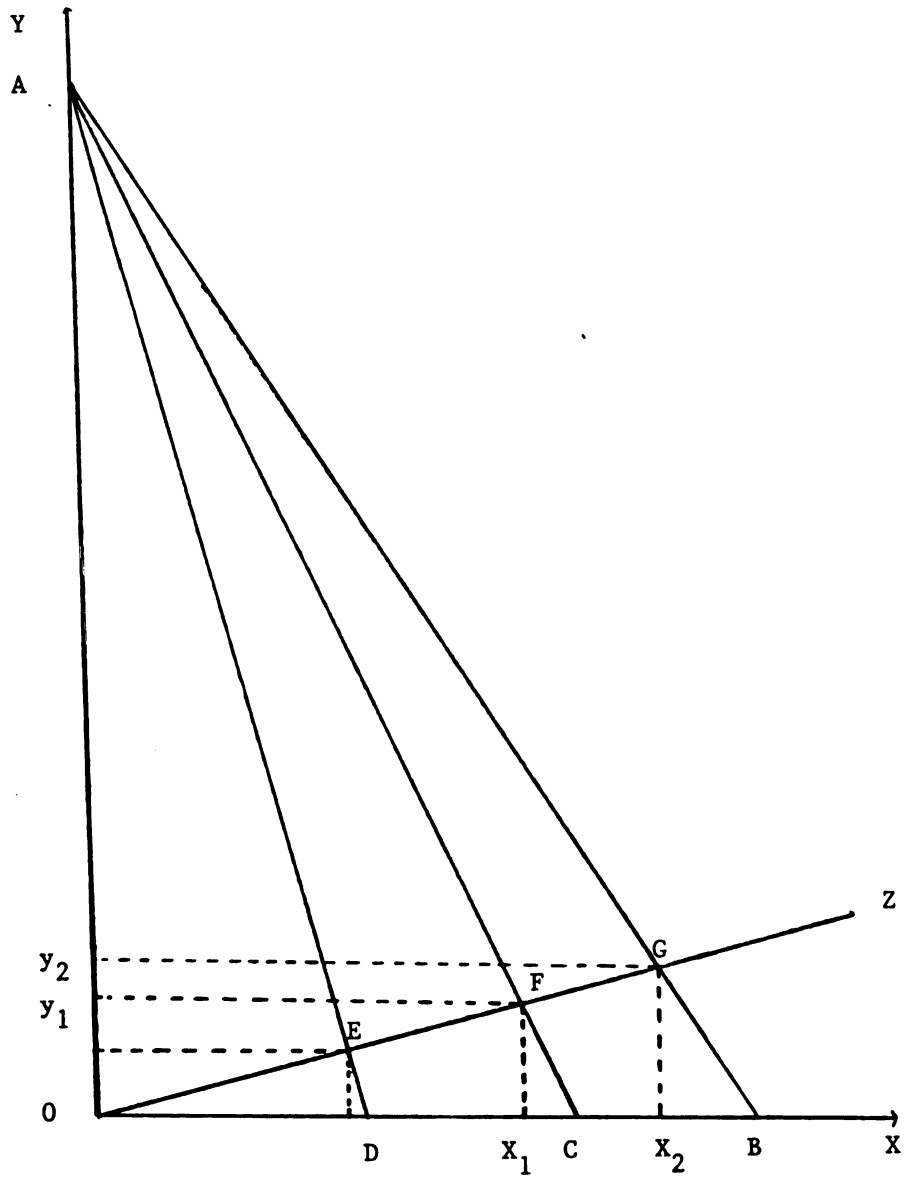


Figure 1.1.--Trade-Diverting Customs Union in the Vinerian Model.

Source: R. Lipsey, "The Theory of Customs Unions: A General Survey," Economic Journal70 (1960), reproduced in J. Bhagwati, ed., International Trade: Selected Radings (Cambridge: MIT Press, 1982), p. 269.

would continue to import from ROW at the same terms of trade, which Spain cannot alter by assumption. But now let Spain and the EC form a CU. If the common external tariff of the CU is prohibitive to ROW, the EC will export X to Spain in exchange for Y. Trade is diverted from ROW. The terms of trade that Spain faces will be AC, and consumption will be at F. Consequently, Y_1A is exported in exchange for OX_1, which leaves Spain at an inferior position compared to G. More is exported in exchange for less imports. We conclude therefore, that a TDCU in the Vinerian model leaves the home country worse off.

But let us now relax the assumption of a fixed coefficient in consumption, as does Gehrels (1956-1957). Using indifference curves, he shows that the welfare-enhancing attainment of a tangency solution between the domestic marginal rate of commodity substitution (MRS) and the marginal rate of transformation (MRT) in production in the postunion phase offsets the welfare inhibiting effects of trade diversion in production. This could conceivably render the TDCU beneficial to the home country.

This argument is shown in Figure 1.2. The tangency of indifference curve I_1 and B at D represents the highest achievable utility for Spain under free trade; it is the first-best solution. But suppose that Spain levies an ad valorem nondiscriminatory tariff on good X. Trade is still carried out with ROW, but the terms of trade facing consumers are now SP.[4] Consumption takes place at T, with I_{11} cutting from above the terms of trade line actually facing

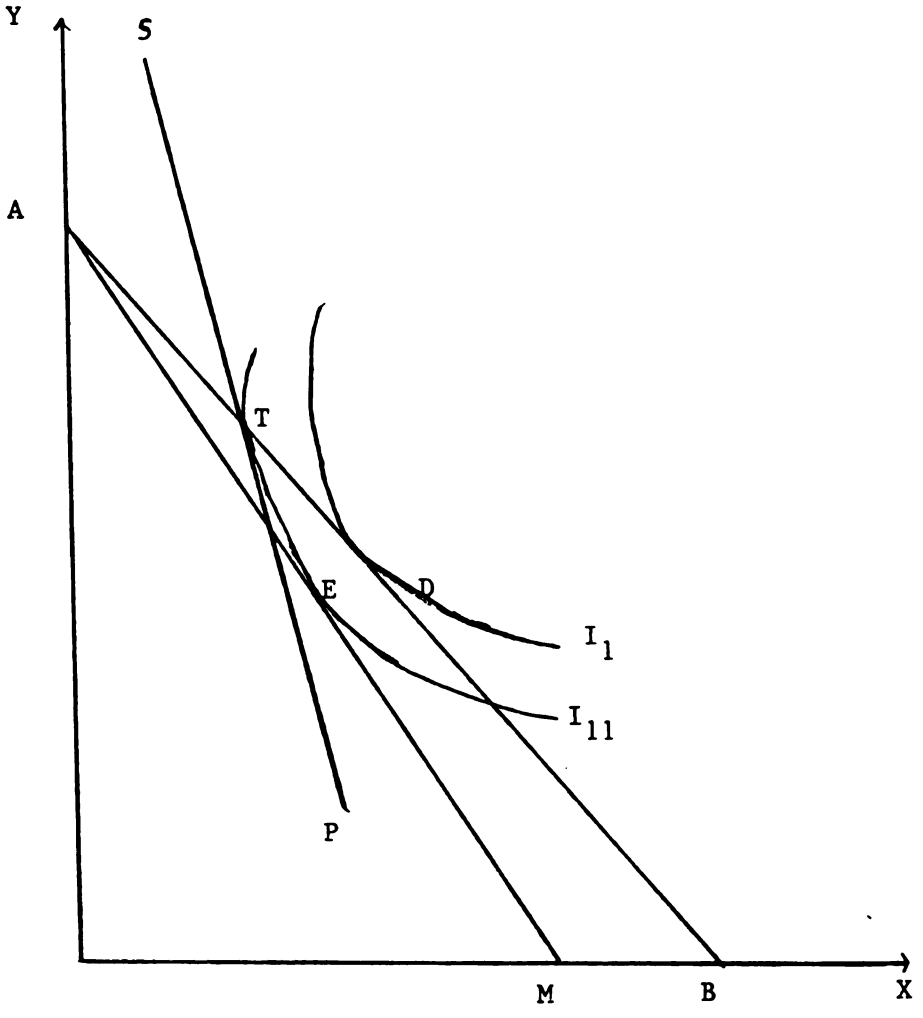


Figure 1.2.--Effects of a Customs Union with Intercommodity Substitution.

Source: F. Gehrels, "Customs Unions from a Single-Country Viewpoint," Review of Economic Studies 24 (1956-1957).

Spain. Relative to the Pareto optimum, too much Y is being consumed because of this price distortion; I_{11} is inferior to I_1.

Now consider AM. It represents the terms of trade at which Spain could be exactly as well off as under tariff-ridden trade with ROW. That is, at relative prices AM, Spain consumes at E where MRS=MRT, which leaves Spanish consumers at the same utility level at T. Hence, if the EC offers terms of trade that are at least as attractive to Spain as AM--that is, terms of trade at which the relative price of X is lower--a higher indifference curve can be reached. Trade is diverted, but Spain's welfare unequivocally increases.

With the possibility of commodity substitution in consumption, there thus exists the possibility of a welfare-enhancing TDCU. In fact, Gehrels reasoned that a CU would bring gains rather than losses. Lipsey (1960), however, points out a naive assumption implicit in Gehrels' analysis. We noted in the introduction that a CU will impose negative effects on efficiency because it distorts the price relationships between partner and nonpartner prices. But if there are only two goods in the model and a linear transformation curve, Spain will import X from either the EC <u>or</u> ROW. This partner/nonpartner price distortion does not exist by assumption. But if there are more than two goods and some goods are imported from both ROW and the EC, the problem of partner/nonpartner price distortions appears.

To see this, refer to Table 1.1. We assume a three-good/three-country model. The Spanish domestic commodity is A; the

Table 1.1.--Spanish Domestic and International Price Relationships under Alternative Trade Policies

Free Trade	Nondiscriminatory Ad Valorumn Tariff on All Imports	Customs Union With the EC
$\frac{P_{Ad}}{P_{Bd}} = \frac{P_{Ai}}{P_{Bi}}$	$\frac{P_{Ad}}{P_{Bd}} < \frac{P_{Ai}}{P_{Bi}}$	$\frac{P_{Ad}}{P_{Bd}} = \frac{P_{Ai}}{P_{Bi}}$
$\frac{P_{Ad}}{P_{cd}} = \frac{P_{Ai}}{P_{ci}}$	$\frac{P_{Ad}}{P_{cd}} < \frac{P_{Ai}}{P_{ci}}$	$\frac{P_{Ad}}{P_{cd}} < \frac{P_{Ai}}{P_{ci}}$
$\frac{P_{Ad}}{P_{cd}} = \frac{P_{Ai}}{P_{ci}}$	$\frac{P_{Bd}}{P_{cd}} = \frac{P_{Bi}}{P_{ci}}$	$\frac{P_{Bd}}{P_{cd}} < \frac{P_{Bi}}{P_{ci}}$

Source: R. Lipsey, "The Theory of Customs Unions: A General Survey,: The Economic Journal 70 (1960), reproduced in J. Baghwati, ed, International Trade: Selected Readings (Cambridge: MIT Press, 1982), p. 272.

Note: d refers to the domestic market

i refers to the international market

imports from the EC and ROW are B and C, respectively. Subscripts d and i refer to prices in the domestic Spanish market and the international market, respectively. Under free trade (column 1), all three Pareto optimal conditions are met. If Spain imposes a nondiscriminatory tariff on both B and C (column 2), the Spain/EC and Spain/ROW price relationships are disturbed, but the EC/ROW price relationship is held intact. When a CU is formed between Spain and the EC (column 3), the undistorted relationship between Spanish and EC prices is established, but at the expense of disturbing the EC/ROW price relationship. Thus, while Gehrels' conclusion would have brought us back to the pre-Vinerian notion that CUs always increase welfare[5], Lipsey shows that this is not the case; welfare could either increase or decrease.

Moreover, if we relax the Vinerian assumption of a linear production possibility frontier and, rather, assume a concave transformation curve in its stead--thereby allowing for incomplete specialization in production--the likelihood of a welfare-enhancing TDCU likewise increases.[6] This is demonstrated in Figure 1.3(a), which depicts Spain's domestic economy. In the two-good/three-country model, the line ROW represents Spain's free-trade consumption-possibilities frontier, as defined by Samuelson (1962). Suppose that Spain levies a tariff on its import good, X, and the new relative price facing consumers become tt. Production of X increases to T from F.[7] Some resources now are diverted to the relatively inefficient industry X. This distortion causes a loss in income to Spain; the consumption-possibility frontier shifts downward from ROW

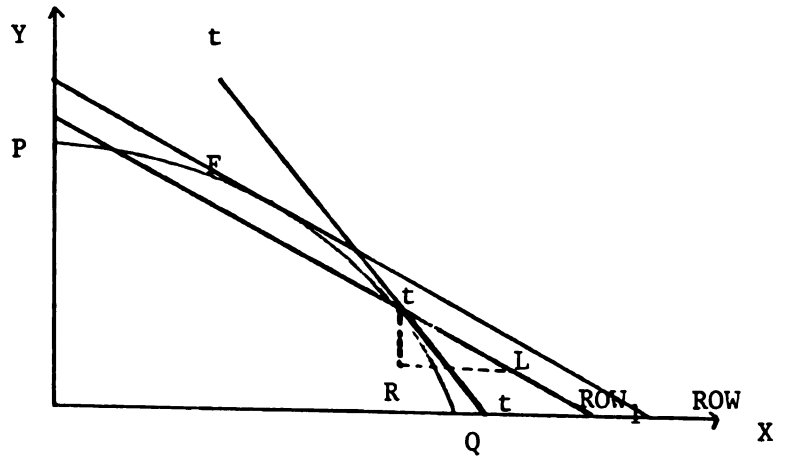


Figure 1.3(a): Welfare Effects of a Nondiscriminatory Tariff with a Concave Transformation Curve.

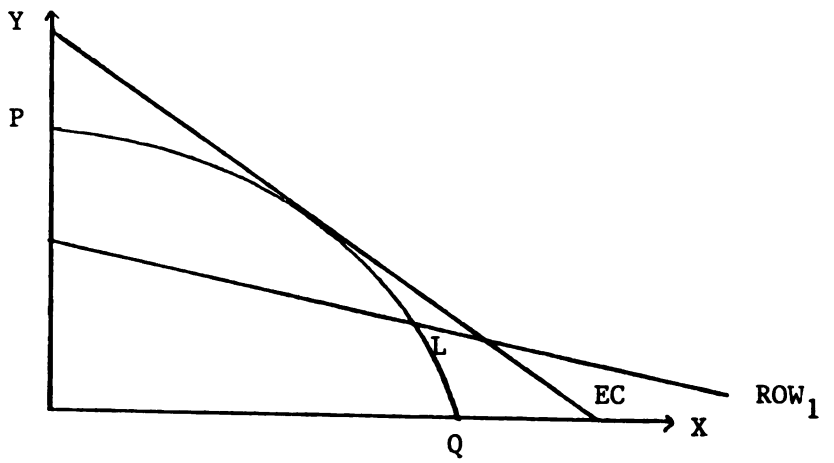


Figure 1.3(b): Welfare-Increasing Trade-Diverting Customs Union with a Concave Transformation Curve.

Fiture 1.3.--Effects of Nondiscriminatory Tariffs and Customs Unions with a Concave Transformation Curve.

Source: M. Michaely, "On Customs Unions and the Gains from Trade," Economic Journal 75 (September): 581.

to ROW^1. (The terms of trade do not change; thus, ROW^1 is parallel to ROW.) Suppose that Spain--consumers and the government--consumes at L. THen Spain imports RL of X in exchange for TR of its exports, Y. Now let Spain form a CU with the EC, which offers a price ratio steeper than ROW yet flatter than tt. Spain will then trade with the EC in lieu of ROW. Will this TDCU decrease welfare? It depends. Refer to Figure 1.3(b), where ROW^1 and L are reproduced from Figure 1.3(a), and the new consumption-possibilities frontier available to Spain via the EC terms of trade has L in its interior. In this instance, the TDCU is welfare-increasing, but this need not be the case. EC has been arbitrarily drawn to lie above L. Yet L could just as well lie to the northeast of the postunion consumption point, in which case the TDCU would be welfare-inhibiting.

Of course, the generating force behind the conclusions of this latter model is found in Spain's ability to adjust production in response to new price signals. This was impossible in the Ricardian model because production is passive; only adjustment in consumption could produce a welfare-enhancing CU. When production can change, tariff protection on Spain's import good causes domestic productive factors to shift from the production of Spain's comparative advantage good, Y, to its inefficient industry X. Once a CU is formed with the EC, however, Spanish production of X contracts. Resources move out of producing X in favor of producing Y. This movement, however, will fall short of the international social optimum, as we assume the EC to be less efficient at producing X than ROW. Ceteris paribus, the greater the reallocation of resources toward Spain's comparative

advantage good, the greater is the likelihood that the CU will be welfare-increasing.

The above production effect which reallocates resources from X to Y is Viner's trade creation. The Ricardian transformation curve does not allow for this possibility. Thus, the Vinerian model assumes away any possible trade creation and, consequently, biases the case for CUs in an unfavorable direction.

III. Models of Customs Union Welfare Effects

In this section, three models that analyze the static welfare effects of CUs are presented. The first is concerned only with the market of Spain's import good, X. It is therefore a partial equilibrium model, and the methodology followed is taken from Kreinin (1981). The second paradigm deals with both an import and an export good for Spain, employing a general equilibrium analysis. This approach is adopted from Ethier (1983). Lastly, an n-commodity model is presented. But instead of showing the objective welfare effects of trade creation and trade diversion as in the first two cases, this latter model demonstrates the existence of a vector of common external tariffs that could ensure welfare-generating CUs. It is thus an existence theorem. These results are obtained with and without the presence of lump-sum transfers, the former being assumed in the Kemp/Wan (1976) version, the latter in the Dixit/Norman (1980) model.

A. Partial Equilibrium

In order to evaluate the static welfare effects of CUs in the partial equilibrium paradigm, we first discard the assumption that Spain is a small country facing a horizontal import supply curve.[8] Thus, it is no longer possible to measure changes in world economic welfare resulting from Spain's forming a CU with the EC by merely evaluating the Spanish market. There will be changes in economic welfare in the EC and ROW as well.

Consider Figure 1.4(a), which characterizes the Spanish market. S_s and D_s are the home supply and demand curves, respectively. Increasing costs in production is assumed, with all supply curves upward-sloping. In addition, we assume normal, well-behaved consumer preferences in the neoclassical tradition to ensure the continuous negative relationship between quantity demanded and price. Linearity is assumed throughout the analysis in order to simplify the model, but without loss of generality.

Figures 1.4(b) and 1.4(c) depict the respective EC and ROW markets for good X. Both countries export X to Spain by assumption; EC_s and ROW_s represent the respective export supply curves. To see how these export supply curves are derived, consider the example given in Figure 1.5. At price P_o, EC domestic supply exactly equals domestic demand. Excess supply of X for export is therefore equal to zero, which is our first point on the excess supply curve. If the international price of X is increased to P_1, domestic quantity demanded falls and quantity supplied rises. Export supply is Q_1Q_2, a second point on EC_s. Note that consumers' surplus decreases and

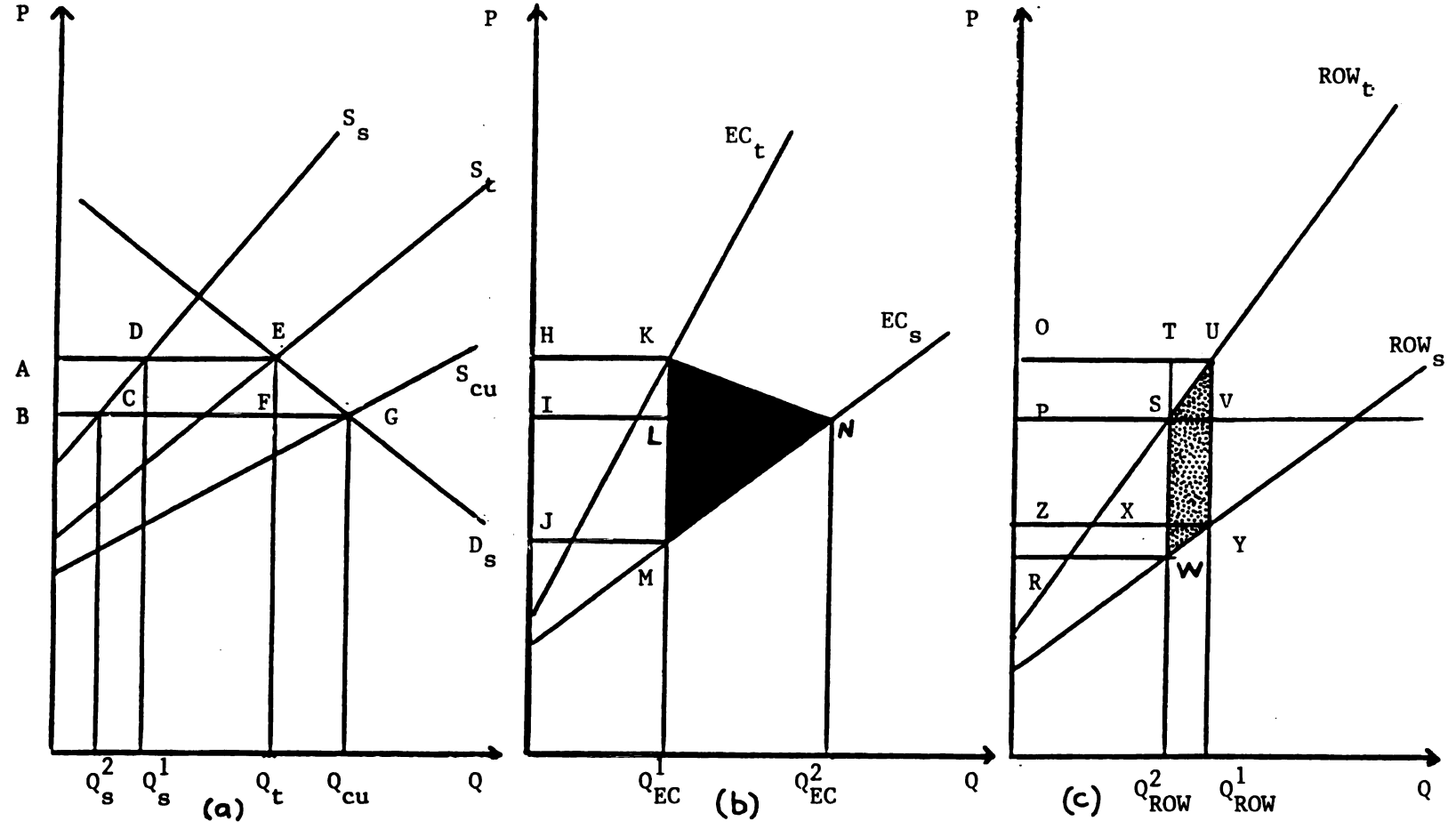


Figure 1.4.--Static Partial Equilibrium Welfare Effects of a Customs Union.

Source: M. Kreinin, "Static Effects of EC Enlargement on Trade Flows," Kyklos 34 (Winter, 1981), Reproduced in M. Kreinin, International Economics--A Policy Approach (5th ed.), (New York: Harcourt Brace Johvanich, Inc., 1987), Appendix VIII.

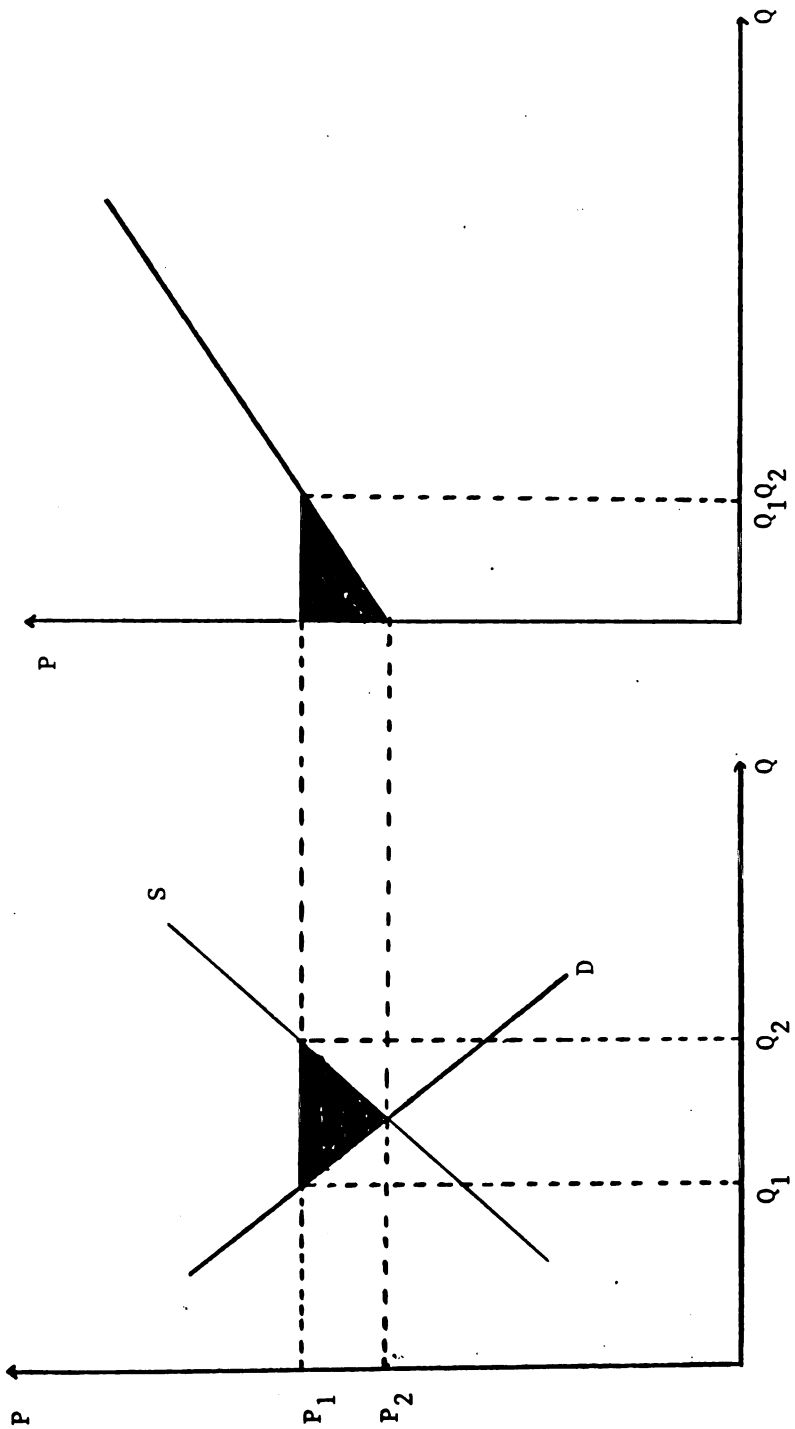


Figure 1.5.--Derivation of EC Export Supply Curve.

producers' surplus increases, the net effect on welfare in the EC being the shaded region. This region is equal to the one above EC_s in the export supply quadrant, and consequently there is a redistribution of income away from consumers to producers. Ceteris paribus, the higher the price elasticities of demand and supply, the more elastic is the EC_s curve. In the present analysis, we assume that ROW_s is flatter than EC_s. If the elasticity of demand for X is identical across countries, this is equivalent to assuming that ROW is more efficient in producing X, an assumption we have made throughout the chapter. In addition, as can be seen from Figure 1.4, ROW and the EC are more efficient in producing X than is Spain.

Suppose that Spain levies a nondiscriminatory ad valorem tax of 100 percent on the EC and ROW exports of X, shifting the latter's export supply curves to the left--to EC_t and ROW_t, respectively. Moreover, define S^t as the total supply curve in Spain in a tariff-ridden regime, namely the horizontal summation of S_s, EC_t, and ROW_t. Superimposing S^t on the Spanish market, we can determine the international price of X and Spanish quantity demanded where $S^t=D_s$, which occurs at price A. Q^1_s is the domestic production of X and $Q^1_sQ_t(=Q^1_{EC} + Q^1_{ROW})$ is total Spanish imports of X from both sources. Total Spanish consumption is Q_t.

Now assume that Spain forms a CU with the EC and that the CU's common external tariff is equal to the preunion Spanish tariff. The new supply curve in Spain becomes S_{cu}, which is the horizontal summation of S_s, EC_s, and ROW_t. The new equilibrium price is B. Spanish production contracts to Q^2_s, EC production expands by

$Q^1_{EC}Q^2_{EC}$, and ROW contracts by $Q^1_{ROW}Q^2_{ROW}$. Total Spanish imports expand by $Q^2_sQ^1_s + Q_tQ_{CU}$.

It is now possible to evaluate the welfare effects of the CU. In the Spanish market, consumers' surplus increases by AEGB, and producers' surplus decreases by ADCB. Hence, there is a net increase in welfare of CDEG. In the EC, producers' surplus increases, and consumers' surplus decreases. The net change is an increase of JMNI. Spain loses JMKH in government revenue receipts from the EC. The gain in welfare is therefore LMN and the loss IHKL in the EC quadrant.

Finally, in the ROW market, consumers' surplus increases, and producers' surplus decreases, the latter exceeding the former by RWYZ. Spanish government revenue decreases by POUS + USXY + WXY = POUS + USWY.

The net effect of the CU on world welfare can therefore be calculated as follows. Since CDEG = HKNI + OPSU by construction, CDEG - IHKL - OPSM = +KLN. Adding this to the gain LMN, we have a net gain equal to the triangle MKN, which is the shaded region in 5(b). This is subtracted from the net loss of USWY--the dotted region in 5(c)--to compute the global net gain or less in welfare. The direction of this net change in welfare is indeterminate <u>a priori</u>.

It is important to recognize the crucial role of elasticities in this model. <u>Ceteris paribus</u>, the higher the Spanish price elasticity of demand for good X, the greater is the consumption effect of the CU. The more price elastic Spanish supply is, the

greater will be the contraction in inefficient Spanish production of X and, hence, the greater the trade creation effect. Likewise, the more price elastic EC_s is, the larger will be the welfare gains to EC producers with the CU. The more price elastic ROW_s is, the greater the welfare loss to ROW producers, i.e., the greater the trade diversion effect of the CU.

B. General Equilibrium

The above model is instructive, but is by definition incomplete; only Spain's import good is evaluated, and surely Spain must offer something in return for X. In this section, a general equilibrium model is developed that encompasses both Spanish exports and imports so that trade is balanced.[9] The trade pattern of Sections I and II--that is, Spain exports Y to the EC and ROW and imports X--is retained. However, we assume here that Spain is small and that the EC and ROW are large. This allows us to ignore any terms of trade effects in order to concentrate on the effects of trade creation and trade diversion on Spanish welfare.

Figure 1.6 presents four examples of potential changes in Spanish welfare due to CU formation. The offer curves S_t and S, ROW_t and ROW, and EC_t and EC are Spain's, ROW's, and EC's tariff-ridden and free-trade offer curves, respectively. The EC and ROW offer curves are perfectly elastic, reflecting the assumption that Spain is small.

Figure 1.6(a) depicts the case of pure trade creation. In this example, the EC is the most efficient producer of X. Thus,

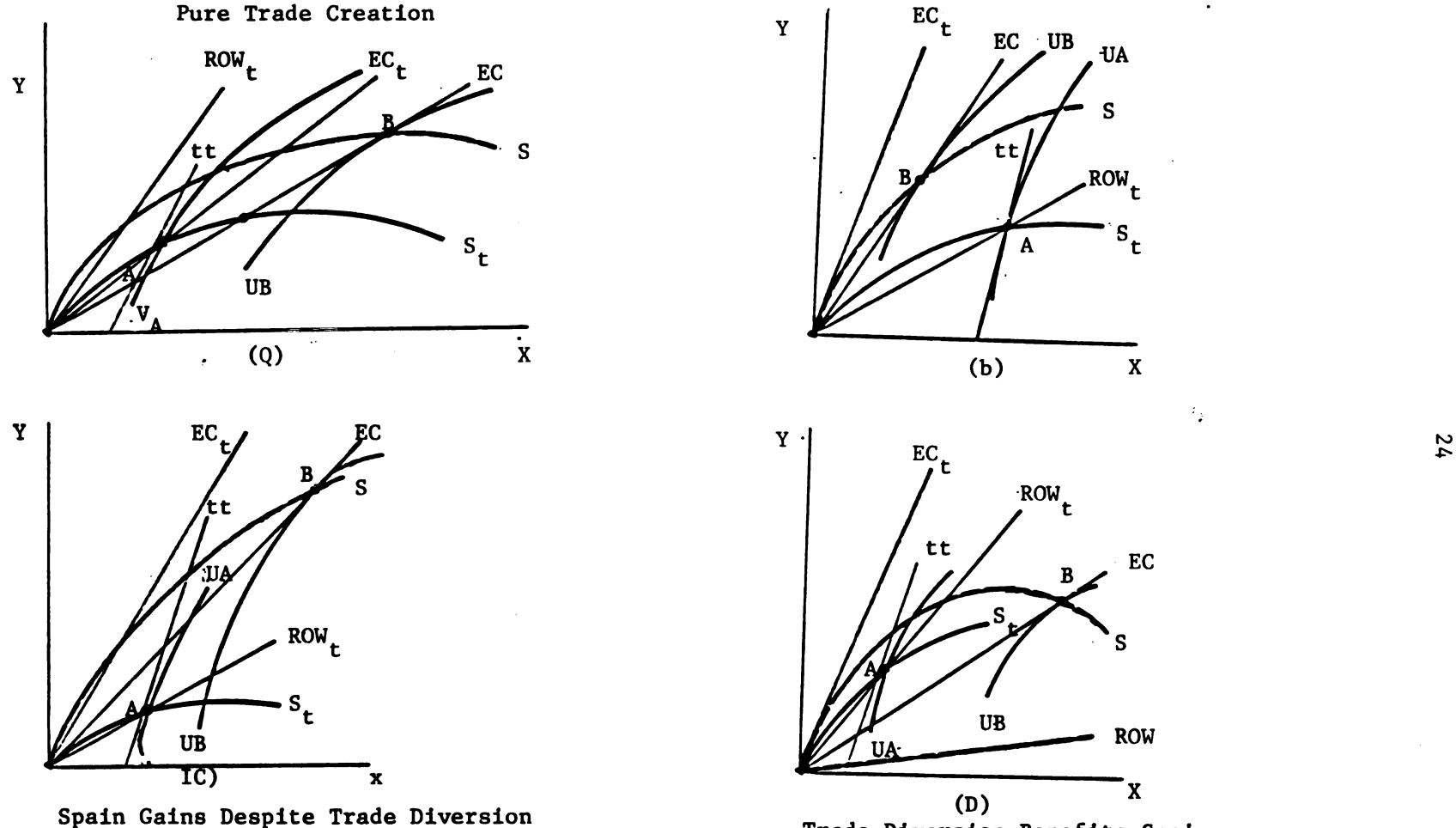


Figure 1.6.--General Equilibrium Welfare Effects of a Customs Union on Spanish Welfare

Source: W. Etheri, Modern International Economics (New York: W. W. Norton and Co., 1983), pp. 484-485.

before the CU is formed, Spain trades with the EC at the intersection of EC_t and S_t, which is at A. Domestic relative prices are tt; therefore, the highest achievable utility level is represented by trade indifference curve (TIC) U_A. When a CU is formed between the EC and Spain, trade takes place at the intersection of the EC and Spanish free-trade offer curves, which is at B. Domestic relative prices are then equal to EC relative prices, and the highest obtainable TIC is U_B, which is superior to U_A. Thus, Spanish welfare increases because of the CU. In addition, world efficiency increases because there is only trade creation and no trade diversion, as Spain traded with the EC before the CU as well.

The examples shown in Figures 1.6(b) through 1.6(d) assume that ROW is the most efficient producer of X. Consider Figure 1.6(b). Prior to the CU, Spain trades with ROW at the intersection of ROW_t and S_t, which is at A. The highest achievable TIC is U_A. However, once the CU is formed, Spanish consumers cease to trade with ROW because the EC offers them better terms of trade (EC is flatter than tt). Thus, trade takes place at B, and utility is maximized at level U_B, which is inferior to U_A. The CU has decreased Spanish welfare. This result is obtained because Spain is now buying from a higher cost producer (trade diversion), and the fall in domestic relative prices (causing TC) is insufficient to compensate for this terms of trade loss.

Figure 1.6(c) and 1.6(d) are examples of trade-diverting CUs that actually increase Spanish welfare. In Figure 1.6(c), Spain trades with ROW at A before the CU, realizing a maximum utility level

of U_A. Once the CU is formed, Spanish trade is diverted to the EC, and CU trade takes place at B. However, this TDCU enables Spain to achieve an increase in utility to U_B. There is an improvement in welfare because the cost of buying from a higher-cost producer is more than offset by the trade creation effect that results from the decrease in relative prices to Spanish consumers.

Figure 1.6(d) depicts a similar situation. Spain trades initially with ROW at A. Once the CU is formed, Spain trades with the EC at B. Spanish welfare increases from utility level U_A to U_B. However, unlike the cases in Figure 1.6(c), the increase in welfare stems not only from the decrease in domestic relative prices, but also from an increase in terms of trade. This latter result obtains because the offer curve EC is flatter than ROW_t. Therefore, ceteris paribus, the likelihood of a welfare-increasing TDCU is greater in the present example. However, since it is still true that Spain trades with a higher-cost producer, world economic efficiency decreases.

In conclusion, Spanish welfare in this model could either increase or decrease when a CU is formed. If the CU is purely trade-creating, Spanish welfare and world efficiency will increase. If the CU is trade-diverting, the change in Spanish welfare is ambiguous. The net effect on welfare will depend on the relative strengths of the trade-creating and trade-diverting forces. However, a TDCU is always detrimental to world economic efficiency.

C. Existence Theorems

In this section, we consider CU formation from a different viewpoint, showing that under certain assumptions, a CU will always be trade-creating. More specifically, if the common external tariff of the CU is determined endogenously rather than exogenously, as in the previous models, a CU can always be welfare-increasing. This result obtains both with and without the possibility of lump-sum transfers.

The paradigm developed by Kemp and Wan (1976) assumes that there are no restrictions on the tariffs of individual countries and that all transportation costs are fully known. Now let any number of countries form a CU. Then there exists a vector of tariffs the CU can choose that leaves trade with the outside world uanffected. Since external prices do not change, all nonmember countries must remain at the same level of welfare in the postunion world. However, since internal prices change in the CU and specialization in comparative advantage goods takes place, there must be an increase in welfare for the CU as a whole. But because internal prices in the individual member countries change, there is no guarantee that all countries individually will be at higher welfare level. However, if we allow for lump-sum transfers, the losers can be compensated, and the welfare of all countries can be increased in the union.

Dixit and Norman (1980) show that the above result holds even if lump-sum transfers are not possible. In other words, they show that by choosing the appropriate tariff and commodity tax vectors,

all countries within the union can be made better off in a Pareto sense.

Assume that, in a tariff-ridden world, consumers in country i face prices p^i for commodities and w^i for factors, choosing quantities c^i and v^i. Firms produce x^i of goods. If P is the vector of world prices in this initial situation, such that net supplies from the outside world are represented by -M(P), we have the following trade situation for two countries, Spain and the EC, who consider forming a CU:

$$C^s + C^{ec} - x^s - X^{ec} = -M(P)$$

Now assume that the CU is formed, and the common external tariff is chosen in such a way as not to change P. This leaves the external countries unaffected by the CU, as in the Kemp/Wan construct. Furthermore, assume that the Spanish and EC governments impose commodity taxes on traded goods such that p^i and w^i remain constant. Consumers will then select the original quantities c^i and v^i.

However, we do let producer prices change. Assuming convex technologies, Dixit and Normal demonstrate that in order for the resulting output vector to be efficient, there must be a common vector of producer prices for Spain and the EC. This new producer price vector yields a more efficient division of production relative to the preunion phase. There is now more of every good produced. It is possible either to redistribute the surpluses to consumers or to

let the prices of these goods fall. In any event, the CU dominates in a welfare sense the preunion case.

Thus, if the correct tariff vector is chosen, and lump-sum transfers or correct commodity tax vectors exist, a CU that is purely welfare-increasing can be derived. Moreover, we are able to do this without reference to trade creation and trade diversion effects. But the driving force behind this model is that tariffs are imposed in such a way as to exclude any trade diversion. Only trade creation is possible. Still, the real-world application of these existence theorems is questionable given the difficulties involved with deriving the ideal tariff and commodity tax vectors, as well as the problems that lump-sum transfers suggest.

IV. Summary

The above analysis reviewed the economic effects of CUs. These effects could be classified into two categories: trade creation, which represents a movement toward free trade, and trade diversion, which represents a movement toward protectionism. However, it was also shown that a TDCU will not necessarily be welfare-inhibiting if either intercommodity substitution in consumption or a concave production-possibility frontier is assumed. In addition, both partial and general equilibrium models were presented in order to analyze in-depth the welfare effects of trade creation and trade diversion. In both models, it was shown that the ultimate net effect on welfare of the CU was impossible to determine *a priori*. However, we also presented a model that ensured welfare-

increasing CUs. This resulted from the principal assumption that there exists an ideal common external tariff vector for the CU that would provide for no trade diversion. Trade creation, however, was possible. Under this ideal tariff vector and several other assumptions, every CU could be welfare-increasing.

NOTES--CHAPTER I

[1]However, Viner was not the first to criticize this view. See, for example, Lionel Robbins, Economic Planning and International Order (London: Macmillan and Co., 1937), and R. W. Hawtrey, Economic Destiny (London: Longmans, Green and Co., 1944).

[2]J. Meade, The Theory of Customs Unions (Amsterdam: North Holland, 1955), p. 5.

[3]J. Vanek, General Equilibrium of International Discrimination (Cambridge, MA: Harvard University Press, 1965), p. 3.

[4]Since income in Spain is constant, consumption continues along AB.

[5]We can say "increases welfare" here in lieu of the less general "increases Spanish welfare" because we assume that Spain is small and therefore its actions do not affect the other countries' welfare.

[6]The following analysis stems from the model developed by Michael Michaely, "On Customs Unions and the Gains from Trade," Economic Journal 75 (September 1965): 577-83.

[7]This phenomenon was impossible under the Ricardian production possibilities frontier case, where either specialization or no trade at all is guaranteed.

[8]The model considered in this section is taken from M. Kreinin, "Static Effects of EC Enlargement on Trade Flows," Kyklos 34 (Winter 1981): 60-71.

[9]The analysis presented here is obtained from E. Ethier, Modern International Economics (New York: W. W. Norton and Co., 1983), pp. 483-86.

CHAPTER II

AN INQUIRY INTO THE ECONOMIC RATIONALE OF CUSTOMS UNIONS

In Chapter I there was no evaluation of the economic efficiency of CUs relative to other policy alternatives. Indeed, if CUs were dominated in a Pareto sense by another policy alternative, there would be no economic rationale for the existence of CUs.

Cooper and Massell (1965) claimed that such a policy alternative did exist. They maintained that CUs are always dominated in an economic sense by unilateral tariff reductions, and therefore, CUs could not be defended on economic grounds in the static model. Only dynamic economic factors or noneconomic considerations could offer a rationale for the existence of CUs. This bold conclusion generated a fresh interest in CU theory. In fact, the work of Cooper/Massell on the unilateral tariff reduction (UTR) alternative is a watershed in the pure theory of CUs. It marks a transition in the fundamental question economists endeavored to answer: away from that of the economic (welfare) effects of CUs and toward the economic rationale for their existence.

In this chapter, we inquire as to the economic rationale of CUs relative to UTRs. Section I considers the UTR contentions in the static model. It begins with a review of the case against CUs in the

CM tradition, followed by a critique of the UTR paradigm. Section II presents some important dynamic effects that support and question the economic rationality of CUs. These effects include: economies of scale, X-efficiency, investment, optimal tariffs, and development strategies.

I. The Static Case

Viner divided the economic effect of CUs into two categories: trade creation and trade diversion. Cooper and Massell (CM) redefine the effects of CUs into two comprehensive components that are more expedient for their purposes: the tariff reduction and the pure trade diversion effects. The former includes all that is welfare-generating in the formation of a CU. That is, it comprises the trade creation and consumption effects that result from the price reduction producers and consumers face, respectively, when a CU is created. The latter component deals with all that is welfare-decreasing when a CU is formed. This includes the real cost of importing from the less efficient partner country as well as the decrease in government revenue.

The fundamental premise of CM is simple. If, instead of forming a CU, the home country were to reduce its tariffs unilaterally, such that the price effect and quantity imported were the same as in the CU case, welfare always would be greater under the UTR policy alternative if dynamic effects are excluded and the terms of trade are fixed.[1] This is because the tariff reduction effect will be constant in the two cases by construction, but with a UTR,

there is no trade diversion. Spain continues to purchase its imports from the lowest cost producer. The policy of UTRs, therefore, Pareto dominates CUs.

The CM analysis critiques the economic value of CUs in the static model from a different approach than that reviewed in Chapter I.[2] The empirical question of whether trade creation exceeds or is dominated by trade diversion is superfluous. UTRs always represent a movement toward free trade, whereas CUs may or may not. Outside of dynamic or noneconomic factors, they claim, there is no economic rationale for the existence of CUs.

Eitan Berglas (1979) extends and elaborates on the CM conclusions in a three-country/n-commodity general equilibrium paradigm. In order to present his model in its most basic form and without loss of generality, we assume only three goods.[3] Let the trade flow between the three countries transpire as follows. Spain exports good 2 to the EC and ROW in exchange for goods 1 and 3 from ROW and good 1 from the EC. This trade pattern is summarized in Table 2.1. It is assumed that ROW has no import barriers on Spanish or EC exports and that any tariff-reduction schemes--be they preferential or nonpreferential--will not change the pattern of trade given above. Moreover, the terms of trade of small country Spain are fixed and determined by large country ROW. Spain levies tariffs T^s_1 and t^s_3 on imports of good 1 from ROW and the EC, respectively, and t^s_3 on its imports of 3 from ROW. The EC levies tariffs t^{ec}_2 and t^{ec}_3 on imports of goods 2 and 3. Internal prices in each country are given in Table 2.2, where P^j_i corresponds to the price of good i

Table 2.1.--Pattern of Trade in the Berglas Model

Exporter/Importer	Spain	EC	Row
Spain	--	2	2
EC	1	--	--
Row	1,3	3	--

Source: E. Berglas, "Preferential Trading Theory: The N-Commodity Case," Journal of Political Economy 87 (April 1979): 318.

Table 2.2.--Domestic Prices (Including Tariffs) in the Berglas Model.

Commodity/Domestic Prices	P_i^S	P_i^{EC}	P_i^{ROW}
Commodity 1	$P_i(1+T_i^S)$	$P_1(1+T_1^S-t_i^S)$	P_1
Commodity 2	P_1	$P_2(1+t_1^{EC})$	P_1
Commodity 3	$P_3(1+t_3^S)$	$P_3(1+t_1^{EC})$	P_3

Source: E. Berglas, "Preferential Trading Theory: The N-Commodity Case," Journal of Political Economy 87 (April 1979): 318.

(i=1, 2, 3) in country j (j=Spain, EC, ROW). There are no transportation costs associated with Spanish and EC trade with ROW, and, as usual, trade must balance for all three countries. "Cross-hauling"[4] is ruled out by the previous assumption that the trade flow does not change.[5]

Given the above model, Spain cannot increase its welfare from an initial tariff-distorted equilibrium by joining a CU with the EC. Since its terms of trade are fixed and determined by ROW, Spain will experience no change in relative internal prices, but will lose tariff revenue. Hence, Spain would have to be compensated for this loss or would not join the CU. Relative prices in the EC do change: P^{EC}_1 increases, P^{EC}_2 declines, and P^{EC}_3 remains constant. However, the relative price change is not necessarily toward world prices. Thus, the net change in welfare in the EC is ambiguous because of second-best considerations. Nevertheless, the EC always will be better off unilaterally reducing tariffs than joining a CU, because all price effects caused by joining a CU are also obtainable via a UTR policy. But in the case of a UTR, no compensation to Spain is required. Thus, UTRs dominate CUs. Ian Wooton (1985) extends the Berglas model using the dual approach in a three-country, n-commodity general equilibrium paradigm and obtains general conditions under which the Berglas conclusions hold.

Although the UTR literature is important in its critique of CUs in the static, pure-theoretical model, it is highly suspect due to its restrictive assumptions. Two important assumptions that are criticized by UTR sceptics are: (a) that EC tariffs can be totally

ignored (an assumption made by CM), and (b) that ROW neither has tariffs nor transportation costs when trading with Spain and the EC (an assumption made by Berglas). The most prominent of these dissenters are Paul and Ronald Wonnacott (1981). With respect to (a), their main criticism is that CM concentrates only on what happens to Spain's imports when it joins a CU, totally ignoring exports. This is in practice a highly questionable assumption. After all, if the EC had no tariffs in their restricted model, Spain would have little reason to want to join the CU! The Wonnacotts show that if the EC initially has a tariff on Spain's export good, the elimination of this tariff would spur EC imports of Spain's export good. The resulting increase in Spanish producers' surplus could easily more than compensate for any loss on the import account. Thus, by ignoring the EC market attraction for Spanish exports, "they [CM] assume away the advantage which most political leaders and executives see in CUs. Namely, the possibility of tariff-free entry into partner's markets" (Paul and Ronald Wonnacott, 1981, p. 9).

Berglas, in contrast, recognized the importance of including the partner's market. But he sets such stringent assumptions on the nature of international trade--no tariffs in ROW and no change in the pattern of trade--that the home country cannot possibly gain from its newly acquired access to its partner's markets in a CU. The Wonnacotts show formally in a three-country, two-good model that if these assumptions are relaxed, the UTR conclusions no longer hold.

Consider Figure 2.1, where S_t and S, EC_t and EC are Spain's and the EC's tariff-ridden and free-trade offer curves, respectively.

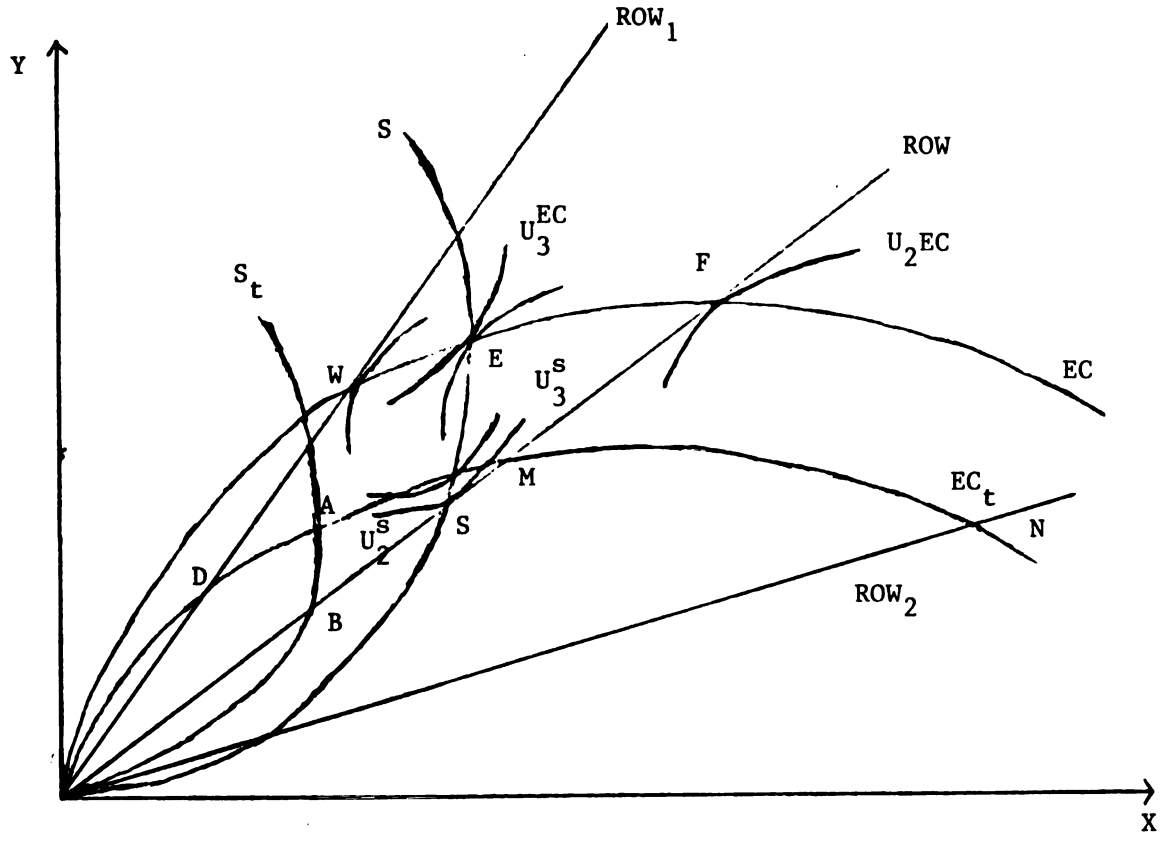


Figure 2.1.--Wonnacotts' Critique of the UTR Model

Source: P. Wonnacott and R. Wonnacott, "Is Unilateral Tariff Reduction Preferable to a Customs Union? The Curious Case of the Missing Foreign Tariffs," American Economic Review 71 (September 1981): 709.

ROW corresponds to ROW's offer curve under the UTR assumptions, i.e., no transportation cost or tariffs associated with ROW trade.[6] It is assumed that Spain and the EC are small relative to large country ROW. Hence, ROW, is infinitely elastic.

In a nondiscriminatory tariff-distorted world, the EC and Spain trade with ROW at the intersection of their respective offer curves with the ROW offer curve. Spain trades with ROW at B, and the EC trades with ROW at M. Now suppose that a CU is formed between Spain and the EC, and a prohibitive common external tariff is imposed on imports from ROW. Spain and the EC will trade at the intersection of their respective free-trade offer curves, namely, at E. The highest utility levels that the EC and Spain can obtain are represented by the trade indifference curves (TICs) U^{EC}_1 and U^{S}_1, respectively.

If instead of forming a CU, Spain and the EC were to reduce tariffs unilaterally, Spain would trade with ROW at S, and the EC would trade with ROW at F. Spain, therefore, obtains maximum utility level U^{S}_2, which is inferior to U^{S}_1, and is better off in a CU. The EC achieves maximum utility at U^{EC}_2, which is superior to U^{EC}_1, and is better off with the UTR. Therefore, if Spain wants to form a CU, it will have to compensate the EC for the amount by which U^{EC}_1 is inferior to U^{EC}_2. However, if Spain has to compensate fully the EC in the CU, it would be better off reducing tariffs unilaterally.[7] Thus, joint EC and Spanish welfare is greater with the UTR than with a CU. This is the standard result of the UTR literature.

The above result is generated by the assumption that ROW fixes the world terms of trade at the relative prices depicted by its offer curve. Spain and the EC have nothing to gain collectively by trading with each other rather than with ROW. However, this result is not necessarily obtained if Spain and the EC are exposed to tariffs or transportation costs when trading with ROW. If we assume that this is the case, then a "wedge" is driven in ROW's offer curve; the resulting ROW offer curves are ROW_1 and ROW_2. ROW_1 is relevant if Spain or the EC imports X from and exports Y to ROW. ROW_2 is the relevant offer curve if Spain or the EC imports Y and exports X. Furthermore, assume that the transportation costs and/or tariffs are prohibitive so that ROW does not trade initially with the EC and Spain, as is the case in Figure 2.1. The tariff-ridden trade equilibrium transpires at A. Once a CU is formed, trade takes place at the intersection of S and EC at E. This is pure trade creation and represents an improvement in welfare for Spain and the EC. But suppose that each of them had instead reduced its respective tariffs unilaterally. Spain would trade with the EC at Z, achieving utility level U^S_3, which is inferior to the utility level at E, i.e., U^S_1. The EC would trade with ROW at W, obtaining utility level U^{EC}_3, which is inferior to U^{EC}_1. Both are better off in a CU; the UTR proposition does not hold.

In conclusion, while UTR may be better in the static model for an individual country than a CU, this cannot be assured without ostensibly forbidding assumptions.

II. The Dynamic Case

The above review only dealt with the static effects of CUs, which are analyzed in the present study. In this section, we examine the principal dynamic arguments for and against CUs. First, the effects of economies of scale are presented. Second, possible X-efficiency improvements made possible by CU formation are analyzed. Third, changes in investment flows caused by a CU are considered. Fourth, the possibility of reaping monopoly power in trade via the formation of CU, i.e., optimal tariffs, is considered. Lastly, the potential for industrial expansion in developing countries is reviewed.

A. Economies of Scale

The advantage derived from access to an expanded market have always been an attraction for countries to form CUs. A main benefit is the possibility of reaping economies of scale in production. The argument is straightforward: In industries where production technology is characterized by decreasing cost, the domestic market alone may be too small to permit production at an optimal level. If there are high tariff walls on these goods in foreign countries, international trade might be of little or no help in allowing these firms to expand output toward the optimum. With the formation of a CU and the subsequent intraunion free trade, the expanded market could present the domestic decreasing cost firms with adequate demand to produce at the optimum.[8] Economies of scale are thus a possible argument in favor of the economic rationale of CUs.

The introduction of economies of scale to our theoretical model yields effects that complement the traditional trade creation and trade diversion phenomena.[9] Assume initially that Spain and the EC protect (by tariffs) their respective production of steel from competition exerted by the least cost producer, ROW. Furthermore, assume for simplicity that these tariffs are prohibitive. Steel production technology is characterized by decreasing average costs in production in Spain and the EC up to a level capable of satisfying both EC and Spanish demand. ROW is a large country presenting both Spain and the EC with a horizontal export supply curve, which is everywhere below the Spanish and EC average cost curve.[10]

Suppose a CU is formed between Spain and the EC and, moreover, that the latter's steel production is totally displaced by the former's production. Furthermore, assume that Spain becomes a price-setter within the union, so that only the producer in Spain can extract economic benefits.

The contraction of the less efficient EC steel industry is the familiar trade creation effect. However, the production increase in Spain's steel industry allows it to reap the benefits of economies of scale. It expands not only production at lower marginal cost, but also reduces the cost of previous production. This phenomenon is called the "cost-reduction" effect. It is a consequence of trade creation, but cannot be subsumed under the latter category because it does not suggest the contraction of the EC's inefficient industry, but rather, the increase in Spanish efficiency. Note that Spain is a price-setter and therefore reaps all the benefits of trade creation

and cost reduction. There is no trade diversion or loss of government revenue for the EC,[11] but the latter could be less well off if its steel producer previously earned excess profits.

But suppose that initial production of steel took place in Spain only. Two scenarios are then possible when a CU is formed. First--and most likely--Spanish steel could take over the EC market and replace the imports previously supplied from ROW. This would divert trade in the Vinerian sense, and the EC would lose government revenue. Spain would reap the trade creation and cost-reduction benefits. Second, a production reversal is possible. This could happen if the expanded market resulting from the CU enabled the EC to begin producing steel even more efficiently than Spain, replacing the latter's steel production. Trade would be created due to the contraction of Spain's inefficient steel industry. In addition, EC imports from ROW would be replaced by domestic production. This latter effect, called "trade suppression,"[12] resembles trade diversion, but since it is diversion of trade in favor of EC production in lieu of Spanish production, it merits a separate category.

A graphical depiction of the above model should clarify the economic effects of a CU with economies of scale. Consider Figure 2.2, where: OP^{ROW}_{x} = ROW's export price, $OP^{ROW}_{M} = OP^{ROW}_{x}$ + transportation costs to Spain and the EC,[13] $OT = OP^{ROW}_{M}(1 + \text{tariff})$, where the tariff is identical for Spain and the EC individually and as a union; $SPSP^{1}$ = Spain's demand curve, $CUCU^{1} = SPSP^{1}$ + EC's demand curve, and AC_{SP} = Spain's average cost curve. Minimum average cost

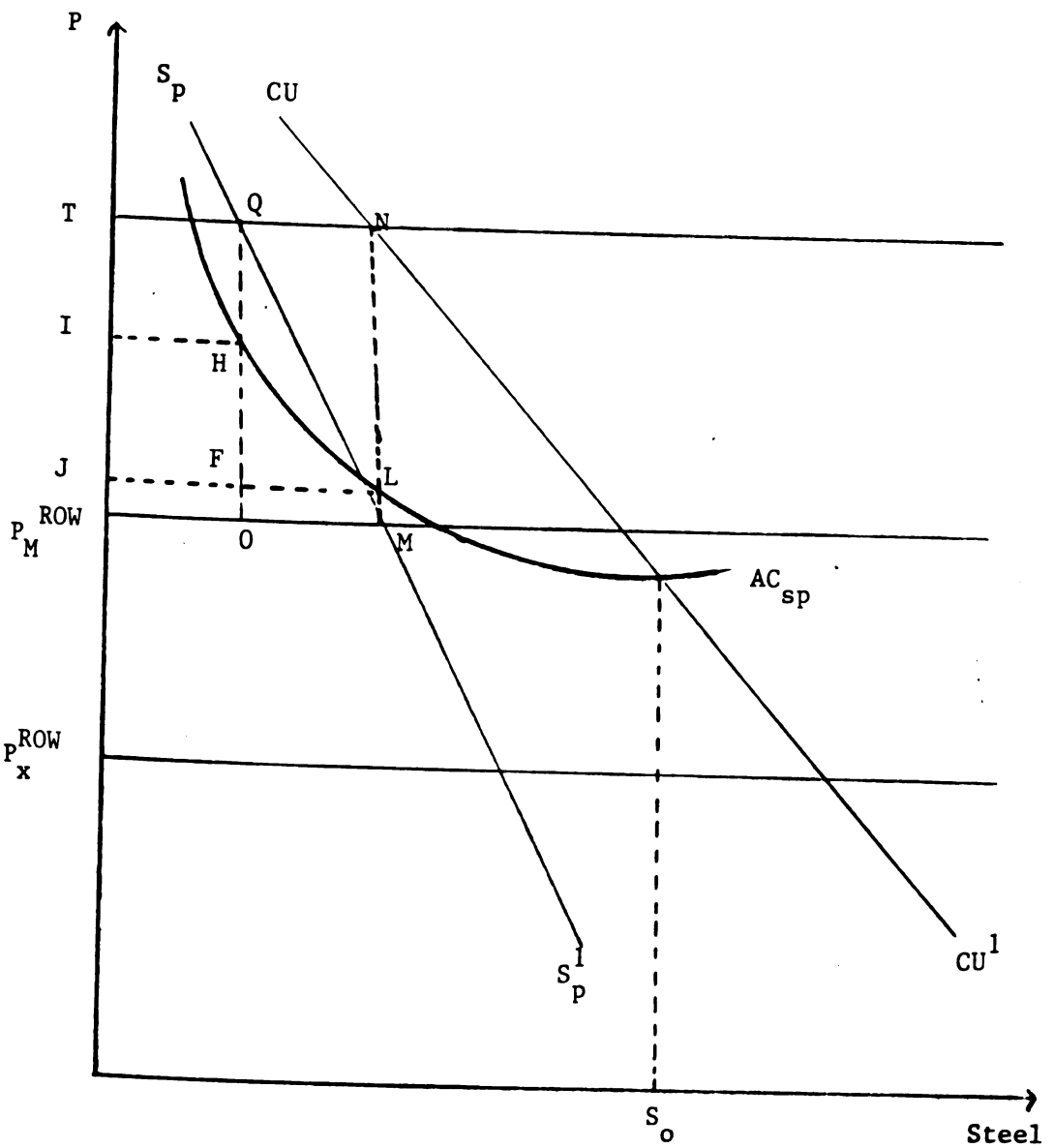


Figure 2.2.--Effects of Economies of Scale in a Customs Union

Source: W. Corden, "Economics of Scale and Customs Union Theory," Journal of Political Economy (June 1972): 475.

for Spanish steel production is at output S_o. We present here the case in which the EC never produces steel and Spain always does.

ROW can begin to compete in the Spanish market at prices above OT, so Spain sets the price of steel at exactly OT before the CU, which keeps out all ROW imports. It produces TQ of steel, which is well below the minimum average cost output, i.e., S_o. Upon joining a CU with the EC, Spain engulfs the EC market, producing TN of steel, which is still less than S_o. Spain maximizes its benefits once again by charging OT, selling TN of steel. The EC loses OQNM in government revenue, OFLM of which results from trade diversion--a net loss to the union--and FQNL of which accrues as a rent to Spain. IJHF is the cost-reduction benefits that also accrue to Spain. Hence, the net effect of the CU on the members' welfare is: FQNL + IJHF - OFLM, which is positive. In theory, then, Spain could bribe the EC to join the union.[14]

While the economies of scale argument is theoretically an important one in favor of CUs, its practical importance has been questioned. For example, Harry Johnson (1957) is skeptical of the argument because populous, developed countries (such as France and Great Britain) should provide adequate demand for the output of most commodities where technology exhibits economies of scale. Thus, optimal production can take place without joining a CU.

B. X-Efficiency

Gains from a CU in the economies-of-scale example stem from the increased productive efficiency of the firm at the micro level.

However, in such cases where the productive technology exhibits decreasing average costs, monopoly potential arises. Indeed, it is a standard result of microeconomic theory that decreasing average cost industries cannot be characterized by perfect competition. And if the firm possesses monopoly power, profit maximization leads to inefficient output from the social optimum perspective. Monopoly power restricts output in order to reap (private) maximum profits at the expense of consumers' surplus and efficiency. The resulting inefficiency is called "allocative inefficiency."

Another type of allocative inefficiency analogous to the decreasing costs case stems from monopoly power in trade, a topic dealt with in Subsection II.d. Suffice it to note here that when monopoly power in international trade exists, the optimal private tariff scheme--that is, the "optimal tariff"--differs from the optimal social (international) tariff scheme, which is free trade. This is allocative inefficiency at the international level.

Allocative inefficiency is therefore an important distortion theoretically. However, it has been estimated empirically[15] that inefficiency due to monopoly power in international or domestic trade is a relatively unimportant distortion. But another sort of inefficiency lurks behind the scene that does not relate to our standard microeconomic analysis yet has been estimated to be highly significant: X-efficiency.[16]

The term X-efficiency relates to the optimal organization of the productive process, e.g., work methods, incentive programs, plant layout, management, and psychological environment at the workplace.

These can be separated into three categories: (1) intraplant motivational efficiency, (2) external motivational efficiency, and (3) nonmarket input efficiency. Harvey Leibenstein (1966) shows empirically that the counterpart to X-efficiency, X-inefficiency, is a far more significant cause of failure to achieve the social optimum in production than is allocative inefficiency.

It is therefore important for our purposes to include the X-efficiency factor in searching for the economic rationale of CUs. If inefficient practices in the workplace of a protected industry are replaced by efficient methods due to competition from the partner country, a CU will improve productivity. This is called "forced efficiency"[17] and represents an improvement in welfare. In addition, there may be other benefits, such as increased technology and method sharing, new ideas to stimulate the psychological atmosphere at the workplace, and increased standardization of quality and specification requirements allowing for longer production runs. Thus, there are theoretically many ways in which a CU could lead to increases in X-efficiency, and this sort of improvement cannot be obtained via UTRs.

C. Investment

A CU will have several effects on the direction of investment flows. First of all, after a CU is formed, domestic capital previously invested in partner countries in order to evade tariffs will now flow to where the return on capital is highest in the CU. This results in a more efficient allocation of investment funds. In addition, the formation of a CU reduces the risk and uncertainty of

investing in foreign countries. Investments in partner countries are no longer subject to the risk that changes in foreign commercial policy may bring. However, there also will be an efficiency cost associated with investment changes induced by CU formation. Investment funds that would be more efficiently invested in nonpartner countries may be diverted to partner countries in the CU. This investment diversion is caused by the "noneconomic" attraction of investment funds to the CU in order to evade its discriminatory tariff wall.[18] Thus, there are both dynamic benefits and costs associated with changes in investment flows caused by a CU.

D. The Optimum Tariff Argument

It is a familiar result of international trade theory that free trade is better than autarky, but free trade is not better than restricted trade for all nations. This is because of monopoly power in trade. If a country has monopoly power, it could exploit this by imposing an "optimum tariff."[19] Although such a tariff strategy is suboptimal from a worldwide perspective, the imposing country will maximize its own (private) welfare, taking a larger slice of a smaller cake.[20]

The possibility of manipulating one's terms of trade more advantageously by joining a CU has long been recognized in the CU literature. Optimum tariff opportunities are increased in a CU because the member countries increase their international market power and, hence, their monopoly power over ROW. Viner (1950) stresses the importance of smaller countries' using CUs in order to

protect themselves from being exploited by larger countries. Similarly, Meade (1955) emphasizes the advantage of increased bargaining power in commercial negotiations. By negotiating as a group, claims Meade, smaller countries are far stronger than if they were to act independently.[21]

In an extension to the literature on the welfare effects of a trade-diverting CU discussed in Chapter I, James Melvin (1969) shows that the assumption of constant terms of trade biases the argument in favor of a welfare-increasing TDCU. If the latter assumption is relaxed and the terms of trade change, the likelihood of a TDCU that increases welfare diminishes. The intuition behind this last statement is simple. Assume that the nondiscriminatory tariff that the large country Spain imposes on the EC and ROW is of the optimal type. Then we know from the optimal tariff literature that the tariff-ridden status quo is an improvement for Spain over free trade. Consequently, "if we are at a restricted trade position which is superior to free trade, any movement toward free trade will diminish welfare" (Melvin, 1969, p. 163). Even a CU that included the entire world would decrease Spanish welfare relative to the optimal tariff position.

But the above result, as Johnson (1965) shows, depends on the dubious assumption that no trade with the nonpartner country survives the CU. If trade does survive, the trade diversion production effect tends to improve the terms of trade. The net welfare effect of a CU becomes once again an empirical question of weighing the favorable--

or unfavorable, if trade with ROW does not survive--terms-of-trade effect and trade creation against trade diversion.

The terms-of-trade argument is a valid defense against the contentions of the UTR literature.[22] If Spain reduces its tariffs unilaterally, it will experience inevitably a deterioration in its terms of trade. Should Spain join a CU with the EC instead, its terms of trade will probably improve, provided that trade with ROW continues.[23] Whether the UTR or the CU would leave Spain better off in this context depends on the magnitudes of the terms of trade and trade diversion effects. But UTRs do not dominate CUs. In fact, Johnson (1965) has suggested that this is the only valid argument in favor of the CUs in the classical paradigm.

Moreover, a unique model which integrates the optimal tariff and the CU literatures is presented by Kennan and Riezman (1982). Using a three-good/three-country model, they are able to produce two significant conclusions that contribute to the arguments for the economic rationale of CUs. First, if Spain and the EC do not determine tariff rates jointly in regulating trade with ROW, a tariff externality exists in that a change in the tariff by one country will affect prices in the partner country by changing the international price of that good. To see this, suppose Spain and the EC import X and Y from ROW. If Spain imposes a tariff on X, the international price of X will fall, assuming ROW's export supply of X and Y are not infinitely elastic. This enables the EC to benefit from the reduced price of X. Furthermore, assume the EC imposes a tariff on Y. This will benefit Spain by reducing the international price of Y. In a CU

where tariffs on X and Y are jointly determined, these externalities are internalized; Spain and the EC can jointly maximize gains from tariff imports from ROW. Hence, the CU increases their welfare.

Second, allowing for retaliation, Kennan and Riezman show that Spain and the EC will lose more if they retaliate independently rather than as a group--i.e., in a CU--against the optimal tariff of a large country ROW. This is because Spain and the EC increase their joint market power by forming a CU. By retaliating together in a CU, Spain and the EC minimize joint losses caused by ROW's optimal tariff. Hence, the economic rationale for a CU in this case is to minimize economic losses caused by ROW's optimal tariff.

E. CU's and Development

It is also a possibility that CUs are economically justifiable if they help develop the economic structure of developing countries. In LDCs, the development of the industrial base is perceived to be of paramount importance for a plethora of reasons, e.g., self-sufficiency aspirations, workforce and social externalities, and political clout of industrialists. In other words, industrial production "appears as a collective consumption good yielding a flow of satisfaction to the electorate independent of the satisfaction they derive directly from the consumption of industrial products" (Johnson, 1965, p. 258). Therefore, if the country wishes to protect and expand its domestic industrial production and forming a CU is the least expensive way to achieve

such a goal (because a large market is needed to attain lower-cost production), it follows that CUs are indeed economically rational.[24]

If one chooses to consider industrial production as a public good, it is necessary to reevaluate our notions of the economic value of trade creation and trade diversion. Trade creation in this context is welfare-inhibiting in that it involves the contraction of industrial production. Trade diversion is welfare-increasing if it involves diversion in favor of domestic industrial production. A developing country will not join a CU in this context if it believes its industrial production will contract in favor of nonindustrial production in which it has comparative advantage.

This theory of industrial preferences was developed intuitively by Johnson (1965), but was formalized by Cooper and Massell (1965). In the latter model, an explicit preference for industrial production on the part of policymakers is assumed. There exists in the model a trade-off between national income and industrial production. This negative relationship is the manifestation of the costs of protecting inefficient domestic production. The total amount of industrial production afforded to domestic producers is determined by the tangency of the planners' indifference curve--which defines the rate at which planners will sacrifice aggregate income for industrial production--and the production/consumption locus. In other words, the number of inefficient industries allowed to function and hence the total income of society is determined at the point where the rate at which consumption is foregone in favor of production and the rate at which

planners are willing to trade off consumption for production are equal.

With the formation of a CU, the developing country in question experiences a growth in market size for its industrial product. If it specializes in the industry in which it has intraunion comparative advantage and the other country does the same, then the same level of industrial production can be sustained at a lower marginal cost. Or, alternatively, for the same cost of production, the level of industrial production can be greater. The driving force behind this result is intuitively logical. Upon joining a CU, the developing country has an increase in market size. It can then specialize in its most efficient industries, that is, those which are least expensive to protect, and can cease to protect the lesser efficient industries, thereby reaping a social savings. The level of union production can be sustained, but at a lower marginal cost if the member countries specialize in producing the goods in which they have intraunion comparative advantage.

CUs in this model are not dominated by UTR, because the tariff-reduction and pure trade diversion components take on new welfare connotations.

III. Summary

There are many reasons CUs are economically rational and superior to UTR. In the static model, we saw that UTRs dominate CUs only under implausibly restrictive assumptions. By ignoring implicitly the benefits that accrue to the home country's increased

access to the partner country's markets, the UTR literature assumes away an important motivation for joining a CU. If this assumption is dropped, the increased producers' surplus for domestic firms stemming from increased exports to the partner country could easily be enough to offset any trade diversion effects. Thus, whether joining a CU or UTR is the superior policy for the home country is an empirical question.

In addition, several arguments derived in the dynamic model support the economic rationale of CUs. The increased access to markets in a CU could benefit the home country if its export industries are characterized by economies of scale. This improvement takes place through the cost reduction effect. In addition, a CU could produce organizational benefits at the industrial level that result form creating a common market among the member countries. This improvement in X-efficiency could significantly improve productivity. Moreover, changes in investment flows produce some benefits. However, there are also costs due to investment diversion. Furthermore, collusion in determining the common external tariff could allow for benefits via optimal tariffs or threats of retaliation. Finally, it is possible that developing countries interested in protecting their industrial base could find themselves relatively better off in a CU. This is because a CU could potentially allow for industrial expansion at lower marginal costs of protection.

NOTES: CHAPTER II

[1]All UTR models assume that the terms of trade do not change. A critique of this assumption is found in Section IIId.

[2]M. Krauss, "Recent Developments in Customs Union Theory: An Interpretive Survey," Journal of Economic Literature 10 (June 1972): 413-16, extends the partial equilibrium model used by CM to a two-good general equilibrium model.

[3]To see the generalized n-commodity framework, see the appendix to E. Berglas, "Preferential Trading Theory: The N-commodity Case," Journal of Political Economy 87 (April 1979): 315-32.

[4]Cross-hauling occurs when, for example, ROW exports commodity 3 to Spain via the EC in order to take advantage of lower import barriers in the EC.

[5]Alternatively, cross-hauling can be ruled out by assuming any of the following conditions: (1) the tariff on commodity 3 is the same in both Spain and the EC; (2) the tariff difference between Spain and the EC is less than the transportation costs between Spain and the EC; or (3) the tariff agreement does not include commodity 3.

[6]In this model, transportation costs between Spain and the EC are omitted. This does not affect the analysis as long as the latter cost is smaller than that between either Spain or the EC and ROW. Since it is an empirical regularity that CUs are geographically close, this is not an unreasonable assumption.

[7]Under standard assumptions, it can be shown that the EC loss at E compared to F is greater than the amount by which Spain prefers E to S.

[8]For a more detailed discussion of the microeconomic foundations of the economies-of-scale argument, see: F. M. Scherer, Industrial Market Structure and Economic Performance (Boston: Houghton Mifflin, 1980), Chapter 4.

[9]The following analysis is taken from W. Corden, "Economies of Scale and Customs Union Theory," Journal of Political Economy 73 (June 1972): 465-75.

[10]The assumption simplifies the analysis by excluding any possibility of Spain or the EC exporting to ROW.

[11]This stems from the previous assumption that the tariffs were prohibitive.

[12]This term was coined by J. Viner, The Customs Union Issue (New York: Carnegie Endowment for International Peace, 1950), p. 45.

[13]We assume for simplicity that trade between Spain and the EC involves no transportation costs.

[14]Corden admits that there is nothing really dynamic about the above model; it is an exercise in comparative statics. However, since economies of scale are always assumed away in the static model, it is logical to include them here, since they depend on dynamic considerations.

[15]H. Leibenstein, "Allocative Efficiency vs. X-Efficiency," American Economic Review 56 (June 1966): 392-97.

[16]Ibid., pp. 397-413.

[17]This term is from R. Lipsey, "The Theory of Customs Unions: A General Survey," in J. Bhagwati, International Trade: Selected Readings (Cambridge, MA.: MIT Press, 1981), p. 281.

[18]M. Kreinin, "On the Dynamic Effects of a Customs Union," Journal of Political Economy 72 (1964): 193-195.

[19]It can be shown that the optimal tariff is equal to the reciprocal of the foreign elasticity of export supply. See, for example, W. Ethier, Modern International Economics (New York: Norton and Co., 1983), pp. 192-97.

[20]We assume that there is no foreign retaliation.

[21]Krause, "Recent Developments," points out that Meade overlooks the counterargument that the chances of reaching a consensus on the precise nature of desired concessions will be less the greater is the number of participants.

[22]Since the UTR contention is only postulated for price-taking countries, the following argument is a criticism of the robustness of the UTR model, not the UTR paradigm per se.

[23]In fact, the continuation of trade with ROW is a necessary condition for UTR to hold, as we saw above.

[24]The above argument, however, is inapplicable if the policymakers view self-sufficiency as the only motivation for propping up the industrial base.

CHAPTER III

EMPIRICAL EX-ANTE TRADE MODELS: REVIEW AND SELECTION

Greece acceded to the EC on January 1, 1981. Spain and Portugal joined the Community on January 1, 1986. This chapter and Chapter V review empirical paradigms employed in the literature to estimate the economic effects of the Second Enlargement of the EC. Ex-ante and ex-post models are presented in Chapters III and V, respectively, leading up to methodologies to be employed in this thesis to estimate the economic effects of the Second Enlargement. These empirical models are developed and applied in Chapters IV and VI.

Section I of this chapter suggests a framework within which to assess these various ex-ante and ex-post models in the literature. Section II reviews several paradigms that have been used to estimate ex-ante the effects of trade liberalization. Included are the price elasticity approaches, general equilibrium models, and the import-demand-regression approach. After the presentation of each, a comparison of estimates obtained using the respective techniques is undertaken. A summary of the results can be found in the appendix to Chapter III. Finally, Section III offers a short review of trade

creation and trade diversion estimates derived using ex-ante paradigms.

I. Criteria for Analyzing Trade Liberalization Models

Because the literature provides a myriad of ex-ante and ex-post trade models, it would be expedient to have a yardstick by which to evaluate them. Several criteria exists in econometrics: Models that are biased are inferior to those that are unbiased; models that are inefficient are inferior to those that are efficient; models that are inconsistent are inferior to those that are consistent. Econometric guidelines are certainly relevant to trade models, but are insufficient for two reasons. First, many of the models are not econometric in nature. Second, the above criteria do not enable one to determine how appropriate the model is for the ultimate goals of the modeler. Thus, it is necessary to have another yardstick for evaluating the desirability of the model in estimating economic phenomena, which in the present context is trade liberalization.

A useful framework within which to evaluate trade liberalization models has been developed by Ali M. El-Agraa (1985). He presents the following minimum standards for a model designed to analyze the effects of changes in economic variables following trade integration:

1. It should be capable of being carried out at the appropriate level of disaggregation[1]

2. It should make possible a distinction among trade creation, trade diversion, and external trade creation[2]
3. It should be capable of discerning the effects of economic growth on trade that would have taken place in the absence of economic integration
4. It should be "analytic" in that it can provide an economic explanation of the actual postintegration situation
5. It should be general equilibrium in nature, capable of allowing for the effects of economic integration in an interdependent world

The models presented in Chapters III and V fit the above criteria in varying degrees. However, while criterion 3 is appropriate for ex-post models, it cannot be applied to ex-ante models because these paradigms ignore completely economic growth effects and concentrate instead on resource reallocation. In addition, all ex-ante and ex-post models are not general equilibrium models in a strict Walrasian sense. Nevertheless, all are general equilibrium in that they allow for the analysis of economic integration in an interdependent world. Thus, they do not necessarily conflict with 5. The models that are presented in Chapters III and V will be evaluated both on the pure econometric basis (where appropriate) and the El-Agraa criteria.

II. Trade Creation and Trade Diversion in Ex-Ante Models

The purpose of ex-ante estimation is to forecast changes in economic variables before they actually occur. As the goal of the present study is to calculate changes resulting from economic integration, the relevant ex-ante variables are changes in global allocative efficiency resulting from the expansion of the EC. The fundamental logic behind the methodology of ex-ante estimation of economic integration can be expounded as follows. First, it is necessary to forecast country i's expected total future imports in postintegration year 2 if integration occurs ($\hat{M}^T_{i2}$), i.e., imports from both partner and nonpartner imports that would have obtained in the absence of integration (M^T_{i2}). Trade creation is calculated as the difference between the former and the latter estimates, that is,

$$TC = (\hat{M}^T_{i2} - M^T_{i2}) \tag{3.1}$$

In order to estimate ex-ante trade diversion, one estimates the future imports from nonpartners of country i with and without integration, which are denoted by ($\hat{M}^N_{i2}$) and (M^N_{i2}), respectively. Trade diversion is the difference between the two:

$$TD = (\hat{M}^N_{i2} - M^N_{i2}) \tag{3.2}$$

The change in economic welfare (including consumption and production effects) will be represented as the difference in magnitudes of trade creation and trade diversion (net trade creation).

III. Empirical Ex-Ante Paradigms and Model Selection

A. Price-Elasticity Approach Models

The price-elasticity approach (PEA) to estimating ex-ante the effects of economic integration is the one most commonly used. Trade creation is derived for each commodity group by multiplying the price elasticity of import demand $(\eta_{mk})^3$ for commodity group k by the percentage change in its price induced by the tariff changes due to integration $(\Delta t/1+t_i)$:

$$TC = [(\sigma_{mk}(\Delta t/1+t_1)_k]M_{ik} \qquad (3.3)$$

Total imports of commodity group k from country i are represented by M^i_k. The parameter η_{mk} is either obtained from other sources in the literature or derived by the modeler himself. The term Δt is the change in the ad valorem tariffs from the preintegration phase (t_1) to the postintegration phase (t_2). Because the tariff on intraarea trade changes from t_1 to zero, trade creation is nonnegative for partner countries. But the change in external tariffs is a priori indeterminate. If $\Delta t<0$, imports from nonmember countries will increase at the expense of inefficient domestic production, yielding external trade creation. If $\Delta t>0$, inefficient domestic production will increase at the expense of nonpartner imports, inducing trade erosion.

In order to estimate (external) trade diversion, it is necessary to estimate first the import price elasticity of substitution between partner and nonpartner imports $(\sigma_{p,np})$. Because

$\sigma_{p,np}$ represents the change in the ratio of external to partner imports induced by a change in the partner price relative to the nonpartner price, $\sigma_{p,np}$ should be negative. The larger the elasticity of substitution (that is, the more homogeneous commodity k is between countries), the greater is the degree of trade diversion. Thus:

$$TD = \sigma_{p,np}(-ti)M^{np}_{k} \tag{3.4}$$

External imports of commodity group k are denoted by M^{np}_{k}. As was the case with η_{mk}, the parameter $\sigma_{p,np}$ is obtained from the literature or the modeler's own estimates. Moreover, the ad valorem tariff rate $-t_i$ represents the external tariff rate of the importing country in the preintegration phase.

This form of the PEA had been used by several authors to estimate trade creation and trade diversion at various stages of economic integration. However, others have used a variant of the PEA. In this procedure, developed by Baldwin and Murray (1977), trade creation is estimated in the same fashion, i.e., according to equation (3.3), but the derivation of trade diversion is different. In lieu of scanning the literature for elasticity of substitution estimates, which are scarce and often unreliable[4], Baldwin and Murray devise a technique that circumvents the need for such parametric estimates. They assume that imports of commodity k from partner and nonpartner countries are imperfect substitutes for domestic production. In addition, imports of the home country i from the partner and nonpartner countries are assumed to be imperfect

substitutes. Thus, consumers in the home country face three distinct demand curves for commodity k. Foreign and domestic supply curves are assumed to be perfectly elastic.

When a customs union is formed, the domestic demand curve for nonpartner and home production of commodity k shifts to the left (decreases) because of the resulting change in relative prices. The loss in producer surplus to the nonpartner firms represents the trade diversions effect, call it A. Hence, trade diversion can be represented as A/X x X, where X signifies total producer welfare for k in the nonpartner country. The ration A/X is then a share coefficient (call it w) which denotes the proportional decrease in nonpartner producer welfare due to the customs union.

Now assume that the substitutability between partner exports and nonpartner exports of commodity k is equal to that between the partner country exports of k and home production of k. Thus, partner country exports of k compete with nonpartner production of k as well as home production of k. (This is a reasonable assumption as long as the home and nonpartner countries' economic structures are similar.) Along with the above assumptions, this ensures that the proportionate change in nonpartner and domestic producer welfare is the same when the customs union is formed. The substitutability between partner and home production is trade creation and can be described in terms of the reduction in total domestic producer welfare (V): B/V x V, where B represents the decrease in domestic producer welfare due to the customs union (trade creation). However, because of the assumptions with respect to substitutability and a perfectly elastic

export supply curve, B/V=A/X=w (i.e., the proportional decrease in nonproducer welfare is equal to the proportional decrease in home producer welfare). Hence trade diversion can be obtained from trade creation as follows:

$$TD = A/X \times A = B/V \times X = TC \times X/V$$

that is, trade diversion is equal to trade creation multiplied by the ratio of nonpartner to domestic production of good k.

Employing the Baldwin and Murray technique, one can avoid using estimates of the elasticity of substitution between alternative sources of imports. Nevertheless, the viability of their technique rests on the crucial assumption that the partner country's exports compete on an equal basis with home and nonpartner products. This is credible in their model because they analyze the effects of discriminatory tariff reductions under the Generalized System of Preferences: The partner countries are GSP beneficiaries, which are all LDCs, and the home (donor) countries and the nonpartner countries (nonbeneficiaries) are DCs. Thus it is plausible that LDC exports should compete as well with the donor as nonbeneficiary countries, whose products are generally homogeneous. However, it would be less reasonable to apply this assumption to the case of the Second Enlargement, as do Donges (1980) and Sawyer (1985). In analyzing the effects of the Second Enlargement, domestic and partner countries include economies with varying degrees of industrial development. In addition, nonpartners include countries as different as the United States and the Magreb states! Therefore, the crucial assumption that

was reasonable in the Baldwin and Murray model is inappropriate when applied to the Second Enlargement. Moreover, the Baldwin and Murray assumption of perfectly elastic export supply has been criticized. Pomfret (1985) demonstrates that this causes trade creation and trade diversion to be biased upward in the Baldwin and Murray model.[5]

The PEA has been used to analyze many different types of trade liberalization, such as the Kennedy Round tariff reductions under GATT (Balassa and Kreinin, 1967), the importance of the Generalized System of Preferences (Baldwin and Murray, 1977), the effects of the First Enlargement of the EC (Kreinin, 1973), and the effects of the Second Enlargement of the EC (Donges, 1980; Sawyer, 1985).

Every ex-ante study using PEA has generated net trade creation. Balassa and Kreinin analyze the effects of a nondiscriminatory 50 percent tariff reduction on manufactured and industrial materials; thus, there is only trade creation in their estimates. Kreinin's estimates of the First Enlargement suggest a value for net trade creation of $1.4 billion, but the U.S. experiences a significant displacement of its exports to the EC, reaching 51 percent of total trade diversion ($2 billion). Donges and Sawyer obtain strong net trade creation estimates for the Second Enlargement. Donges, who considers exclusively the case of Spanish accession, obtains net trade creation of $415 million. Analyzing the impact of the accessions of the Three on US exports, Sawyer calculates a value of net trade creation of $111.7 million.

Absolute net trade creation values of the estimates for the First Enlargement ostensibly exceed those of the Second Enlargement. But the First Enlargement involved the accessions of much larger economies. In fact, if net trade creation is expressed as a percentage of gross trade creation, the ranking is reversed (Sawyer, 90%; Donges,, 84%; Kreinin, 58%).

1. Model Selection. There are two PEA candidates for the present study: the traditional price-elasticity approach and the Baldwin and Murray technique. Both are well suited to handle disaggregated data and, hence, conform well to the El-Agraa criteria. In addition, data requirements are easily accessible; commodity coverage is generally limited to the availability of elasticity estimates.

One way to assess the accuracy of the PEA models is to compare results obtained from ex-ante PEA estimation of a given phase of trade liberalization with ex-post results obtained after the integration process is complete. Such a comparison is possible in the case of the First Enlargement of the EC for the traditional PEA and the effects of implementing the Generalized System of Preferences for the Baldwin and Murray technique.

Kreinin (1973) uses the traditional PEA technique to estimate the effects of the First Enlargement. He obtains results exhibiting strong net trade creation. In a follow-up study, Kreinin (1981) derives results that confirm his previous conclusions that the First Enlargement would improve world allocative efficiency, even though

net trade creation is greater in the latter study than in the former.[6] Furthermore, empirical estimates in the present dissertation reaffirm the credibility of the PEA. Ex-ante calculations obtained in Chapter IV for the accession of Greece to the EC(9) suggest strong net trade diversions; the ex-post predictions in Chapter VI support these results not only in direction, but also in order of magnitude.

In addition, the Baldwin and Murray (1977) PEA analysis can be compared to the ex-post Sapir (1980) results on the economic effects of the EC's GSP. Both studies conclude that there will be a preponderance of net trade creation, but the magnitudes are quite different: Sapir's estimates imply that net trade creation was actually eight times per year greater than what Baldwin and Murray had predicted.

Because of its theoretical soundness and successful empirical verification, the traditional PEA was chosen as an estimation technique in this dissertation. The Baldwin and Murray technique was not selected because of its problematic theoretical assumptions with respect to country homogeneity and perfect supply elasticities, discussed in Section III.a, and its lack of ex-post verification.

B. General Equilibrium Models

Various general equilibrium models have been used to estimate the effects of trade liberalization. They represent a diverse array of commodity and country disaggregation and display in impressive variety of assumptions in terms of general equilibrium interactions

and suppositions with respect to smoothly functioning, perfectly competitive markets. In addition, these models differ in their assumptions of factor mobility and time dimension. The most popular are the computational general equilibrium models (CGE), pioneered by Shoven and Whalley (1984), and the Michigan Model of World Trade and Development (MM) (1986), developed over the years by Deardorf and Stern at the University of Michigan. While the present review is limited to these later two, the summary of results presented at the end of this subsection and in the appendix includes results from several other general equilibrium models.

The general equilibrium models in the literature are characterized by two common features. First, as in the PEA, they employ a priori elasticity estimates. Elasticities are derived either through a literature search and logical approximations (CGE), or through independent derivations of elasticities (MM). Second, a system of equations that describes the actions of all agents in the economy at all stages of production and demand is erected in both models. The functional forms of the economic agents include Leontief, CES, Cobb-Douglas, and LES production functions, depending on the model. By solving for profit and utility maximization of firms and consumers, respectively, a general equilibrium solution is derived using a special algorithm (CGE) or a linearization assumption and a simple algorithm (MM).[7]

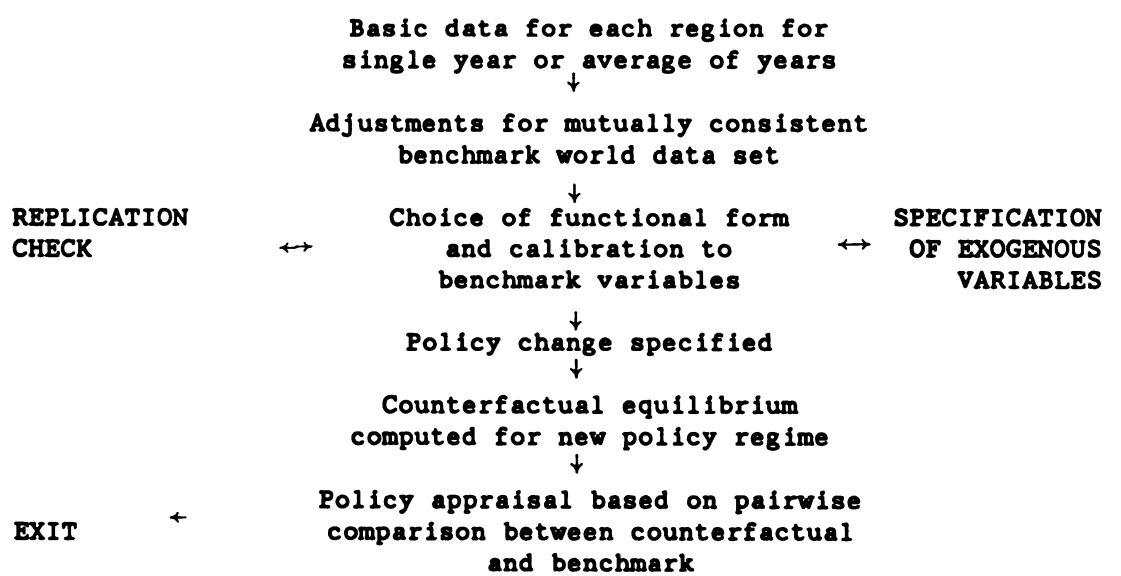
By changing economic variables, such as tariffs, one is able to solve for new equilibrium values of endogenous variables, called the "counterfactual equilibrium." It is possible to compare the

values obtained for the endogenous variables from the counterfactual simulation with those in the benchmark simulation. From this comparison, one can deduce changes in output in different sectors, factor remuneration, economic efficiency (i.e., trade creation and trade diversion), the terms of trade, and the balance of payments.

The CGE model rests on three basic assumptions: the Walrasian assumption of demand equaling supply in all goods and factor markets with perfect mobility of factors; zero profits in all industries; and an external sector balance in each region. Based on these assumptions, the CGE model yields a global general equilibrium. In addition, to avoid problems of cross-hauling, the Armington assumption is made.[8]

The specification of demand and production functions, the level of aggregation of countries and product categories, and the specification of functional forms in the CGE model depend on the version of the model being considered. For example, Whalley (1985) constructs two different ones. The first is a four-region model. On the demand side, each agent in each of the four regions--EC, U.S., Japan, and ROW--has a nested two-level CES utility function. On the production side, each industry in each region has a CES value added function. Intermediate production in each region is characterized by fixed coefficient intermediate requirements in terms of composite goods. Fixed requirements of composites are satisfied by a substitutable mix of comparable domestic and imported goods. Constant elasticity of substitution functions are used at this level for each fixed composite requirement.

The second model is more disaggregated regionally, consisting of seven regions--EC, U.S., Japan, Other Developed Countries, OPEC, NICs, and LDCs.[9] It employs on the demand side a four-level nested CES/LES demand function. The production side is similar to the four-region model, i.e., CES value added functions and fixed coefficient intermediate requirements, but with each fixed coefficient expressed in terms of composites only. The process of solving the model once the system of equations is developed can be summarized in terms of a flow chart:



Source: J. Whalley, Trade Liberalization among Major World Trading Partners (Cambridge, MA: MIT Press, 1985), p. 121.

The MM is more disaggregated than the CGE model. For example, in Deardorf and Stern (1986), twenty-nine countries and thirty-four countries are used. A full general equilibrium analysis of the goods market is included, but wages and expenditure are held

fixed, and labor markets are permitted to be in disequilibrium, as opposed to the full general equilibrium in all markets found in the CGE. In addition, the capital stock is fixed in each sector. Furthermore, there is a different time span: The fixities in wages, expenditure, and capital movements imply that the MM is geared to a more short run analysis, whereas CGE models are long run in nature.

In sum, the assumptions employed in the MM give rise to a Keynesian analysis of policy-induced changes in economic variables. Thus, although the CGE and MM paradigms differ in many ways, such as solution procedures and institutional and behavioral assumptions, the differences between the two models can be reconciled to some degree by regarding the latter as a short-run approach and the former as a long-run approach.

The general equilibrium models fit the El-Agraa criteria rather well. By comparing benchmark and counterfactual results, ex-ante estimates of trade creation, trade diversion, export expansion, terms of trade, and balance-of-payments effects can be derived. Disaggregation, however, is difficult to attain because large numbers of regions and commodities increase exponentially the size and computer cost of the model. Also, in the CGE model, the potentially key role of the Armington assumption is a hindrance because it reduces the substitutability not only between domestic goods and imports, but also between alternative sources of import supply. Moreover, both models suffer from the problem of assembling international benchmark data. Finally, these models depend entirely

on exogenous specification of elasticities. As noted in the previous subsection, such estimates are often unreliable. Since elasticities play a major role in both models, this is a serious drawback. One solution is to use sensitivity analysis to project upper and lower bounds of elasticities (which is done in Chapter IV to estimate elasticities of substitution for the price-elasticity approach).

Nevertheless, the CGE and MM approaches, still in their infancies, have great potential in the analysis of trade liberalization. Most of the CGE models have been dedicated to analyzing public finance questions, such as the implementation of value-added taxes, changes is in indirect taxes, etc.[10] However, Whalley (1985) obtains significant results with respect to trade liberalization effects, such as the welfare effects of a unilateral abolition of U.S. tariffs and a simultaneous abolition of tariffs in all regions, i.e., free trade. Similarly, the MM was used in Deardorf and Stern (1986) to analyze the welfare effects of the Tokyo round reductions in tariff and nontariff barriers.

Two other general equilibrium models analyze various effects of the Second Enlargement. Christou and Sarris (1980) examine the effects on agriculture of the accession of Greece. They predict that because of the cessation of intricate subsidies present in Greek agriculture prior to accession, that sector will suffer substantial setbacks. In fact, they predict a considerable deterioration in the balance of payments (8.2 billion drachmas) and decease in government tariff revenue (1.5 billion drachmas). Jean-Marie Viaene (1981)

analyzes the long-term static and dynamic effects of Spain's accession. For 1983-1987, she predicts average annual trade creation at approximately 41.46 billion pesetas and external trade creation to be 10.64 billion pesetas. Although her estimates imply a strong improvement in allocative efficiency, they also imply a significant deterioration in Spain's balance of payments, as import expansion exceeds export expansion. She concludes that accession will slightly retard Spanish economic development.

1. Model Selection. Unlike the case of the PEA models, there are no ex-post estimates that can be used to verify the ex-ante results of the general equilibrium models. Moreover, several theoretical and practical problems preclude the use of a general equilibrium model in the present study.

The first drawback, stressed by Leamear (1986), is the demanding data requirements. In fact, the scarcity of international price and tariff information is a hindrance not only in general equilibrium but also in partial equilibrium models. These problems stem from inadequate and inaccurate data collecting agencies at the international and national levels, divergent commodity nomenclatures, frequent lapses in time-series statistics, and so forth. The interdependent nature of all countries in the general equilibrium setting renders "holes" and inadequacies much more problematic. Furthermore, general equilibrium models require a diverse array of microeconomic and macroeconomic data that are unnecessary in partial

equilibrium models. Leamer suggests that an empirical paradigm which follows less strictly the literal interpretations of general equilibrium constructs should be undertaken, mainly to get around the (sometimes prohibitively) demanding data requirements.[11]

In addition, the functional forms of production functions and consumer behavior are generally chosen as a matter of convenience in general equilibrium paradigms rather than as a matter of propriety. This is a point emphasized in Shoven and Whalley (1984). It is often the case that weak a priori reasoning is applied in the selection of functional forms, when in fact, they are used only because of convention or simply because the functional form yields interesting and/or manageable results. In fact, Deardorf and Stern (1986) employ a curious strategy of manipulating their model to conform to their expected results at all times. As they concede, "to some this may seem to make the whole exercise either pointless or illegitimate," but they insist that the method is viable at this early stage of their modeling (Deardorf and Stern, 1986, p. 221).

Finally, there is the drawback of exogenous specification of elasticity parameters in general equilibrium modeling which is necessary due to their complicated computational nature.[12]

In conclusion, it does not appear that the application of a general equilibrium model to the Second Enlargement would yield more robust results than a partial equilibrium construct. Hence, no general equilibrium paradigm is employed in this dissertation.

C. Import Demand Regression Approach

The import demand regression approach (IDRA) is an econometric model of bilateral trade flows that can be used to estimate the economic effects of trade liberalization. It is of special interest for two reasons: It is the only econometric model that we have considered thus far, and it can be used to obtain both ex-ante and ex-post estimates. The ex-ante version is developed in this section; the ex-post version is constructed in Chapter V.

Although some economists have developed import-demand regression models that employ exogenous price elasticities (e.g., Armington, 1969), most students estimate price elasticities endogenously. In fact, a frequent use of the IDRA is to generate exclusively price and economic activity elasticities (for example, Kreinin, 1973; Price and Thornblade, 1972). The IDRA is well suited to handle any degree of regional and commodity disaggregation that data restrictions will permit. Hence, it meets the El-Agraa criterion with respect to disaggregation.

The following IDRA is designed explicitly to generate parameters that are necessary in forecasting trade creation and trade diversion. Such an import demand regression can be expressed as follows:

$$\ln M^{i}_{j} = a_{oi} + a_{ij}\ln(P_j//Pd) + a_{2j}\ln(P_j/P_s) + a_{3j}\ln(Y_i) + \mu \qquad (3.7)$$

where: M^{i}_{T} represents total country i imports of commodity k from foreign country; P_j denotes the price of foreign country j's exports

of k in country i's market; P_d signifies the domestic wholesale price of k; P_s is a weighted average of competing country export prices; Y_i represents a domestics activity variable, which is usually real income or some index of industrial production; and μ is a normally distributed error term. The dependent and independent variables are expressed in logarithmic form in order that the model's parameters, that is, a_{1i}, a_{2i}, a_{3i}, be expressed as elasticities.

The first parameter, a_{1i}, is the price elasticity of substitution between domestic and foreign suppliers (j). It is expected that the sign of this parameter be negative, for a rise in the import price of k relative to the domestic price of k will induce a decrease in imports. The coefficient a_{2i} is the elasticity of substitution between partner and nonpartner imports, defined in other models (e.g., Price and Thornblade, 1971) as the "competitive price elasticity." However, in predicting changes in economic efficiency with the creation of a customs union, the estimation procedure requires only the elasticity of substitution between partner and nonpartner sources. Due to the nature of the changes in tariffs with customs union formation, there is no a priori reason to expect import displacement between competing nonpartners or between competing partners. The elasticity of substitution between partner and nonpartner exports is expected to take on a negative sign because a decrease in partner relative to nonpartner import prices will cause a decrease in nonpartner imports. Finally, a_{3i} is the income elasticity of import demand.

It is supposed that country i is small and, therefore, faces infinite export supply elasticities. This ensures that any changes in tariffs will be reflected entirely in import prices. It is assumed that the price elasticity of demand for imports is equal to the tariff elasticity of demand for imports, an assumption that has been criticized in the literature[13] but which greatly simplifies the model.

Once (3.7) is estimated, usually using ordinary least squares, parametric estimates $\hat{a}_{1i}$, $\hat{a}_{2i}$, and $\hat{a}_{3i}$ are obtained. These elasticity estimates are used to project changes in allocative efficiency stemming from regional integration. Trade creation in country i and commodity k is calculated directly by multiplying the estimated foreign price elasticity between foreign and domestic sources by the percentage change in price induced by tariff adjustments:

$$TC = (\hat{a}_{1i})(\Delta t/t+1)M^{T} \qquad (3.8)$$

This simulation is carried out for all countries in the model. Since $\hat{a}_{1i}$ is negative, $\Delta t<0$ will imply (internal) trade creation for partner countries and external trade creation for nonpartner countries. If $\Delta t>0$ for nonpartner countries, trade erosion will result.

Trade diversion is calculated by multiplying the estimated elasticity of substitution between partner and nonpartner imports by the percentage change in price resulting from integration for all nonpartner countries. Thus:

$$TD = (\hat{a}_{2i})(\Delta t)M^{np}) \tag{3.9}$$

where M^{np} is the total of imports from external sources. Assuming country i's external tariff on imports of k prior to integration is nondiscriminatory, it is not necessary to calculate Δt as a weighted average; Δt is the same for all partner countries. When a customs union is formed, Δt is equal to the preintegration external tariff. Hence (Δt) reduces to $(-t)$. Since a_{2i} is negative, trade diversion will be positive.

Using a multistage IDRA, Resnick and Truman (1975) derive ex-ante and ex-post estimates of several examples of tariff liberalization. The ex-post estimates are presented in Chapter V. The ex-ante inquiry deals with the impact of tariff changes accompanying the First Enlargement of the EC and the creation of a broad European free-trade area, which includes the European Free Trade Association and the EC. A total increase in total imports in the integrating area amounts to $1.1 billion. However, a significant displacement of nonpartner exports results, totalling $531 million.

1. Model Selection. The IDRA conforms adequately to the El-Agraa criteria and has the added advantage of estimating relevant parameters endogenously. However, because the method has been used infrequently in the literature to estimate trade creation and trade diversion, it is difficult to assess its practicality. Nevertheless, the strong net trade creation figures obtained from the ex-ante Resnick and Truman model are supported by the ex-post results of

McConnel (1981), who also estimates the net trade creation effects of a broad European free trade area.

The most inhibiting shortcoming associated with the IDRA is again the data requirements. In the present study, it is necessary to produce bilateral trade statistics for Spain, Portugal, and Greece, none of which publish disaggregated monthly bilateral international trade information. One is obliged to use annual data, which involves the cost of losing degrees of freedom in the individual regressions. In addition, the number of product categories for which wholesale prices are available is limited.

Nevertheless, these problems are not insurmountable in the cases of Spain, Portugal, and the EC. The attendant benefits of using the import-demand regression approach for ex-ante estimation outweigh the costs, and hence this model was chosen as an estimation procedure. Because of the more limited time horizon for Greece (1969-1980) and the scarcity of available data, this procedure was not applied to the Greek case. Yet, the import demand regression approach is applied in ex-post estimation in Chapter VI.[14]

IV. Summary

A summary of the values of trade creation and trade diversion using ex-ante methods is provided in Table 3.1. All techniques generate positive net trade creation, yielding magnitudes ranging from $251 million to $2.3 billion. Hence, for each particular study, economic integration is salutary for global allocative efficiency.

Table 3.1.--Summary of Ex-ante Estimates of Trade Creation and Trade Diversion (Millions of Dollars)

Author	Approach	TC	TD	NTC
Balassa and Kreinin (1967)	PEA	251	0	251
Kreinin (1973)	PEA	5300	3900	1400
Baldwin and Murray (1977)	PEA/BM[a]	414.7	64.4	350.3
Dongess (1980)	PEA/BM[b]	512	96.7	415.3
Sawyer (1985)	PEA/BM[a]	125.5	5.4	120.1
Viaene (1981)	GE	3089[b]	793	2305

Source: Appendix A.

[1]PEA/BM: Balwin and Murray variation of PEA.

[2]Converted from pesetas to dollars.

With respect to the Second Enlargement, Sawyer (1985) estimates trade creation and trade diversion but only considers U.S. exports. In addition, two studies examine the accession of Spain to the EC, but the procedures differ substantially from those used here. Donges (1980) employs the Baldwin and Murray technique; Viaene (1981) includes both static and dynamic effects in a general equilibrium model. Thus, the use of the PEA and the IDRA is this dissertation will provide diverse estimates not only in terms of applied techniques, but also in the inclusion of Portugal and Greece as well as Spain.

NOTES--CHAPTER III

[1]This includes both commodity and regional disaggregation.

[2]External trade creation occurs when there is a net increase in imports from nonpartners with integration. This results when there is a downward adjustment of the home country's external tariff to conform to the common external tariff of the customs union.

[3]The parameter η_{mk} is called a price elasticity. However, it has been pointed out by Kreinin in two articles, "Effects of Tariff Changes in the Prices and Volumes of Imports," American Economic Review 51 (1961): 310-24, and "Price Elasticities in International Trade," Review of Economics and Statistics (November 1967), that changes in tariffs have a greater effect on imports than do equivalent changes in import prices. Technically, η_{mk} should be a tariff elasticity. Nevertheless, trade models generally ignore this distinction.

[4]The problem of locating appropriate elasticities for disaggregated regions and commodities is discussed in Chapter IV.

[5]For a discussion of the benefits and shortcomings of this variant of the PEA, see: Richard Pomfret, "The Trade Diversion due to EC Enlargement: A Comment on Sawyer's Estimates," Weltwirkschaftliches Archives 120 (3) (1985): 560-61, and C. Sawyer, "The Effects of the Second Enlargement of the EC on U.S. Exports to Europe: Reply," Weltwirtschaftliches Archives 120 (3) (1985): 562-63.

[6]Nevertheless, Kreinin includes Norway in the ex-ante study.

[7]The linearization assumption simplifies the solution procedure significantly. It is a good approximation for small changes.

[8]The Armington Assumption is that goods are differentiated completely by country of origin. A discussion of the practicality of this assumption applied to general equilibrium models can be found in Alan Deardorf and Robert Stern, The Michigan Model of World Production and Trade (Cambridge, MA: MIT Press, 1986), pp. 20-21.

[9]For a breakdown of the countries included in each block in the 7-region model, see: John Whalley, Trade Liberalization Among Major World Trading Areas (Cambridge: MIT, 1985), pp. 62-63.

[10]For a survey of CGE models, see Shoven and Whalley, "Applied General Equilibrium Models of Taxation and International Trade: An Introduction and Survey," Journal of Economic Literature 22 (September 1984): 1007-51.

[11]Although Leamer suggests a general model that eventually might be used empirically in international trade, it is still in an embryonic stage. Leamer (1986) in large part offers an exposition of the practical and theoretical problems involved in applying general equilibrium theory to empirical estimation in international trade.

[12]See: Whalley, Trade Liberalization, Chapter III.

[13]Refer to Note 3 above.

[14]However, this is done using parametric estimates obtained for Spain and Portugal in Chapter IV.

CHAPTER IV

EMPIRICAL EX-ANTE ESTIMATES OF TRADE CREATION AND TRADE DIVERSION: THE SECOND ENLARGEMENT

This chapter presents two specific models of ex-ante estimation of the Second Enlargement of the EC: the price-elasticity approach (PEA) and the import demand regression approach (IDRA). Section I reviews the data sources and commodity selection for the two models. Section II overviews relevant bilateral institutional tariff information necessary for PEA and IDRA estimates of trade creation and trade diversion. Section III constructs the chosen PEA, reviews the institutional considerations necessary in evaluating the effects of discriminatory tariff changes associated with the Second Enlargement, and summarizes the results obtained using the PEA. Section III also presents the import demand regression estimation procedure and evaluates the results. Finally, a summary of results derived using ex-ante techniques is undertaken in Section IV.

I. Commodity Selection and Data Sources

A list of commodities employed in the PEA and the IDRA is offered in Appendix B.1 and Appendix B.2, respectively. Selection was based on the following considerations: exports of interest to the Three and to the EC; exports important to third countries; commodities generally accepted to be important to the economic

development of the Three. The choice of commodities according to this criterion was made via a literature and statistical search, but the selection process was limited by the availability of reliable data. In fact, the product groups covered in the various estimation techniques differ because of diverse statistical requirements for the respective models. The IDRA proved to be particularly demanding because it was only possible to use commodities for which domestic wholesale prices were available.

The data used in the ex-ante techniques were obtained from several sources. International tariff information was taken from the International Customs Tariff Bureau, International Customs Journal, for the EC and the Three. The entries are listed according to the Common customs Nomenclature (CCN), which is equivalent to the Brussels Tariff Nomenclature (BTN). It was necessary to convert the CCN/BTN data to SITC category equivalents, which was done through the UN Statistical Papers. The tariff levels of the EC and the Three are (unweighted) average ad valorem rates for the latest years preceding accession.[1] Tariffs for Portugal and Spain were extracted from the most recent publications of the International Customs Journal, (1982-1983 and 1983-1984, respectively); tariffs for Greece and the EC come from the 1975-76 and the 1980-81 editions, respectively.

The bilateral import statistics for the PEA were obtained from the relevant issues of OECD, Foreign Trade by Commodities. The import quantity and value information for the import demand regression approach were taken from the OECD, Foreign Trade by Commodities, and the UN Commodity Trade Statistics, various issues.

The latter was needed to fill in data "holes" prior to 1981, and was used exclusively from 1981-1985, as quantity statistics are not available in Foreign Trade by Commodities after 1980. (EC and Portugal entries were available until 1984; since the 1985 publication for Spanish imports was available, more observations were obtainable for Spain.) It was on occasion awkward to use the UN publication because in 1982 and 1983 only nine out of the ten countries comprising the EC offered data.[2] Where this was the case, the missing country information was taken from the year immediately preceding the absent year.

In addition, annual data for real GNP growth used in the IDRA were extracted from Eurostatistics, National Accounts ESA, 1960-1984, and from Spain's national statistical yearbook for 1985. Domestic price information was obtained from the various national statistical yearbooks for the Three and from Eurostatistics, Yearbook of Agricultural Statistics, various issues, for the EC.[3]

II. Bilateral Tariff Information

Because of the complicated nature of tariff adjustments that transpired between the EC and the Three prior to accession, there is some question as to which tariff rates should be considered in ex-ante analysis. To determine the appropriate tariff reduction scheme, it is necessary to summarize the bilateral trade integration resulting from the Associate Agreements and the Treaties of Accession.

Although the scheduled reductions in bilateral tariffs between the EC and Greece, Spain, and Portugal vary, trade in manufactured goods was significantly liberalized on the eve of their respective accessions. The Greece-EC Association Agreement, signed in 1962, stipulates (Article 6) that all ad valorem tariffs should be eliminated over a twelve-year transition period for EC imports from Greece, the rate of liberalization depending on the type of good. In fact, tariffs on all Greek exports of manufactures to the EC were completely abolished ahead of schedule, in 1968.[4] However, Greek manufactured imports from the EC were subject to two different tariff-reduction transition periods of twelve years and twenty-two years. All tariffs scheduled for reduction according to the twelve-year category were reduced to zero by the date of accession; also, the Greek external tariff had been adjusted to the Common External Tariff for most manufactures in this category.[5] As is apparent from Table 4.1, the list of goods covered by the longer period is extensive, and relatively high tariffs remained on Greek imports from the EC on the eve of accession. In fact, within the categories of goods in Table 4.1, total free trade was achieved only in tobacco, nonmetallic mineral products, and precision instruments. (Also, according to Article 18, Greece was able to reintroduce, increase, or impose custom duties of up to 25 percent ad valorem on imports of sensitive goods.) Moreover, significant differences between the Greek external tariff and the Common External Tariff were present when Greece acceded.

Table 4.1.--Ad Valorem Tariff Schedules for the Three and the EC

Commodity	Spain Conv.[1]	Spain ECT[2]	Portugal Conv.[1]	EC Conv.[1]	Greece Conv.[1]	Greece ECT[2]
Iron/Steel	16.3	13.8	19.7	6.7	15.5	4.8
Textiles	19.9	16.0	27.0	6.5	11.5	6.3
Clothing	33.5	24.9	35.3	15.6	33.2	33.2
Footwear	19.8	11.2	39.9	9.6	35.6	20.0
Chemicals	12.9	9.7	2.9	11.9	14.4	13.9
Machinery	13.5	9.1	5.0	5.7	8.1	3.6
Tobacco	0.0	0.0	0.0	50.2	0.0	0.0
Elec. Mach.	16.5	12.5	14.3	8.0	10.4	5.7
Furniture	26.8	19.1	30.0	4.7	29.8	28.8
Leather P.	7.3	4.4	14.6	4.2	34.2	13.2
Wood and Cork	6.0	4.1	3.6	2.7	11.7	9.2
Mach. Tools	11.8	8.8	11.2	5.6	7.6	4.9
Nonmet. Min. P	14.3	10.7	18.3	6.8	12.2	0.0
Trans. Equip.	23.6	19.7	11.1	7.3	9.0	9.0
Prec. Ins.	30.5	22.9	15.0	8.6	9.0	0.0
Paper P.	12.6	12.6	23.8	10.5	25.6	25.6
Rubber	23.6	16.2	35.7	4.5	17.2	17.2
Meat	7.0	5.8	7.6	7.6	14.1	14.1
Dairy P.	21.8	21.8	35.3	20.0	34.5	10.5
Sugar	45.3	45.2	45.5	80.0	NA	NA
Cereals	15.9	13.2	9.9	9.0	15.0	15.0
Fruit/Veg.	2.5	2.0	10.4	7.2	17.6	17.6
Fish	8.3	7.6	22.9	13.4	16.7	6.1

Source: International Customs Tariff Bureau, International Customs Journal, various issues.

Note: Years: 1982-83, 1983-84, 1975-76 for Spain, Portugal, Greece, resp. 1980-81 for the EC.

[1]Conv. = Conventional tariff applied to all countries without preferential status.

[2]ECT = Preferential Tariff on EC exports to Spain and Greece.

Ratified in June 1970, the EC-Spain Association Agreement stipulated that tariffs would be eliminated in two stages, but only the first stage was ratified in the agreement itself. Duties on industrial imports of the EC originating in Spain were to be reduced to virtually zero by the third year (Annex 1, Article 1); duty-free entry of Spain's exports was achieved shortly afterward. Spain's tariff reduction scheme took place at a much slower rate (Annex II, Article 1), and substantial tariffs remained on industrial products on the eve of accession, as seen in Table 4.1.

Given its previous status in the European Free Trade Association (EFTA), Portugal is an exceptional case. It formally joined EFTA on December 31, 1966, but was granted a special status and was given a long transition period to remove tariffs on industrial and agricultural commodities.[6] The EFTA and EC formed a free-trade area in industrial goods in the 1970s and had removed all import duties by July 1, 1977, but Portugal was again the exception.[7] Tariffs on imports from the EC followed the guidelines established under the 1978 EC-Portugal Association Agreement, whereby Portugal was able to perpetuate its residual customs duties through 1985, while the EC had already abolished all tariffs on industrial goods.[8]

The treaties of accession between the EC and the Three involved in each case a gradual reduction of the remaining tariffs existing on EC industrial export and gradual adjustment of the respective external tariffs to the Common External Tariff. The Greek treaty allowed originally a five-year transition to a full customs

union, which was extended to seven years for some commodities due to economic difficulties in Greece.

The Spanish and Portuguese transitional agreements with respect to manufactured (and agricultural) commodities are similar. They stipulate that Spanish/Portuguese tariffs on EC exports should be abolished by January 1, 1993, or seven years after the formal date of accession (Article 31). In addition, full alignment of the Spanish and Portuguese external tariffs to the Common External Tariff is to be completed over a seven-year period (Article 37). Thus, with respect to manufactures, a customs union between the EC and the Two will be completed by January 1, 1993.

The agreements between the EC and the Three in the area of agricultural goods has been much more complicated than for the industrial sector, in large part due to the wider variety of politically sensitive products, the important adjustments to the modus operandi of the common agricultural Policy (little was agreed upon for the transition to the CAP in the association agreements), and higher levels of customs duties existing on the eve of accession, both specific and ad valorem.

The association agreements between the EC and the Three established in each case a Council of Association to supervise the harmonization of the respective agricultural systems of the Three to conform to the CAP and establishment of the general rules for the abolition of customs duties import quotas, and export subsidies/ taxes. However, the greatest progress made in the agreements themselves was the consensus to refrain from imposing new bilateral

customs duties and quantitative measures. Although some tariff reductions were made, high ad valorem and specific tariffs remained on bilateral agricultural trade between the EC and Greece.[9] The Spanish and Portuguese accords provided for a greater variety of reduction in customs duties than did the Greek treaty. Yet, ad valorem and specific tariffs remained high in many sensitive areas, especially for Mediterranean products, and the Two negotiated escape clauses that enabled them to increase or restore ad valorem customs duties of up to 20 percent in "exceptional cases" (Annex 1 and Annex 2).

Hence, the adjustments necessary to establish a full customs union between the EC and the Three in the agricultural sectors were mainly left to the treaties of accession. The integration achieved on the eve of accession in industrial products was significantly greater than that for agricultural commodities. This is especially true for exports of the Three to the EC. Prior to the Second Enlargement, it was noted above that no ad valorem tariffs remained on EC imports of industrial goods from the Three, whereas significant duties remained on EC agricultural imports originating in the Three. Moreover, because of the greater magnitudes of trade barriers remaining in agriculture, a longer transitional phase (ten years) was promulgated for many agricultural goods. Furthermore, it was necessary to establish a transitional period to alter the Three's agricultural support system to that of the EC; this is to be completed by January 1, 1990, for the Two.

The present study estimates trade creation and trade diversion for two conceptually distinct phases of custom union formation. The first deals with the marginal effects of the accessions, that is, the dismantling of bilateral tariffs existing on the eve of accession (Greece, 1981; Spain and Portugal, 1986). Thus, preferential treatment due to bilateral agreements before accession is not included in the estimates. This is the phase that is traditionally analyzed, and it will be referred to as the "marginal phase." Second, because the association agreements were negotiated specifically for the purpose of creating a customs union, it is also appropriate to analyze the total effect of preferential agreements leading to full integration. Hence, bilateral discriminatory reductions in protection beginning with the association agreements (Greece, 1962; Spain, 1970; Portugal, 1978) are considered. This will be called the "all-inclusive phase." For each estimation procedure, the marginal phase calculations are presented first.

Furthermore, for both the marginal and all-inclusive phases, it is assumed that the Common Customs Tariff of the EC does not change with enlargement. True, the accessions of the Three will entail a change in the Common Customs Tariff because it is derived as a weighted average of all member countries' external tariffs, but any such change would have little effect due to the relatively small weights that would be assigned to the external tariffs of the Three. In addition, it is uncertain as to what form this procedure will take. Such an adjustment cannot be made without first negotiating under the GATT. As is stipulated in Article 38 of the treaty between

Spain and the EC, no change in the Common External Tariff will take place until negotiations can be worked out formally under Article XXIV of the GATT.[10] Thus, external trade creation and trade erosion will stem uniquely from the adjustments of the Three's external tariffs to the Common External Tariff of the EC.

III. Price Elasticities Approach

The price elasticities of import demand employed in this session have been chosen from a literature search. While import price elasticities of demand are relatively easy to locate for all countries involved,[11] they are scarce for disaggregated commodity groups, although they are available at a disaggregated level for the EC (Cline, 1978) and Spain (Donges, 1980). The appropriate adjustments of the import price elasticities for both sets of parameters were taken from Balassa and Kreinin (1967).[12] Since there are no disaggregated import price elasticity of demand parameters for Portugal and Greece, the Donges estimates are employed, adjusted according to the Balassa and Kreinin (1967) formula.[13] These estimates are presented in Table 4.2.

Attempts at estimating the elasticity of substitution between alternative sources of supply have not produced robust results.[14] For example, Hickman and Lau (1976) generate elasticity of substitution estimates for four SITC commodity groups that range between -1.13 and -1.73. However, Cline (1978) demonstrates that these estimates are biased downward, a problem that stems from product aggregation. Some economists[15] employ the scalar -3,

Table 4.2.--Import Price Elasticities of Demand for PEA Estimation

Commodity	EC	Spain	Portugal	Greece
Iron/Steel	-3.25	- .58	-.25	-.39
Textiles	-2.61	- .52	-.22	-.34
Clothing	-3.00	- .26	-.07	-.17
Footwear	-2.77	- .03	-.01	-.02
Chemicals	-2.50	- .83	-.36	-.55
Machinery	-2.63	-1.18	-.51	-.78
Tobacco	-1.02	- .53	-.23	-.35
Elec. Mach.	-2.63	-. 84	-.36	-.55
Furniture	-3.00	-1.17	-.50	-.77
Leather P.	-2.33	- .52	-.22	-.34
Wood and Cork	-2.09	- .90	-.39	-.59
Nonmet. Min. P.	-2.07	-1.10	-.47	-.73
Trans Equip.	-2.43	- .33	-.14	-.22
Paper P.	-2.60	- .94	-.40	-.62
Rubber	-3.25	- .42	-.18	-.28
Meat	-1.09	- .90	-.39	-.59
Dairy P.	-1.09	- .90	-.39	-.59
Sugar	-1.02	- .90	-.39	-.59
Cereals	-1.26	- .90	-.39	-.59
Fruit/Veg.	- .86	- .90	-.39	-.59
Fish	-1.02	- .90	-.39	-.59

Source: J. Dongess, "The Spanish Industry in Face of Its Integration into the EC," Economia Internazionale 33 (1980), and W. Cline, Trade Negotiations in the Tokyo Round (Brookings, 1978, Washington, D.C.).

Note: These estimates have been adjusted according to the Balassa and Kreinin technique, where appropriate.

suggesting that this is a plausible figure, but without offering strong theoretical justification. Cline (1978) uses a compromise between the Hickman and Lau estimates and the traditional -3, namely, -2.5, for all product categories. Donges (1980) employes -1.5 and -2.5.

Kreinin (1981) calculates an implied elasticity of substitution between European and non-European markets of -2.2 for manufactured goods.[16] This technique for estimating implicitly is obtained by first calculating the ratio of trade diversion obtained in ex-post estimates to total base period nonpartner imports. This value is then divided by the average external tariff rate on nonpartner imports to derive the actual implicit value of the substitution parameter. This would be theoretically an appropriate way to generate for the PEA, but because it is impossible to obtain the needed ex-post trade diversion estimates for Spain and Portugal, this method cannot be used at present.

In sum, the elasticities of substitution for manufactures and agricultural products vary form approximately -2.0 to -3.0, with no general consensus. Hence, it is best to utilize several scalar estimates, varying within this range. This dissertation employs three values, -2.0, -2.5, and -3.0, and therefore generates upper and lower bounds of trade diversion computations.

The net trade creation results summarized below are values obtained assuming = -2.5 for both agricultural and manufacturing commodity grouping because of its relative popularity in the literature (for example, Donges, 1980; Hickman and Lau, 1976; and to

some extent, Kreinin, 1981). Net trade creation calculations derived using σ = -2.0 and -3.0 are found in Appendix B.

The most recently available data, for 1984, were used for Spain, Portugal, and the EC(10), as the Two acceded on January 1, 1986. Data for 1980 were utilized for Greece, which joined on January 1, 1981, and the EC(9). In the summary of Chapter VI, the ex-ante derivations of trade creation and trade diversion associated with Greece's accession will be compared to ex-post estimates obtained in that chapter.

Trade creation and trade diversion are obtained by applying equations (3.3) and (3.4), respectively. The net trade creation results for the marginal and all-inclusive phases are summarized in Tables 4.3 and 4.4, respectively. Detailed calculations are available in Appendix B.

For the marginal phase, net trade creation is negative for total manufactures and agriculture in the Greek market. The values obtained for negative net trade creation (in 1980 prices) are $104 million for manufactured goods and $79 million for agricultural goods.

For Greek manufactures, net trade creation is positive only for furniture and nonmetallic mineral products. While internal trade creation is relatively large for several manufactured commodities (especially chemicals and paper and paperboard), external trade creation contributed significantly to all commodity categories and often exceeded internal trade creation. This is particularly true for paper and paperboard, nonmetallic mineral products, and wood and

Table 4.3.--Net Trade Creation: The Price-Elasticity Approach, Marginal Phase (Millions of U.S. dollars; $\sim$ = 2.5)

2-digit SITC Comm. Group	Spain 1984 Prices	Portugal 1984 Prices	EC(10) 1984 Prices	EC(9) 1980 Prices	Greece 1980 Prices
Iron/Steel	16.0	- 27.1			- .3
Textiles	- 23.2	- 38.3			- 12.1
Clothing	- 25.2	- 2.7			- 7.7
Footwear	- 6.4	- .5			- 2.2
Chemicals	- 68.9	- 10.8			- 5.3
Machinery	15.9	- 18.2			- .02
Elec. Mach.	- 18.4	- 18.7			- 2.3
Furniture	3.8	- .5			.2
Leather P.	- 70.3	- 11.5			- 3.5
Wood and Cork	- 9.7	- 4.7			- 28.4
Nonmet. Min. P.	8.9	- 3.9			.9
Trans. Equip.	- 64.1	- 75.9			NA
Rubber	- 1.3	- 6.4			- 1.3
Paper P.	- 39.0	- 14.4			- 42.5
Dairy P.	NA	NA	-259.2	-338.3	6.7
Meat	- 6.4	- .8	-595.3	-517.0	- 65.8
Cereal	-184.1	-122.6	-444.6	-786.9	- 20.7
Fruit/Veg.	- 10.4	- 4.2	-1016.5	-1885.0	3.6
Sugar	- 23.3	-64.5	-987.0	-1439.4	NA
Fish	NA	NA	-722.3	-884.1	- 2.7
Tobacco	- 95.9	- 2.8	-2965.3	-2998.1	- .2
Total Manu.	-282.5	-233.5			-104.4
Total Agr.	-319.9	-194.8	-6990.4	-3948.9	- 79.0
Total	-602.5	-428.3			-183.4

Source: Appendices B.3-B.13

Table 4.4.--Net Trade Creation: The Price-Elasticity Approach, All-Inclusive Phase (Millions of U.S. Dollars: σ = 2.5)

2-SITC Comm. Group	Spain (1984 Prices)	Portugal (1984 Prices)	EC(10) (1984 Prices)	EC(9) (1980 Prices)	Greece (1984 Prices)
Iron/Steel	- 22.6	- 27.1	- 619.4	- 1194.1	- 1.0
Textiles	- 30.7	- 38.3	- 819.5	- 1328.4	- 20.0
Clothing	- 33.8	- 2.7	- 2926.7	- 3546.6	- 7.2
Footwear	- 5.3	- .5	- 178.0	- 421.9	- 3.9
Chemicals	- 98.5	- 10.9	- 2013.6	- 2453.3	2.6
Machinery	16.0	- 18.2	- 716.3	- 918.9	1.3
Elec. Mach.	- 31.3	- 18.7	- 1959.3	- 1788.7	- .2
Furniture	4.2	- .5	- 122.5	- 174.8	.7
Leather P.	- 13.8	- 11.5	- 100.1	- 154.2	- 10.4
Wood and Cork	- 23.0	- 4.7	- 91.4	- 163.1	- 38.1
Nonmet. Min. P.	9.9	- 3.9	- 881.2	- 2023.5	7.4
Trans. Equip.	- 79.8	- 75.9	- 760.4	- 1336.4	NA
Rubber	- 2.9	- 6.4	- 72.9	- 148.1	- 1.1
Paper P.	- 39.1	- 14.4	- 1574.2	- 1829.4	- 40.1
Dairy P.	NA	NA	- 259.2	- 338.3	12.7
Meat	- 7.7	- .8	- 595.3	- 517.0	- 63.1
Cereals	- 222.9	-122.6	- 444.6	- 786.9	- 19.7
Fruit/Veg.	-9568.0	- 4.2	- 1016.5	- 1885.1	- 4.8
Sugar	- 23.3	- 64.5	- 987.1	- 1439.4	NA
Fish	NA	NA	- 722.3	- 884.1	- 12.9
Tobacco	- 95.9	- 2.8	- 2965.3	- 2998.1	- .2
Total Manu.	- 350.7	-233.5	-12907.6	-17481.4	-110.1
Total Agr.	-1657.3	-194.8	- 6990.3	- 8848.9	- 88.0
Total	-2008.0	-428.3	-19897.9	-26330.3	-198.1

Source: Appendices B.3 to B.13.

cork, implying that the adjustment to the Common External Tariff was often as important and occasionally more important than the abolition of bilateral tariffs. The burden of trade diversion in manufactures is borne mainly by ROW (84 percent of total trade diverted). However, ROW experiences the greatest amount of external trade creation ($17.9 million), which is also 84 percent of the total. Japanese exports are only marginally affected because of the small volume of trade with Greece.

For Greek agriculture, positive net trade creation is obtained for dairy products and fresh fruit and vegetables. Negative net trade creation in meat ($66 million) exceeds that of all agricultural and manufactured goods. The bulk of trade diversion in agriculture falls once again on ROW (78.5 percent). Exports from New Zealand are particularly damaged. However, U.S. exports of cereals also suffer considerable trade diversion ($24.3 million).

The net trade creation for the EC(9) is strongly negative, a total of $9 billion. There is negative net trade creation in all agricultural categories; the lion's share of the burden of trade diversion falls on ROW (as in the Greek market), but the U.S. also experiences a significant displacement of its exports to the EC. In fact, all exports from ROW, the U.S., and Japan in the sugar and tobacco categories are displaced. For marginal phase calculations, there is no trade creation or diversion in manufactures because all tariffs on Greek--as well as Spanish and Portuguese--exports had been abolished by the date of accession.

In sum, the net effect on efficiency dues to the accession of Greece to the EC(9) is significantly negative. Although the adjustment of the Greek external tariff to the Common External Tariff causes external trade creation in some commodity groupings, this effect is swamped by the large discriminatory reductions in tariffs within the customs union. Hence, Greece's accession to the EC(9) induces a deterioration in global allocative efficiency. Nevertheless, total net trade diversion is small, amounting to 1 percent of total trade in Greece and the EC(9).

In the Spanish market, total net trade creation is also negative in manufacturing and agriculture, a consequence of preferential reductions in high tariffs on EC exports. The totals are (1984 prices) -$283 million for manufactures and -$320 million for agricultural goods. Net trade creation is positive in iron and steel, machinery, furniture, and nonmetallic mineral products for manufactures, but it is never positive in the agricultural sector.

In the manufacturing sector, external trade creation plays once again an important role in the computation of the trade creation values. This is especially true for machinery ($17.4 million), electrical machinery ($15.1 million), and transport equipment ($11.7 million). However, unlike the Greek example, in no case does external trade creation exceed internal trade creation. Thus, the adjustment of the Spanish external tariff to the Common External Tariff is less significant than in the Greek case.

Trade creation is minor in all agricultural commodities. This results from the small trade in agriculture between the EC and

Spain prior to accession. Spain, more than Greece and Portugal, depends to a large degree on imports from third countries, particularly the U.S. The displacement of third country agricultural products is widened by the relatively large magnitude of negative external trade creation (trade erosion). Unlike the EC(9) and Greek cases, trade diversion in agriculture is greatest with respect to U.S. exports (52 percent). As the U.S. experiences a large reduction in its exports due to trade erosion as well (-$59.3 million), U.S. exporters will be particularly hard-hit by the accession of Spain to the EC.

The Portuguese market experiences negative net trade creation for both total manufactured and agricultural commodities, but especially for the latter, totalling $428 million. There is no commodity group for which net trade creation obtains. This is because the external trade creation stemming from reductions in the Portuguese external tariff is dominated by the particularly large discriminatory reductions in tariffs on EC exports. Trade diversion is greatest in textiles and transport equipment for ROW and in transport equipment for the U.S. and Japan. In agriculture, net trade creation is negative in all categories, but is by far the greatest in cereals (54 percent of total trade diversion in agriculture). As in the Spanish market, the largest amount of trade diversion falls on the U.S., whose exports of cereals to Portugal plummet. In fact, approximately 60 percent of total trade diversion summed over all countries and all commodities in the Portuguese market is represented by the displacement of U.S. cereal

exports. However, the absolute amount of trade diverted from U.S. exporters in agriculture is larger in the Spanish market.

In the EC(10), there is strong negative net trade creation in agriculture, stemming from preferential treatment of Spanish and Portuguese exports in the highly protected EC agricultural markets. Trade diversion values are greatest in tobacco, sugar, and fresh fruits and vegetables.

In conclusion, marginal phase estimates of total net trade creation values for the accessions of Spain and Portugal are -$516 million in manufacturing and -$7.5 billion in agriculture. As was the case with the accession of Greece, the expansion of the EC to include the Two causes a deterioration in allocative efficiency. However, net trade diversion is small, constituting 1 percent of total trade in the Two and the EC(10).

As evidenced in Table 4.4, the all-inclusive phase calculations exhibit significantly greater values of net trade diversion. It increases in the EC(9) and Greek markets to $198 million and $26.3 billion, respectively. The largest increase in net trade diversion is in EC(9) manufactures, in which it prevails in every commodity group. Net trade diversion constitutes 3.7 percent of total trade.

IV. Import Demand Regression Approach

The import demand regression approach is an econometric model in which relevant elasticity parameters are first estimated and then used to generate trade creation and trade diversion values. The

present study analyzes bilateral trade flows for an array of disaggregated commodity groupings, listed in Appendix B.2.

The general regression used is similar to equation (3.7) of Chapter IV, with the exception that two dummy variables are employed. The first has a value of zero for annual data entries from 1969 to 1975, which corresponds to the completion of the First Enlargement, and unity from 19795-1984 (1975-1985 for Spain). The second dummy has a value of zero from 1969 through 1980, which marks the last year prior to Greece's accession, and of unity from 1981-1984 (1981-1985 for Spain). The dummy variables are used in the regression to detect any change in import patterns due to the accession of the United Kingdom, Denmark, and Ireland (First Enlargement), and the accession of Greece. Hence, the adaptation of (3.7) is:

$$\ln M^{1}_{j} = a_{oj} + a_{1j} \ln(P_j/P_d) + a_{2j}\ln(P_j/P_s) + a_{3j}\ln(Y_i) + \mu + \text{DUMM1} + \text{DUMM2} \qquad (4.1)$$

For the variables of the regressions, 3-digit SITC categories were used to approximate their 2-digit equivalent. It was necessary to do this because of the major problems associated with international price data at more aggregated levels (see Leamer, 1986; Price and Thornblade, 1971). Indeed, it would have been better to use data complied at an even greater levels of disaggregation, but quantity and value data for bilateral trade flows in the present model are unavailable at more than the 3-digit level for the relevant period.

The dependent variable $\ln M^i_j$ is the log of the volume index of total imports of the home country i from country j, where the latter could be a partner country (Spain, Portugal, EC(10)) or a nonpartner country (U.S., Japan, and ROW).[17] The volume index was obtained by deflating the value of imports by a constructed unit-price index (explained below). This method was utilized in lieu of the physical quantity of imports because of the difficulties inherent in summing 3-digit SITC categories of greatly diverse value.[18] The variable p_j is the unit value of country j's exports to country i. In order to approximate the 2-digit SITC level, weighted indices of unit prices of 3-digit SITC categories were compiled to create a unit-value measure for the 2-digit SITC equivalent. By constructing such an index, the unit-value price surrogate should be more stable. The higher the level of aggregation in time-series analysis, the less reliable are unit values as price proxies.[19] Weights were computed according to the quantity contributions of each 3-digit category to the 2-digit group; these weights were assigned for a three-year average, i.e., according to:

$$[M^t_{jki} / \sum_{k=1}^{N} M^t_{jki} + M^{t+1}_{jki} / \sum_{k=1}^{N} M^{t+1}_{jki} + M^{t+2}_{jki} / \sum_{k=1}^{N} M^{t+2}_{jki}]*1/3 \qquad (4.2)$$

where k = 3-digit SITC; j = 2-digit SITC; and i = exporting country.

Because of the two revisions of SITC groupings over the time span of this study (1969-1985), some commodity categories at the 3-

digit level (and higher levels of disaggregation) were redefined. For these goods,[20] we were unable to perform parametric estimation, and so they were excluded.

The variable P_d is the domestic wholesale price variable of the 2-digit SITC grouping or that a commodity grouping which most closely resembles the pertinent 2-digit category. International wholesale price data for the relevant time horizon are relatively scarce, and this imposed further restrictions on the number of commodities used in the study, particularly for Spain.

The partner a_{1i} is the coefficient of the log of the ratio of (P_j/P_d); it is therefore the price elasticity of substitution between domestic and foreign suppliers, or the "relative price elasticity." Once estimated, it is used in calculating trade creation, which is derived according to equation (3.8). The variable P_s is a proxy for the price changes of country j's competitors in i's market. It is a weighted average of export prices of competitors. The weights for the index were assigned for a three-year average.

The coefficient of the log of the ratio (P_j/P_s) is a_{2i}; thus, it is the elasticity of substitution between nonpartner and partner exports to country i, or the "competitive price elasticity." It is used in estimating trade diversion according to (3.9).

The variable Y_i is real GNP in country i. Thus, the parameter a_{3i} is the income elasticity of import demand.

The statistical procedure used for the various regressions was ordinary leas squares; results are presented in Tables 4.5 through 4.7. In cases where serial correlation was present (measured

Table 4.5.--Import Demand Regression Results: The Spanish Market

SITC	Exporting Country	a3j (Income)	a1j (Rel. P.)	a2j (Comp. P.)	DUM1	DUM2	$\bar{R}^2$	DW	F
02 (Dairy P.)	U.S.	2.95 4.6;.64	.26 1.4;.17	-1.58 1.4;-1.1	-1.2 .35;-.98	--	.2	1.8	.75
	ROW	1.90** .13;14.7	.25 .46;.54	-.91* .51;-1.8	-.31 .35;-.88	--	.4	1.8	4.6*
	EC	3.7** 1.3;2.8	-.46 .33;-1.4	.16 .15;1.1	-1.5** .41;-3.6	--	.52	2.0	5.4**
	Port.	.28 1.7;.17	-1.16** .36;-3.2	-.87** .35;-2.5	--	--	.59	1.3	8.7**
04 (Cereal)	U.S.	2.53** .22;11.5	-.1 .31;-.32	.1 .3;.33	-.53 .57;-.93	--	.80	1.0+	16.1**
	ROW	2.3** .07;30.0	.04 .64;.1	-.04 .38;-.1	-.35 .55;-.64	--	-.27	1.9+	.2
	EC	2.7 3.0;.9	-1.36* .75;-1.8	-.85 .53;-1.6	-1.1 1.0;-1.1	--	.64	1.9+	8.0**
61 (Leather P.)	U.S.	2.6 2.1;1.3	.17 .39;.44	-.22 .7;-.32	-.83 .54;-1.5	--	-.08	2.4	.7
	Japan	1.5** .36;4.1	-.22 .51;-.43	.9 .52;1.7	--	--	.13	1.8+	1.7
	ROW	4.7** .3;15.9	.59** .06;10.5	-.08** .04;-2.0	.46** .08;6.1	--	.99	2.8+	434.7**
	EC	5.0* 2.5;2.0	.33 .27;1.23	-.29* .15;-1.9	-.14 .38;-.38	--	.70	1.7+	7.9**
	Port.	1.8** .47;3.9	1.46 1.0;1.4	-.9 1.1;-.8	--	--	.92	2.5+	55.0**
64 (Paper P.)	U.S.	1.543** .53;3.0	.43** .18;2.4	-.29** .12;-2.4	--	--	.30	2.3	3.2
	Japan	1.61** .2;8.0	-.13 .28;-.45	-.14 .25;-.57	--	--	.91	2.6+	50.7**
	ROW	2.05** .19;10.6	.92 .83;1.1	-.12 .21;-.58	--	--	.84	2.5*	26.4**
	EC	2.14** .10;21.9	.05 .44;.12	-.14 .37;-.38	--	--	.87	2.3+	34.5*

Table 4.5.--Continued.

SITC	Exporting Country	a3j (Income)	a1j (Rel. P.)	a2j (Comp. P.)	DUM1	DUM2	$\bar{R}^2$	DW	F
65 (Textiles)	U.S.	2.78 3.8;.73	-.80 1.55;-.51	-.32 2.1;-.15	.06 .52;.12	-1.1 .79;-1.4	.49	1.7+	3.4*
	Japan	.55** .05;11.9	-1.0** .11;-9.4	1.3** .15;8.4	--	--	.95	2.3+	102.0**
	ROW	1.26** .24;5.7	-1.77** .65;-2.7	-1.8 1.2;-15.	-.52 .43;-1.2	-1.0 .46;-2.2	.37	1.6+	2.8
	EC	1.23** .09;13.4	-.79** .31;-2.5	1.81** .83;2.2	--	--	.79	1.5+	20.4**
	Port.	.72** .19;3.8	-1.1* .52;-2.1	.16 1.1;.14	-1.3** .45;-2.9	--	.39	2.0+	3.4*
67 (Iron/ Steel)	U.S.	.52** .2;2.5	1.6* .87;1.9	-4.0** 1.2;-34	.68 .58;1.2	1.7* .84;2.1	.80	2.1+	12.7**
	Japan	.75** .11;6.6	.87 .49;1.7	-2.6** .41;-6.5	--	--	.82	2.2	36.6**
	ROW	1.0** .06;16.0	.004 .27;.02	-.74 .58;-1.3	--	--	.17	1.6	2.6
	EC	.53 .94;.83	-.2 .17;-1.2	-.35* .17;-2.1	-.25 .23;1.1	--	.20	2.1+	1.7

Note: Standard errors are below coefficient and to the left; t-statistics are below coefficient and to the right.

* = Significant at the 90% level.
** = Significant at the 95% level.

\+ = Cochran-Orcutt transformation employed.

Table 4.6.--Import Demand Regression Results: The Portuguese Market

SITC	Exporting Country	a3j (Income)	a1j (Rel. P.)	a2j (Comp. P.)	DUM1	DUM2	$\bar{R}^2$	DW	F
01 (Meat)	ROW	.30**	-.35	1.51**	--	--	.20	1.54	2.8
		.1;3.0	.24;-1.5	.75;2.0					
	EC	3.4**	-.02	-1.08**	--	--	.69	2.1	11.9**
		.88;3.9	.24;-.1	.50;-2.2					
02 (Dairy P.)	ROW	2.39*	-.39	.11	--	--	.59	.96	8.3**
		1.3;1.9	.33;-1.2	.15;.74					
	EC	3.56**	-.15	-1.41**	--	--	.76	1.5+	12.0**
		1.3;2.7	.26;-.58	.48;-3.4					
	Spain	1.64**	-.52	-1.6**	--	--	.75	1.7+	14.7**
		.22;7.5	.51;-1.1	.48;-3.3					
04 (Cereal)	U.S.	2.15**	-.24	-.77**	--	--	.81	1.5	33.1**
		.06;34.0	.25;-.97	.26;-3.0					
	EC	1.63**	1.7**	-2.62**	-	-	.62	1.6	13.1**
		.11;15.3	.49;3.4	.45;-5.8					
06 (Sugar)	ROW	1.92**	-.003	-.02	-.47**	--	.001	1.6	1.05
		.03;73.3	.09;-.04	.11;-.17	.13;-3.6				
	EC	1.01**	-.10	-.12	--	--	.33	1.3	4.63*
		.07;15.6	.23;-.80	.11;-1.1					
	Spain	-.03	-1.61**	-.19	-2.34*	--	.57	2.2+	5.62**
		.38;-.07	.50;-3.2	.22;-.86	1.3;-1.8				
12 (Tobacco)	U.S.	.84*	-.50	-1.2	-1.86**	-.87*	.84	1.9+	15.7**
		.40;2.1	.49;-1.0	.81;-1.5	.48;-3.9	.47;-1.9			
	ROW	1.49**	.13	-.06	.11	-.09	.69	2.2+	6.4**
		.39;3.8	.25;.51	.32;-.19	.20;-.45	.20;-.45			
	EC	.37**	-.60**	.22	--	--	.80	2.0+	19.1**
		.13;2.9	.20;-2.9	.39;.56					
	Spain	1.45	-.55	.18	--	--	.76	1.9+	11.8**
		1.2;1.2	.31;-1.7	.38;.48					
62 (Rubber)	U.S.	-1.1	-.43	-.99**	-.01	1.4**	.92	2.0	37.3**
		.89;-1.2	.24;-1.7	.36;-2.8	.33;-.04	.27;5.3			
	ROW	.47	-.04	-.68*	-	--	.04	1.4	1.2
		.74;.64	.26;-.15	.37;-1.8					
	EC	1.62*	-.42*	-.53	-.46	-.37	.60	1.6	5.5*
		.81'2.0	.24;-1.8	.48;	-1.1	.37;-1.2	.22;-1.7		
	Spain	1.48**	-.59**	.22	--	--	.79	1.4	19.6**
		.57;2.6	.25;-2.4	.37;.61					

Table 4.6.--Continued.

SITC	Exporting Country	a3j (Income)	a1j (Rel. P.)	a2j (Comp. P.)	DUM1	DUM2	$\bar{R}^2$	DW	F
64 (Paper (P.)	U.S.	.08 .06;1.2	-.27* .13;-2.1	-.39 .23;-1.7	--	--	.62	2.1	12.7**
	ROW	.50 .59;.85	-.16 .11;-1.5	-.60** .16;-3.9	-.48** .18;-2.7	--	.82	1.6	17.0**
	EC	.61 .42;1.5	-.57** .16;-3.6	-.29** .11;-2.7	-.35** .14;-2.6	.30 .21;1.4	.88	2.7	22.9**
	Spain	2.08** .65;3.2	-.16 .18;-.93	-.67** .19;-3.6	-.50* .25;-2.0	--	.53	2.9	5.2*
65 (Textiles)	U.S.	.65 .93;.70	-.74 .43;-1.7	-1.37** .54;-2.5	-.79* .39;-2.0	--	.78	3.0	11.8**
	ROW	.43** .09;4.5	.26** .10;2.6	-1.2** .23;-5.5	--	--	.40	2.3+	4.1*
	EC	1.42** .35;4.0	-.28 .17;-1.7	.05 .2;.25	-.22 .14;-1.6	--	.68	2.3+	7.1**
	Spain	1.72* .82;2.1	-.80** .24;-3.3	.41 .28;1.5	-.29 .34;-.87	--	.63	1.8	7.4**
67 (Iron/ Steel)	U.S.	.10 2.3;.04	.62 .91;.68	-1.8** .73;-2.5	-.2 .76;-1.5	--	.86	2.4+	18.6**
	ROW	1.30** .05;28.0	-.50* .25;-2.02	-.70 .46;-1.5	--	--	.87	1.3+	32.0**
	EC	.97** .40;2.4	-.54** .19;-2.8	.18 .16;1.1	--	--	.58	1.9	7.8**
	Spain	1.13** .10;11.3	-1.05** .37;-2.9	.17 .21;.81	--	--	.82	2.4+	21.8**

Note: Standard errors are below coefficient and to the left; t-statistics are below coefficient and to the right.

* = Significant at the 90% level.
** = Significant at the 95% level.

+ = Cochran-Orcutt transformation employed.

Table 4.7.--Import Demand Regression Results: The EC(10) Market

SITC	Exporting Country	a3j (Income)	a1j (Rel. P.)	a2j (Comp. P.)	DUM1	DUM2	$\bar{R}^2$	DW	F
01 (Meat)	U.S.	2.70**	-.20	.02	.05	-.45**	.82	1.1	4.9**
		.64;4.2	.22;-.91	.07;.24	.15;.34	.09;-5.0			
	ROW	1.86**	-.57**	-.31**	--	--	.71	2.0+	12.7**
		.06;29.9	.2;-2.8	.11;-2.9					
	Spain	3.88	-1.87*	-.66	-.64	--	.36	1.6	3.1
		2.3;1.7	.99;-1.9	.55;-1.2	.53;-1.2				
02 (Dairy P.)	U.S.	.80	-4.1	-.02	-3.85**	2.7**	.35	1.3	2.6
		7.9;.1	3.3;-1.3	2.4;-.01	1.6;-2.3	1.1;2.3			
	ROW	.94**	-.85**	-.12	--	--	.88	1.8+	3.4**
		.09;10.1	.32;-2.7	.31;-.38					
	Spain	-17.3	.14	-1.1	.24	--	.44	2.2+	3.2
		11.9;-1.5	1.9;.07	1.7;-.66	1.1;.23				
04 (Cereals)	U.S.	1.37**	.2	-.07	--	--	.63	2.0+	3.9**
		.53;2.5	.39;.54	.1;-.63					
	ROW	.92**	-.74**	.11	-.08	--	.93	1.7+	49.5**
		.34;2.7	.20;-3.7	.06;1.7	.15;-.53				
	Spain	.46**	-.31	-.38	-.58	--	-.01	2.2	1.0
		.08;6.1	2.2;-.14	2.3;-.17	2.3;-.17	.76;-.77			
	Por	2.25**	-7.55	-.29	-5.50**	--	.75	2.0	16.0**
		.38;6.0	4.7;-1.6	3.9;-.1	2.0;-2.8				
06 (Sugar)	U.S.	.30**	-.06	-1.14**	--	--	.74	2.6	22.7**
		.08;3.8	.33;-.17	.36;-3.1					
	ROW	.79*	-.20**	.03	.003	-.19**	.56	2.3	4.8*
		.42;1.9	.09;-2.3	.08;.05	.02;.05	.06;-3.1			
	Spain	.49**	-1.1*	.30	-.60	--	.59	1.9	5.9**
		.10;5.1	.50;-2.2	.54;.57	.39;-1.5				
12 (Tobacco)	U.S.	.26*	.03**	-.1	--	--	.58	1.9	7.5**
		.14;1.9	.36;2.6	.13;-.79					
	ROW	1.50**	.31**	-.09*	--	--	.79	1.9	15.0**
		.40;3.8	.10;3.1	.05;-1.8					
	Japan	-.94**	2.16**	-2.55**	--	--	.40	1.9+	4.1*
		.28;-3.2	.78;2.8	1.0;-2.6					
	Spain	.71**	-2.3**	1.03*	1.28*	--	.77	2.1+	12.9**
		.23;2.9	.50;-4.7	.51;2.02	.68;1.9				
	Por	16.1**	-3.39	4.9	--	--	.49	1.9	5.9**
		5.6;2.9	4.51;-.74	5.2;.94					

Note: Standard errors are below coefficient and to the left; t-statistics are below coefficient and to the right.

* = Significant at the 90% level.
** = Significant at the 95% level.

via the Durbin-Watson statistic), a first-order autoregressive Cochran-Orcutt technique was applied.

While some parameters in the regressions are statistically insignificant, this is not unusual given the data problems involved. In fact, parametric estimation for relatively aggregate commodity groups for the Three in the Taplin (1973) study yielded a minority of statistically significant parameters (22 percent). The "white noise" caused by exogenous factors should be particularly strong in the cases of Spain and Portugal, as each went through significant political transition and instability in the 1970s in addition to exogenous shocks of economic origin.

Nevertheless, the results obtained using the import demand regression approach are generally consistent with those of other studies. Compared to the Donges (1980) estimates for Spain (see Section II of this chapter), the relative price elasticity parameters for agricultural goods are somewhat smaller for the more disaggregated commodities in the present approach, albeit with some notable exceptions (for example, cereals and textiles). In addition, the relative price elasticity estimates derived for the EC in Cline (1978) and Balassa and Kreinin (1967) are consistent with the present parameters. The competitive price elasticity estimates for the EC and the Two are lower than in the studies reviewed in Section II; however, because the present estimates are of bilateral trade flows, they are not strictly comparable.

The parametric estimates derived using the import demand regression approach were used to estimate trade creation and

diversion. The estimates of the parameters are presented in Appendices B.14, B.15, and B.16. If an independent coefficient estimation in a regression were smaller in value than its standard error or had the wrong sign, the parameter was not used in the estimation process. In its stead, a statistically significant (at least at the 90 percent level) surrogate was employed according to the following hierarchy of possibilities: (1) within the same market and commodity group, the parameter from the country which is closest in economic characteristics; (2) the parameter for the same commodity group and exporting country in the market most resembling the home market; and (3) a parameter from a similar commodity group and the same exporting country.

The net trade creation calculations for the marginal phase and all-inclusive phases are presented in Table 4.8 and Table 4.9, respectively. The detailed calculations are available in Appendix B.

For the marginal phase, total net trade creation in Spain is negative and equal to $163 million. However, there is positive net trade creation in dairy products, rubber, paper and paperboard, and textiles. In addition, net trade creation is positive for total manufactures. Nevertheless, the strong negative trade creation values obtained for tobacco and cereals dominate the latter positive effect. Trade diversion is particularly damaging to U.S. cereal exports, and trade erosion causes a large deterioration in U.S. tobacco exports.

In the Portuguese market, net trade creation is negative, but small in total value, $7.8 million; it is positive for manufactures

Table 4.8.--Net Trade Creation: The Import Demand Regression Approach, Marginal Phase Estimates (Millions of U.S. Dollars, 1984 prices).

Commodity	Spain	Portugal	EC(10)	Total
Meat	- 2.3	- .3	- 72.7	- 75.2
Dairy P.	9.2	.4	- 93.7	- 84.1
Cereals	- 52.6	-35.3	- 146.4	- 234.2
Sugar	- 1.3	22.8	- 560.0	- 538.3
Tobacco	-135.7	- 7.2	- 132.4	- 275.3
Leather P.	- 2.2	.2		- 2
Rubber	6.3	2.5		8.8
Paper P.	9.5	1.0		10.5
Textiles	6.8	- 4.8		2.0
Iron/Steel	- 1.3	12.8		11.5
Total Agr.	-182.6	-19.5	-1005.0	-1207.1
Total Manu.	19.2	11.7		30.9
Total	-163.4	- 7.8		-1176.2

Source: Appendices B.14 to B.17.

Table 4.9.--Net Trade Creation: The Import Demand Regression Approach, All-Inclusive Phase Estimates (Millions of U.S. Dollars, 1984 prices).

Commodity	Spain	Portugal	EC(10)	Total
Meat	- 2.2	- .3	- 97.4	
Dairy P.	9.2	.4	- 88.8	
Cereals	- 65.2	-35.3	- 146.5	
Sugar	5.8	22.8	- 899.2	
Tobacco	-135.6	- 7.2	- 132.1	
Leather P.	- 3.6	.2	- 12.9	
Rubber	9.2	2.5	- 25.8	
Paper P.	13.0	1.0	- 171.9	
Textiles	- 9.9	- 4.8	- 690.0	
Iron/Steel	- 1.8	12.8	- 719.7	
Total Agr.	-188.0	-19.5	-1364.1	
Total Manu.	71.9	11.7	-1620.3	
Total	-181.0	- 7.8	-2984.4	

Source: Appendices B.14 to B.17.

and negative for agricultural commodities. Most commodity groups experience positive net trade creation, but net trade diversion is relatively large in cereals ($35 million); once again, U.S. exports are significantly displaced.

There is substantial negative net trade creation in the EC(10) market, amounting to -$1 billion. Net trade diversion occurs in each agricultural commodity group, but is greatest in sugar and cereal. The lion's share of trade diversion falls on ROW in every commodity group save cereals, in which the U.S. bears the burden. Within the ROW group, the exports of Canada, Yugoslavia, Turkey, Morocco, and the Ivory Coast are particularly displaced.

As seen in Table 4.9, net trade diversion in the all-inclusive phase for the accession of the Two is $3.2 billion, which is substantially higher than in the marginal phase. Net trade creation obtains in Spain and Portugal, but this effect is dominated by the large values of net trade diversion in the EC(10) market. In fact, total net trade diversion is derived in every commodity group. The strong net trade diversion in EC(10) manufactures is responsible in large part for the differences between the marginal and all-inclusive phase calculations. Nevertheless, negative net trade creation is negligible, amounting to less than 1 percent of total trade.

V. Summary

The results from the two ex-ante approaches are summarized in Table 4.10. All estimation techniques yield total negative net

Table 4.10.--Net Trade Creation in Ex-ante Estimation
(Millions of U.S. Dollars)

	Manufactures		Agriculture		Total	
	MA	AIA	MA	AIA	MA	AIA
PEA:						
Greece Accession	-104	-1706	-8928	-8937	-9032	-10697
Spain/Portugal Accessions	-516	-13492	-7505	-8842	-8021	-22334
IDRA:						
Spain/Portugal Accessions	+ 31	-1602	-1207	-1572	-1176	-3173

Sources: Tables 4.3, 4.4, 4.8, and 4.9

[a]MP and AIA refer to the marginal and all-inclusive phases, respectively.

trade creation. Thus, the relative price changes caused by customs union formation induce a deterioration in resource allocative efficiency. Positive net trade creation obtains only in manufactures for the IDRA marginal phase estimates of the accessions of Portugal and Spain. However, the all-inclusive phase estimates yield net trade diversion for that same approach, the difference being due in large part to substantial values of net trade diversion in EC manufactures in the all-inclusive phase. Net trade diversion in agriculture is always greater than in manufactures. This is a result of larger discriminatory reductions in agricultural trade barriers. The agricultural exports of the U.S. are particularly damaged.

The values of net trade diversion range from less than 1 to 3.7 percent of total trade for the accession of Greece, and from less than 1 to 3.5 percent for the accession of Spain and Portugal.

NOTES--CHAPTER IV

[1]It would have been more accurate to use weighted values, but this was not possible due to the lack of quantity data available for the relevant commodity categories.

[2]The United Kingdom and Belgium-Luxembourg were the missing countries in question.

[3]For the EC(10) real GNP growth and domestic price movements, it was necessary to include acceding countries into the data compilations, i.e., prior to 1975 for the U.K., Denmark and Ireland, and prior to 1981 for Greece. This was done by constructing a weighted index in all cases.

[4]X. Zolotass, The Positive Contribution of Greece to the European Community (Athens: Bank of Greece, 1979), p. 21.

[5]Ibid.

[6]European Communities, European Yearbook 22 (1984): EFTA 1.

[7]Ibid.

[8]European Communities, Commission of the EC (1984): EFTA 1.

[9]International Customs Bureau, International Customs Journal, Greece: 1976, Introduction.

[10]The anticipation of this adjustment has already caused policy disputes between the U.S. and the EC.

[11]Robert Stern et al., Price Elasticities in International Trade (New York: Macmillan, 1976), pp. 1-26.

[12]The underlying formula behind these calculations is:

$$n_m = n_{C/M} + eP/M,$$

where C denotes domestic consumption, F domestic production, and M imports: n_m is the import elasticity of demand (Blassa and Kreinin, 1967), p. 129.

[13]Ibid.

[14]W. Cline, Trade Negotiations in the Tokyo Round (Washington, D.C.: Brookings, 1978), pp. 60-63.

[15]For instance, W. Branson, "The Trade Effects of the 1971 Currency Realignments," Brookings Papers on Economic Activity 1 (1972): 15-69; P. Armington, "The Geographical Patterns of Trade and Effects of Price Changes," International Monetary Fund Staff Papers 16 (July 1969): 179-201.

[16]See M. Kreinin, "Static effect of EC Enlargement on Trade Flows in Manufactured Products," Kyklos 34 (1981): 65, for a detailed description of the technique.

[17]The ROW group of countries here is slightly different from that of the PEA because Spain is not included for Portuguese imports, and Portugal is not included in the ROW group of Spanish imports. The tariff reduction schemes between Spain and Portugal are still subject to negotiation; this is why inter-iberian trade was not exclusively estimated in the PEA. However, data were available for inter-iberian trade for the IDRA, and because there eventually will be a full customs union between Spain and Portugal, it was useful to consider trade between these two countries in this section.

[18]Nevertheless, this latter method was attempted, and the regression results were generally inferior. However, in several cases, the physical quantity dependent variable clearly gave the best results. Therefore, these parametric estimates were used in the following markets (SITC categories): Spain, all (02) imports and (64) imports from the U.S.; Portugal, all (02) imports; and EC, imports of (01) for ROW imports and (04) for Portugal.

[19]Price and Thornblade, "US Import Demand Functions Disaggregated by Country and Commodity," Southern Economic Journal 39 (July 1972): 50.

[20]That is, fruits and vegetables (05), fish (03), chemicals and chemical manufactures (51/52), and relevant manufactures higher than SITC 6.

CHAPTER V

EMPIRICAL EX-POST TRADE MODELS: A REVIEW

Having been a member of the European Community for more than six years, Greece is on the verge of completing its transitional phase to full membership. The ex-ante methods reviewed in Chapter III were useful in projecting estimated effects on the acceding countries when there is no historical data. In the case of Greece, however, an ex-post procedure can be utilized.

Consistent with the format of Chapter III, the present chapter reviews the various ex-post techniques used to estimate the effects of trade liberalization. After an exposition of the theoretical structure of these constructs in Section I, Section II presents several empirical ex-post approaches: gravitational paradigms, import growth models, and the import demand regression approach. The review of models also involves assessing the relevance of each paradigm to the case of the Second Enlargement and a discussion of which models were selected in the present thesis. (An application of the latter two models to the Greek example is presented in Chapter VI.) Moreover, each model is evaluated using econometric guidelines (where appropriate) and the El-Agraa criteria, which were presented in Section I of Chapter III. A synopsis of the results obtained in ex-post empirical studies is undertaken at the

end of each subsection of Section II. Section III provides a brief summary of the various ex-post estimates of trade creation and trade diversion. A detailed summary of the results is presented in Appendix C.

I. Theoretical Structure of Ex-Post Models

A modeler who intends to employ an ex-post estimation procedure possesses all relevant post-integration data, but needs to know what those data would have been in the absence of integration. Thus, the problem that manifests itself in ex-post estimation is in constructing the "antimonde." The techniques reviewed below differ in their approaches to that construction. In ex-post models, trade creation estimates are obtained by first estimating what expected total imports would have been in the absence of integration in the postintegration year 2 ($\hat{M}^T_{i2}$). Once this is obtained, it is necessary to subtract $\hat{M}^T_{i2}$ from the actual value of total imports, M^T_{i2}, in order to deduce the change in total imports due exclusively to integration, that is:

$$TC = (M^T_{i2} - \hat{M}^T_{i2}) \tag{5.1}$$

Trade diversion is estimated by subtracting the actual value of nonpartner imports in postintegration year 2 (M^N_{i2}) from the estimated value of external imports in year 2 in the absence of integration ($\hat{M}^N_{i2}$), i.e.:

$$TD = (\hat{M}^N_{i2} - M^N_{i2}) \tag{5.2}$$

The construction of the antimonde and its comparison to actual data are similar to the comparison of counterfactual and benchmark data found in ex-ante general equilibrium estimation. However, the latter procedure compares two hypothetical situations, whereas the ex-post procedure compares a hypothetical state to an actual one. As long as a realistic, unbiased, and consistent technique is used to formulate the antimonde, the possession of actual data will enhance the plausibility of the estimates. This is because many factors that are generally left out in ex-ante estimation--for example, dynamic effects--are necessarily influential in ex-post models. However, if the antimonde is not accurate, e.g., if the dynamic effects are inappropriately modeled, then the ex-post results will be biased. In this case, the inherent features of the ex-post techniques may or may not be superior to ex-ante procedures.

Thus, the construction of a realistic antimonde is of the essence. The following technique offer alternative means by which to do this.

II. Empirical Ex-Post Models

A. Gravitational Models

Gravitational models provide an empirically tractable general equilibrium framework for estimating the antimonde. They have a sound theoretical basis and include many useful applications.[1]

Gravitational models are bilateral econometric models that use bilateral import demand (X_{ij}) as the dependent variable and a variety of explanatory variables, e.g., income of the importing

country (Y_i), income of the exporting country (Y_j), population of the importing and exporting countries (N_i and N_j, respectively), and a variable that accounts for the distance between the importing and exporting countries (D_{ij}). Thus, expressed in logarithmic form, a characteristic gravitational model of bilateral trade would be of the form:

$$\ln X_{ij} = A + \delta_1 Y_i + \delta_2 \ln Y_j + \delta_3 \ln N_i + \delta_4 \ln N_j + \delta_5 \ln D_{ij} + \ln e_{ij} \qquad (5.3)$$

where i = importing country; j = exporting country; A = intercept; δ_i = coefficients of the explanatory variables; and log e_{ij} = lognormal error term.[2]

Once the coefficients of all the explanatory variables are estimated, it is possible to project what the growth rate of imports would have been in the absence of integration, i.e., the antimonde. These results are then compared to the actual data to obtain trade creation and trade diversion. In addition, since bilateral trade flows are involved, it is possible to deduce changes in the balance of trade of individual countries attributable exclusively to integration.

Gravitational models have been used to analyze the effects of several forms of trade liberalization, such as the EC and EFTA tariff preferences granted to Portugal, the benefits accruing to less-developed countries through the programs of the Generalized System of Preferences (GSP), and the resource allocation effects of the creation of the EEC and the EFTA.

Every ex-post model applied to the estimation of trade creation and trade diversion generated net trade creation. Da Silva (1985) estimates the effects of the EFTA and EEC tariff preferences granted to Portugal to be salutary for economic efficiency; a total of $4.2 billion in trade creation is obtained for 1978-1979. Sapir (1980) analyzes the effects of the EEC GSP on trade flows; a total of $5.4 billion in net trade creation is obtained. It is concluded that the EC GSP has achieved significant results in expanding manufactured exports from semi-industrialized countries. Verdoon and Schwartz (1972) estimate the effects of the creation of the EEC and EFTA. They conclude that the formation of the two trade blocs in Europe was successful in increasing allocative efficiency. Net trade creation is calculated to be $9 billion.

1. Model Selection. Although the gravitational models ostensibly meet the El-Agraa criteria, they do not perform well under the econometric guidelines. By estimating (5.3) using cross-sectional data, the gravitational paradigms bias the quantitative results obtained for trade creation and diversion. This is because cross-sectional data cannot take into account cyclical pressures on trade flows. In addition, since all price variables are excluded, relative price variables that do not result from integration but rather stem from exogenous changes--such as deterioration in terms of trade due to energy price changes--tend to bias the model. Thus, a gravitational model was not constructed to estimate the economic effects of Greece's accession.

B. Import Growth Approaches

The import growth approaches formulate an antimonde based on what import growth rates would have been in the absence of integration. Once such growth rates in the antimonde are estimated, it is possible to perform pairwise comparisons in order to derive (internal and external) trade creation, trade diversion, trade erosion, and balance-of-payments changes resulting from integration. However, the question arises as to how the antimonde import growth rates should be estimated. There are three different versions: the standard normalized, the import-share-in-apparent-consumption, and the EFTA approaches.

The standard normalized approach estimates an antimonde import growth rate by using a control country as a normalizer. Pioneered by Kreinin (1972), this approach posits a modified control country's (or countries') import growth rates as a proxy for the importing country(s)'s growth rate in the antimonde. The principal argument for using a control country approach is that simple projection of trends in preintegration growth rates can lead to substantial biases. This is due in large part to the differing historical economic environments in the preintegration years relative to postintegration years. For example, assume that a modeler wants to measure change in import growth due to economic integration from 1973 to 1979 for Denmark. Furthermore, suppose that the past trend of import growth used to estimate the antimonde is derived from the 1960s. That decade was one of substantial world economic growth

relative to the 1970s, a period of considerable economic stagnation due to oil shocks, raw material shortages, international financial crises, etc. Hence, import growth in the 1960s should be greater than in the 1970s, ceteris paribus. Since import growth would have an upward bias in the antimonde, trade creation and trade diversion would be biased downward and upward, respectively.

Thus, preintegration growth rates are biased if the subjective economic environment in the preintegration phase is different from that in the postintegration phases. In fact, given the extensive economic gyrations in the postwar period, this method is dubious; a country's past is a poor normalizer for itself in the present. This discussion will be pertinent to the EFTA approach considered below.

In order to produce a more efficient proxy, Kreinin (1972) suggests that a country similar to those being considered be used as a normalizer. The more similar the country, the better the predictor. Ideally, this country will be at the same level of economic development, have comparable import patterns, be isolated from the integration process itself, and undergo similar exogenous economic changes in the domestic and international realms. Such a country is difficult to find, but a ranking of countries can be compiled and the best control(s) chosen according to their "degree of appropriateness."[5] Note, however, that because there is no perfect control country, it is impossible to determine a prior if this method is superior to extrapolating preintegration trends.

In the standard normalized approach, trade creation in country i and commodity group k is estimated by adjusting imports in period 1 by the import growth rate of the control variable[6] to derive antimonde total imports (M^{T*}_{ik2}). This value is subtracted from actual imports in period 2:

$$TC = [M^{T}_{ik2} - M^{T*}_{ik2}] \tag{5.4}$$

where: $M^{T*}_{ik2} = [M^{T}_{ik1} (1 + M^{T}_{nk})]$; and M_{nk} = growth rate of imports in control country n from t_1 to t_2.

This figure is summed over all k in country i to derive total trade creation for that country. The sum of trade creation over all countries yields total trade creation stemming from integration.

Trade diversion is estimated in country i and commodity group k by subtracting from antimonde external imports M^{X*}_{ik2} the actual external imports in t_2 (M^{X}_{ik2}):

$$TD = [M^{X*}_{ik2} - M^{X}_{ik2}] \tag{5.5}$$

where: $M^{X*}_{ik2} = [M^{X}_{ik2}(1 + M^{X}_{nk})]$; and M^{X}_{nk} = growth rate of external imports in n from t_1 to t_2.

This value is summed over all k in country i to compute total trade diversion for that country, and summing over all i yields total trade diversion.

Instead of focusing on the growth rate of total imports in the antimonde, the normalized import-share-in-apparent-consumption approach focuses on changes in imports relative to apparent consumption. A control country or group of countries is chosen

analogously to the standard approach, but changes in the ratios of imports to apparent consumption are used to construct an antimonde. Thus, trade creation is measured as follows:

$$TC = [(M^T_{ik}/C_{ik})_2 - ((M^T_{nk}/C_{ik})^*]^*C_{ik2} \qquad (5.6)$$

where: C_{ikt} = apparent consumption (domestic production plus imports minus exports) in period t, t = 1, 2; $(M^T_{nk}/C_{ik})^* = [M^T_{ik}/C_{ik})_1(1 + (M^T_{nk}/C_{nk})]$; and (M^T_{nk}/C_{nk}) = rate of growth in imports to apparent consumption from period 1 to period 2 in control country n.

Hence, trade creation is derived in the same way as above, except that the changes are expressed in ratios. However, it is necessary also to multiply the change in the ratios--which are expressed in percentage terms--by total apparent consumption in period 2, the postintegration year.

Trade diversion is estimated analogously to the standard normalized approach:

$$TD = [(M^*_{ik}/C_{ik})^* - (M^X_{ik}/C_{ik})_2)]^*C_{ik2} \qquad (5.7)$$

where: $(M^X_{ik}/C_{ik})^* = [(M^X_{ik}/C_{ik})_1(1+(M^X_{mk}/C_{nk})]$.

The growth rate in the control country's external imports share in apparent consumption is used in the trade diversion equation to estimate what that ratio would have been in the absence of integration. The percentage change in actual values of import shares in apparent consumption are subtracted from the percentage change in antimonde external import shares in apparent consumption to calculate

trade diversion. However, there is another technique that has been used to estimate trade diversion in the import share technique.[7] One can assume that the ratio of external imports relative to total imports does not change, in which case the appropriate trade diversion estimator is:

$$TD = [(M^T_{ik2})(M^X_{ik}/M^T_{ik})_1 - M^X_{ik2}) \qquad (5.8)$$

This technique is unbiased as long as exogenous economic disturbances that influence import growth throughout the period under consideration affect external and total import growth equally, so the ratio does not change.

There are several advantages to the control group techniques. First, it is possible to avoid the time-trend problem of different historical conditions. Second, even though no ideal control groups exist, it is possible to exclude those commodities for which the importing country and the control country are unacceptably different, or one could use another control country as a surrogate. Third, divergent income growth rates in the importing and control countries can be scaled upward or downward, as is appropriate, to correct for biases. This is necessary even in the import-share-in-apparent-consumption approach because if the control country's income growth rate were faster than the importing country's income growth rate, trade creation would be understated and trade diversion overstated. This is because the income elasticity of import demand with respect to real GNP has been estimated[8] to be significantly greater than the income elasticity of demand. Hence, the antimonde change in imports

relative to apparent consumption would be biased upward. Last, it is possible to correct for divergent changes in price competitiveness in the control and importing countries. This may come about due to differential inflation rates or real exchange rate variations. If changes in price competitiveness do occur, potential biases could result. For example, if the control country's inflation rate were higher than the importing country's, one would expect, ceterus paribus, a relative decline in the former country's competitiveness. Thus, the antimonde trade creation and trade diversion would be biased downward and upward, respectively, if one does not adjust for inflation differentials.

A method related to the import-share approach is that used by the EFTA secretariat (1969). It concentrates on computing differences in actual and antimonde shares of imports in the apparent consumption of various commodities. Differences between the actual and the antimonde ratios reflect the changes attributable to integration. However, while the import share approach utilized a control country in formulating the antimonde, the EFTA construct employs a projection of past trends in import growth to apparent consumption growth. Thus, in lieu of a foreign country, it chooses the domestic country in a different historical context. The problem with using historical trends was pointed out previously.

The import growth approaches to estimating trade creation and trade diversion have been used to analyze a wide variety of trade liberalization programs. The EFTA secretariat (1972) and Kreinin (1972) have estimated the effects of the creation of the EC. The

EFTA calculates net trade creation of $4 billion for 1965-1967. Kreinin utilizes the standard normalized approach with three different control countries, the U.S., the U.K., and Japan for 1969-1970; he obtains net trade creation in each case of $6.8 billion, $18.8 billion, and $24.7 billion, respectively. After concluding that the U.S. was the most appropriate control group for EC(6) import growth in the antimonde, Kreinin adjusts the U.S. estimates to account for differential income and price movements between the U.S. and the EC. His results still imply significant net trade creation with the establishment of the EC ($4.8 billion).

In addition, Kreinin (1981) estimates changes in allocative efficiency for the First Enlargement of the EC. He uses the import share in apparent consumption approach, with the U.S. and Canada as control groups, and he calculates net trade creation of $37 billion for 1977-1978.

1. Model Selection. The standard normalized import growth approach has been very popular in the literature. It has provided consistent results in the analysis of allocative efficiency changes stemming from economic integration (see Appendix C) and conforms well to the El-Agraa criteria. In addition, it does not involve prohibitive data requirements.

The import-to-apparent-consumption methodology is not as common in the literature, mainly because of more restrictive statistical information requirements. However, it also conforms to

the El-Agraa criteria and is an acceptable estimation procedure for those products for which data are available.

The EFTA approach has approximately the same data requirements as the import-to-apparent-consumption paradigm. However, this method is biased because of the time-trend problem of structural changes that industrialized countries have experienced throughout the postwar decades.

Thus, the present study uses two normalized import growth approaches: the standard normalized import growth model and the normalized imports-to-apparent-consumption paradigm. In each case, both unadjusted and adjusted estimates are presented, compared, and contrasted.

C. Import Demand Regression Approach

Familiar from Chapter III, the import demand regression model (IDRA) is an econometric approach to analyzing economic changes due to trade liberalization. In this approach, country i's demand for imports is regressed on two relative price variables and one economic activity variable. The ex-post version of equation (3.7) can be expressed as:

$$\ln M^T = a_{oi} + a_{1i}\ln(P_j/P_d) + a_{2i}\ln(P_j/P_s + a_{3i}\ln Y_i + \mu \qquad (5.10)$$

where the definition of the variables are identical to those in Section II of Chapter III, except for P_s. That variable is defined here as the weighted average of all foreign suppliers of k competing

with j in i's market. Only the substitution of partner for nonpartner imports was of interest in the ex-ante versions because customs union formation affects uniquely the competitiveness of nonpartner relative to partner country imports. However, in the present model, it is necessary to model changes in nontariff prices among all alternative sources of supply in the absence of integration. Hence, the coefficient a_{2i} is no longer the price elasticity of substitution between partner and nonpartner imports, but rather between all alternative sources of supply. The definitions of the coefficients a_{2i} and a_{3i} remain the relative price elasticity and the income elasticity of import demand, respectively.

In the ex-post IDRA, it is necessary to estimate changes in imports in the absence of integration (antimonde imports) over the relevant time horizon. This can be accomplished by estimating the parameters of equation (5.10) using time-series data prior to accession and then applying them in the following way in order to derive changes in allocative efficiency due to integration.

The antimonde is created by projecting imports over the period being analyzed, which includes the years following accession to the most recent year for which data are available. Total imports are expected to follow the same trend in the postintegration phase as in the preintegration phase. Thus, the expected change in country i total imports from country j of commodity k from year t to postintegration year t+1 is:

$$\Delta \hat{M}^{T}_{t,t+1} = \hat{a}_{ij} \left[((P_j)/P_d)_{t+1} - ((P_j/P_f)_t)/(P_j P_d)_t\right] + \hat{a}_{3j}[(Y_{t+1} - Y_t)/Y_t)] \quad (5.11)$$

The expected value of total imports in t+1, that is, antimonde total imports, is then calculated as:

$$\hat{M}^{T}_{t=1} = M^{T}_{t} + \Delta \hat{M}^{T}_{t,\ t+1} \quad (5.12)$$

Trade creation is expressed as the difference between observed total k imports and antimonde total imports:

$$TC = [M^{T}_{t+1} - \hat{M}^{T}_{t+1}] \quad (5.13)$$

In order to estimate trade diversion, the observed total of nonpartner imports of commodity k is subtracted from total projected external imports in the absence of integration. The change in total external imports is calculated analogously to (5.11), except that only nonpartner imports are relevant:

$$\Delta \hat{M}^{X}_{t,\ t+1} = \hat{a}_{2i}[(P_j/P_s)_{t+1}) - (P_j/P_s)_t)/(P_j/P_s)_t + \hat{a}_{3i}[(Y_{t+1} - Y_t)/Y_t] \quad (5.14)$$

The antimonde total external imports, therefore, are derived as:

$$\hat{M}^{X}_{t+1} = \Delta M^{X}_{t} + M^{X}_{t,\ t+1} \quad (5.15)$$

Finally, trade diversion is obtained by subtracting actual external imports from antimonde external imports:

$$TD = [\hat{M}^{X}_{t+1} - M^{X}_{t+1}] \quad (5.16)$$

The IDRA has been employed infrequently in the literature. A variant was used by Resnick and Truman (1975) to analyze the effects of the Dillon Round and the formation of the EEC and EFTA. Changes in trade flows attributed to the Dillon Round suggest an aggregate expansion of world trade of $582 million. This was a small (less than 1 percent) portion of total trade at the time, implying that the effect in stimulating world trade was minimal.

In addition, Resnick and Truman estimate that the formations of the original EEC and EFTA generated net trade diversion of $1.1 billion and $413 million, respectively. These results conflict sharply with those obtained by Verdoon and Schwartz (1972), who calculated a significant amount ($9 billion) of net trade creation (see Appendix A). Furthermore, Kreinin (1969) also obtains net trade creation when estimating the effects of the formations of the EEC and the EFTA. Using a 1954-1962 data-base regression, he derives for the transitional years 1963-1965 a total net trade creation of $77 million due to the EEC and $21 million attributable to the EFTA. Although these figures are small in view of the size of the economies in question, they are far more encouraging with respect to the economic efficiency effects of the creation of the European trade blocs than are the Resnick and Truman estimates.

1. Model Selection. The IDRA applied to the ex-post model is attractive for all the reasons given in the ex-ante version of the model (see Chapter IV). However, the practical data problems have proven to be prohibitive for analysis of the Second Enlargement for

bilateral trade and disaggregation by commodity, thereby causing the model to conform poorly to the El-Agraa criteria. The problem here lies with Greece. As in the case of Spain and Portugal for ex-ante analysis, Greece does not publish monthly disaggregated trade data; hence, only annual statistics can be used. In addition, for the relevant information that is available, frequent gaps occur in the time-series entries. Moreover, since it is only possible to use data up to 1981--the year of accession--fewer observations were available for Greece than for Spain and Portugal. Thus, the IDRA is applied in this dissertation using adjusted parameters derived for Spain and Portugal in Chapter III. (The adjustment procedure is outlined in Chapter VI.)

III. Summary

A condensed summary of the values of trade creation and trade diversion derived using ex-post models is given in Table 5.1. The range of net trade creation varies from -$1.1 billion to +$56 billion. Calculations for the creation of the EC and the First Enlargement are always positive, ranging from $21 million to $37 billion. However, no ex-post study has been applied to assess trade creation and trade diversion associated with the accession of Greece. And because Greece is not a developed country, the present study should provide insight into the effects of bilateral economic integration between developed and "lesser developed" economies. Yannopoulos (1987) has stressed that this is an important new area in the general analysis of economic integration.

Table 5.1.--Summary of Trade Creation and Trade Diversion in Ex-Post Models (Millions of Dollars)

Author	Approach	TC	TD	NTC
Langhammer (1981)	M/C	-3970	-60162	56192
McConnel (1981)	SNA	36780	7880	28900
McConnel (1981)	M/C	32090	7880	24210
Kreinin (1981)	M/C	45000	8000	37000
Kreinin (1972)	SNA	7200	2400	4800
EFTA (1972)	EFTA	3600	1800	1800
Da Dilva (1985)	Grav	4172	0	4172
Sapir (1980)	Grav	5417	0	5417
Aiten and Lowry (1973)	Grav	560	0	560
Verdoon and Schwartz (1972)	GRAv	10100	1100	9000
Resnick and Truman 91975)	IDRA	4122	5193	-1071
Reiling and Scaperlinda (1983)	IDRA	2600	3700	-1100
Kreinin (1969)	IDRA	190	117	73
Kreinin (1969)	IDRA	54	33	21

Source: Appendix C.

a > M/C = Imports share in apparent consumption approach

b > SNA = Standard normalized approach.

c > EFTA = EFTA import growth model.

d > Grav = Gravitional model.

e > IDRA = Import demand regression approach

NOTES--CHAPTER V

[1]See Brada and Mendez, "Economic Integration Among Developed, Developing, and Centrally Planned Economies: A Comparative Analysis," Review of Economics and Statistics (November 1984): 549-55.

[2]Standard trade theory would suggest that the coefficients of the explanatory variables would have the following signs:

$$\delta_1 > 0, \delta_2 < 0, \delta_3 > 0, \delta_4 < 0, \delta_5 < 0$$

[3]Brada and Mendez, "Economic Integration."

[4]External trade creation occurs when, for example, an adjustment to the common external tariff causes nonpartner imports to increase.

[5]This term is taken from M. Kreinin, "The Effects of the EEC on Imports and Manufactures," Economic Journal 82 (September 1972): 902.

[6]The growth rate needs to be adjusted for any obvious differences in import patterns.

[7]See, for example, B. McConnell, Trade Creation and Trade Diversion in the Enlarged EEC and EFTA (Ph.D. dissertation, Michigan State University, 1981), pp. 64-66.

[8]Kreinin, "Effects of the EEC," p. 909.

[9]The differences in the definition of the explanatory variables stem from the use of different country groupings in each model.

[10]For an explanation of the competitive price elasticity, see Chapter III.

CHAPTER VI

EMPIRICAL EX-POST ESTIMATES OF TRADE CREATION AND TRADE DIVERSION: THE CASE OF GREECE

In this chapter, the standard normalized, the normalized imports-to-apparent-consumption, and the import demand regression paradigms are employed to estimate trade creation and the trade diversion stemming from the accession of Greece to the EC. In both import growth constructs, unadjusted and adjusted estimates of import growth in the antimonde are presented. Section I overviews control country, data, and commodity selection in the ex-post models. Sections II and III present results of the standard normalized and import-to-apparent-consumption paradigms, respectively. The import demand regression approach estimation is applied in Section IV. Finally, a summary of the ex-post results is given in Section V.

I. Control Country, Data, and Commodity Selection

After an investigation of appropriate control countries for EC import growth in the antimonde, the U.S. was considered the best candidate. It traditionally has been deemed the best--or at least an acceptable--control country for the EC (Kreinin, 1972, 1981; McConnel, 1981). Briefly, this is because the U.S. and the EC have similar economic structures, populations, GNP levels, and so forth. Japan also has been used for this purpose, but was not chosen for the

present study for three main reasons: (a) there are problems with disaggregated production data necessary for the imports-to-apparent-consumption approach; (b) the internal (for example, savings rate) and external (for example, the massive trade surplus, capital account deficit) performance of the Japanese economy is divergent relative to the EC[1]; and (c) studies done in the 1970s in which both Japan and the U.S. were deemed acceptable as control countries[2] did not yield substantially different results when estimating trade creation and trade diversion.

With respect to Greek antimonde import growth, Spain appears to be the best control country, but Portugal is also viable. Both have a common geographical position, similar economic structure, equivalent status with the EC (associate members) prior to Greece's accession, comparable income and price changes, and relatively similar postwar political experiences. Spain is the closest to Greece in these aspects, but it happened that there were gaps in Spanish data in the imports-to-apparent-consumption approach. Hence, Portugal was used to fill only the existing statistical "holes" in this latter model.[3]

The data for the two ex-post models considered here were extracted from several sources. For the standard normalized approach, 2-digit SITC import value statistics were obtained from OECD, Foreign Trade by Commodities, various issues.[4] For the imports-to-apparent-consumption and the import demand regression approaches, 3- and 4-digit SITC import and export quantity entries came from OECD, Foreign Trade by Commodities, and UN, Commodity Trade

Statistics, for all countries save the U.S. The U.S. import and export quantity data were available in the relevant publications of General Imports and General Exports.[5] Production statistics necessary in computing apparent consumption were obtained from UN, Yearbook of Industrial Statistics, various issues.[6]

Annual data for real GNP growth and domestic and external price changes necessary in import growth adjustments were extracted from Eurostatistics, National Accounts ESA, 1960-1984, and IMF, International Financial Statistics, various issues. Effective exchange rate indices were taken from pertinent issues of the latter. For disaggregated commodity price changes in the import demand regression approach, it was necessary to use the relevant national statistical yearbooks as well as the Eurostatistics publications.

The commodities chosen for ex-post analysis are presented in Appendices D.1, D.2, and D.3. Commodity selection was based on the criteria established in Chapter V, Section I. Data restrictions were particularly troublesome in employing the imports-to-apparent-consumption model, as production figures are scarce.[7] Thus, the categories investigated using that approach are generally more limited than the standard approach.[8,9]

II. Standard Normalized Import Growth Approach

As discussed in Chapter VI, the standard normalized import growth approach derives trade creation estimates by using the import growth of the control country as a proxy for the unobservable import growth in the domestic country. The difference between actual and

projected total imports is trade creation (negative values constitute trade erosion). Trade diversion is estimated by subtracting actual external imports from antimonde external imports. Hence, trade creation and trade diversion are calculated according to (5.4) and (5.8), respectively.

Using the import growth of the U.S. as the control for the EC(9) and Spain as a control for Greece, the unadjusted values of trade creation and trade diversion for the accession of Greece to the EC are presented in Table 6.1 for the postintegration years 1983-1984. Estimates for 1982-1983 and trade diversion calculations can be found in Appendices D.4 to D.7. The base for these estimates was 1976-1977, which are the first years after the completion of the First Enlargement. The average of two years is used in all cases in order to avoid cyclical problems that may be associated with the use of only one year.[10]

In Table 6.1 it is evident that net trade creation is negative in the EC market and positive in the Greek market for agricultural and manufactured goods. However, the negative values in the former swamp the net trade creation magnitudes obtained in the latter. Total net trade diversion in agriculture is $17.7 billion and is particularly strong in cereals, vegetables and fruits, leather and leather manufactures, iron and steel, electrical machinery, and clothing. Positive values for net trade creation are found only in meat and meat preparations.

The above values are unadjusted; they ignore all changes in price and income between the control and member countries. As

Table 6.1.--Standard Normalized Approach: Unadjusted Estimates of Net Trade Creation (Millions of U.S. dollars: 1983/84 prices)

Commodity	EC Market			Greek Market			Total
	TC	TD	NTC	TC	TD	NTC	NTC
Meat	1292.0	- 1.1	1293.1	362.7	370.5	-7.9	1285.4
Dairy P.	- 487.4	- .1	- 487.2	128.0	18.1	109.3	- 377.3
Fish	- 281.7	2.4	- 284.1	- 2.1	3.7	-5.8	- 290.0
Cereals	-8407.1	-207.0	-8406.9	-40.3	53.4	-93.7	- 8500.6
Fruit/Veg	-9036.9	- 7.6	-9029.4	14.5	5.7	8.8	- 9020.6
Sugar	- 215.6	- .7	- 215.0	3.4	- .6	4.0	- 211.0
Tobacco	- 650.1	0	- 650.1	34.7	16.2	17.9	- 622.3
Leather P.	-1582	0	-1582.0	168.4	44.1	124.3	- 1457.7
Rubber	- 128.4	- 67.2	- 61.2	-10.7	6.5	-17.2	- 78.4
Wood and Cork	- 255.0	0	- 255.0	- 4.2	3.1	-7.3	- 262.3
Paper P.	-2652.2	- 6.1	- 2646.1	-31.5	19.2	- 50.6	- 2696.8
Textiles	1115.4	0	1115.4	151.3	6.5	144.8	1260.2
Nonmet. Min. P.	-5947.9	-604	- 5343.9	36.8	- 3.8	40.3	-5303.6
Iron/Steel	-3228.3	0	- 3228.3	222.7	79.3	143.3	-3085.0
Elec. Mach.	-5997.4	223.5	- 5820.9	3.9	19.5	-15.6	-5836.5
Clothing	-7973.0	212.8	- 8125.8	45.9	.3	43..6	-8140.3
Total Manu.			-26007.9			407.8	-25600.2
Total Agr.			-17779.4			33.1	-17746.1
Total			-43787.4			440.9	-43346.3

Source: Appendix D.4

discussed in Chapter IV, divergent real GNP growth and price changes between the control and partner countries will bias estimates of trade creation by affecting import demand.[11] The income adjustment is made by first multiplying the difference in real GNP growth between the control and the home countries by the income elasticity of import demand for that product category. This value is then multiplied by the base-year import value to obtain the estimate of the size of the bias. Subtracting this value from the antimonde import value yields a magnitude which is independent of any income bias. In equation form, the income bias equation is:

$$[(Y_N - Y_H)]\,\eta M_{ikn}]M^T_{ik} \qquad (6.1)$$

where: Y_H = real GNP growth of home country

Y_N = real income in the control country

ηM_{ikn} = income elasticity of import demand

In addition, it is possible that divergent rates of domestic inflation and exchange rate changes can cause the antimonde to be biased. Corrections are made for unequal domestic price changes by multiplying the difference in inflation rates in the home and control countries by the price elasticity of demand for imports in each commodity group. Multiplying this by total imports in the base year yields an estimate for the inflation bias in the antimonde:

$$[(I_h - I_n)\eta^{M}_{kn}]M^{T}_{ik} \qquad (6.2)$$

where: I_h = inflation in the home country

I_n = inflation in the control country

η^{M}_{kn} = price elasticity of demand in commodity group k and control country n

The correction for the exchange rate bias is carried out similarly to (6.2), but effective exchange rate changes are used in lieu of internal inflation rates:

$$[(ER_n - ER_h)]\,\eta^{M}_{kn}M^{T}_{ik} \qquad (6.3)$$

where: ER_n = change in control country currency/SDR

ER_p = change in home currency/SDR

Real income growth rates and price changes during the relevant time span are given in Table 6.2. The real GNP in the U.S. grew at a faster pace than in the EC(9) for both 1976/77 - 1982/83 and 1976/77 - 1983/84. Thus, there is an upward bias for import demand, and it is necessary to deflate the antimonde estimates of import growth. Since real GNP in Greece grew at a faster pace than in Spain for both periods, there is a downward bias in antimonde import growth.

With respect to divergent inflation rates, the EC(9) and the Greek inflation rates are greater than those of their respective control countries of both periods. Hence, antimonde import growth is biased downward in each case.

Table 6.2.--Real Income and Price Divergencies Between Partner and Control Countries

	1976/77 - 1982-83		1976/77 - 1983-84	
	Growth (%)	Difference (%)	Growth (%)	Difference (%)
A. Real GNP Growth Rates				
EC(9)[1]	10.05		11.86%	
U.S.	11.8	-1.75	27.50	-5.64
Greece	14.08		15.80	
Spain	7.73	+6.35	10.04	+5.76
Greece	14.08			
Portugal[2]		-14.3	Not Applicable	
B. Domestic Price Changes[3]				
EC(9)[1]	70.1		81.1	
U.S.	56.3	+13.8	62.6	+18.5
Greece	275.5		330.0	
Spain	240.8	+34.7	269.0	+61.0
Greece	275.5			
Portugal[2]	310.4	-34.9	Not Applicable	
C. External Price Changes[4]				
EC(9)	19.2		27.9	
U.S.	- 6.4	+25.6	- 0.8	+37.7
Greece	110.0		116.1	
Spain	70.4	+39.6	88.1	+78.0
Greece	110.0			
Portugal	117.3	-67.3	Not Applicable	

Sources: Eurostatistics, National Accounts ESA Aggregates, 1960-84; U.N., International Financial Statistics, Various Issues.

[1]Growth rates were recalculated through a weighted index in order to exclude Greece when exclusively EC(10) data were available.

[2]Portugal is used as a control country for several commodities in the imports-to-apparent-consumption approach. Hence vital statistical information is necessary uniquely for 1976/77 - 1982-83.

[3]As measured by the GDP deflator.

[4]As measured by National currency/SDR.

Because the weighted average of changes in the effective value of EC(9) currencies[12] declined faster than the effective value of the U.S. dollar--which actually appreciated--and the effective value of the drachma declined faster than the peseta in both periods, the antimonde import growth will be biased upward, and the corrective value will be negative.

When calculating the adjustments for income and price divergencies, it was necessary to find the relevant price and income elasticity parameters. The former vector of parameters for all commodity groups is taken from Table 4.2, Chapter IV, which gave the parameters used for the price-elasticity approach in the previous chapter. The vector of income parameters was obtained from Kreinin (1972).

The adjusted values for net trade creation are shown in Table 6.3. Similar results to the unadjusted estimation obtain, that is, there is a preponderance of net trade diversion, but the magnitudes are smaller: Total net trade diversion comes to $11 billion and $16 billion for manufactures and agriculture, respectively. Estimated net trade diversion amounts to 4.4 percent of total trade. In the EC market, the value of total negative trade creation is still substantial at -$27.7 billion. Although net trade creation is derived for both manufacturing and agriculture in the Greek market, net trade creation for the two markets combined is only positive in meat and meat preparations, rubber, wood and cork, textiles, and iron and steel.

Table 6.3.--Standard Normalized Approach: Adjusted Estimates of Net Trade Creation
(Millions of U.S. Dollars, 1983/84 Prices)

Commodity	EC(9)	Greece	Total
Meat	1526.1	12.7	1538.8
Dairy P.	- 433.0	114.8	- 318.1
Fish	- 109.3	- 15.9	- 125.2
Cereals	- 7898.2	-115.3	- 8013.5
Fruit/Veg.	- 8251.5	7.7	- 8243.8
Sugar	- 81.1	3.9	- 77.2
Tobacco	- 445.3	18.5	- 436.9
Leather P.	- 1270.8	136.0	- 1134.9
Rubber	148.1	- 19.4	128.7
Wood and Cork	107.5	- 7.9	99.7
Paper P.	- 1550.4	- 62.8	- 1613.2
Texiles	2618.7	125.8	2744.5
Nonmet. Min. P.	- 3947.3	34.2	- 3913.1
Iron/Steel	1421.8	118.5	1540.3
Elec. Mach.	- 3463.0	- 26.5	- 3489.5
Clothing	- 6061.4	40.9	- 6020.5
Total Manu.	-11996.7	338.9	-11658.0
Total Agr.	-15702.4	26.4	-15675.9
Total	-27699.1	365.2	-27333.9

Source: Appendices D.4-D.7.

In agriculture, negative net trade creation is greatest in cereals ($8 billion) and fresh fruits and vegetables ($8.2 billion), accounting for 60 percent of total trade diversion. The bulk of it in both cases is borne by the U.S. In fact, in the EC market, ROW--especially Turkey, Morocco, and the Ivory Coast--actually experiences negative trade diversion (external trade creation) in all agricultural commodities except dairy products and sugar. This phenomenon may be explained by ROW's access to benefits included in the EC's Generalized System of Preferences, from which the U.S. and Japan are excluded. The Greek market experienced net trade creation in all product categories save fish and cereals.

Negative net trade creation for manufactured goods is greatest in clothing ($6 billion) and nonmetallic mineral products ($3.9 billion). Positive net trade creation is largest in iron and steel ($1.5 billion) and textiles ($2.7 billion). Once again, the lion's share of trade diversion falls on U.S. exports, and trade diversion is actually negative for ROW in the EC market. Since GSP benefits apply to a wide variety of manufactures, the expansion of ROW exports, especially for India and Yugoslavia, is even more pronounced than in agriculture.

There are several possible explanations of why net trade diversion obtains. First, internal and external relative price changes caused by customs union formation play an important role. Second, the large values of trade erosion in EC agriculture could be

the result of policies designed by the EC administration to increase self-sufficiency in agriculture, a response to over production in traditional products. Third, almost half the unadjusted values of net trade diversion in EC manufactures was due to income and price biases. Finally, the substantial trade erosion in this latter category can be attributed to exogenous factors, such as increased protectionism in basic industries.

III. Imports-to-Apparent-Consumption Approach

The imports-to-apparent-consumption method is a normalized approach that uses changes in imports relative to apparent consumption (imports + domestic production - exports) to derive trade creation. Values for the latter are calculated according to (5.6). This approach has the advantage that structural changes in imports in specific commodity groupings relative to consumption in general are endogenized (see Chapter V for a detailed explanation). Trade diversion for the various commodity groupings is estimated according to (5.8), as suggested by McConnel (1981).[13]

The unadjusted estimates of trade creation, trade diversion, and net trade creation are summarized in Table 6.4 for 1981-83. The detailed calculations of trade diversion by country of origin are presented in Appendices D.8 and D.9 for the EC and Greek markets.

Total net trade creation comes to -$10.7 billion for both manufactures and agricultural markets. Positive net trade creation occurs in flour, cocoa, tobacco, paper and paperboard, cotton fabrics, woven fabrics, cement, and iron and steel bars.

Table 6.4.--Imports-to-Apparent-Consumption Approach: Unadjusted Estimates of Net Trade Creation (Millions of U.S. Dollars, 1982/83 Prices)

Commodity	EC(9)	Greece	Total
Meat	-4757.9	- 12.6	-47776.5
Butter	- 999.2	3.7	- 998.6
Cheese and Curds	- 42.8	34.0	- 8.8
Flour	1.8	- 1.3	.5
Vegetables	- 79.9	2.8	- 77.1
Cocoa	988.9	- 13.1	976.9
Chocolate	- 53.3	1.5	- 51.8
Tobacco Manu.	NA	3.5	3.5
Hides and Skins	- 837.1	1.5	- 835.6
Pulp and Paper Waste	-5710.1	58.3	- 5651.9
Paper P.	679	- 50.0	629.0
Cotton Fabrics	141.6	-110.2	31.4
Woven Fabrics	662.1	- 21.0	641.0
Cement	15.2	NA	15.2
Glassware	- 317.4	3.5	- 313.9
Pig Iron	- 39.5	- 6.5	- 96.0
Iron/Steel Bars	20.2	- 19.2	1.0
Iron/SteelRods	12.7	- 15.9	- 3.3
Iron/Steel Tube Pipes	- 140.5	- 9.8	- 150.3
Total Manu.	-5563.9	-169.3	- 5733.2
Total Agr.	-4935.5	18.2	- 4917.3
Total	-10499.4	-151.1	-10650.5

Source: Appendices D.8-D.9.

However, these values are dwarfed by the large values of negative net trade creation in the other categories, particularly in meat and paper and paper waste. The burden of trade diversion falls on ROW exports, but the U.S. experiences considerable trade diversion in several commodity groups. Exports from Japan actually rise, but this is almost exclusively attributable to external trade creation in paper and paper waste.

Price and income adjustments to correct for biases presented when using control countries are performed essentially in the same way as in the standard normalized approach (see Chapter V). The results are summarized in Table 6.5. Total net trade creation is negative in both total agriculture (-$4.4 billion) and manufactures (-$4.3 billion). Net trade creation obtains in a majority of commodity groups, but the total value of net trade diversion in the other categories dominates these latter values. Net trade diversion amounts to 1.4 percent of total trade.

In the Greek market, positive trade creation is derived for all agricultural goods, except meal, flour, and cocoa. Trade creation is especially strong in meat and cheese and curds. Nevertheless, substantial values of trade erosion obtain in all categories of SITC 6 save in glassware. Trade diversion occurs in all agricultural categories except meal, flour, and vegetables, being strongest in meat ($3501.4 million). Trade diversion is also present in most manufactures and semimanufactures; pulp and paper waste and glassware are the only exceptions and have values that are small in magnitude (a total of $3.3 million). The lion's share of the trade

Table 6.5.--Imports-to-Apparent-Consumption Approach: Adjusted Estimates of Net Trade Creation (Millions of U.S. Dollars, 1982/83 Prices)

Commodity	EC(9)	Greece	Total
Meat	-4358.7	-10.4	-4369.1
Butter	- 966.8	3.7	- 963.1
Cheese and Curds	- 15.1	34.1	19.0
Flour	2.1	- 1.1	1.0
Vegetables	- 70.8	2.9	- 67.9
Cocoa	1040.4	- 4.4	1036
Chocolate	- 48.2	1.7	- 46.5
Tobacco Manu.	NA	8.5	8.5
Hides and Skins	- 717.2	- 1.9	- 719.1
Pulp and Paperwaste	-5260.5	58.3	-5202.2
Paper P.	1075.9	-64.1	1011.8
Cotton Fabriccs	232.9	-109.2	123.7
Woven Fabrics	920.0	12.6	932.6
Cement	16.1	NA	16.1
Glasswre	- 305.6	3.1	- 302.5
Pig Iron	- 68.8	- 6.7	- 75.5
Iron/Steel Bars	72.4	-22.2	50.1
Iron/Steel Rods	29.3	-17.0	12.3
Iron/Steel Tube Pipes	- 94.0	-11.8	- 105.8
Total Manu.	-4099.6	-159.0	-4258.6
Total Agr.	-4417.2	34.9	-4382.3
Total	-8516.8	-123.1	-8640.9

Source: Appendices D.8-D.9.

diversion is associated with ROW exports, whose total burden comes to $465.5 million, which is 96 percent of the total. (Note: Greece has no GSP.) Exports form Morocco and Yugoslavia are damaged in particular.

Positive net trade creation in the EC market occurs only in cocoa for agriculture, but there is positive net trade creation in most manufacturing categories, especially paper and paperboard and woven fabrics. However, the negative trade creation values in the other product classifications are greater than those yielding positive trade creation. Trade diversion is borne mainly by the U.S. ($58 million), with Japan and ROW actually experiencing external trade creation.[14]

IV. Import Demand Regression Approach

Trade creation and trade diversion in the ex-post import demand regression approach are calculated according to equations (5.13) and (5.16), respectively. The parameters employed, which are adjusted estimates from the ex-ante version,[15] are presented in Table 6.6. The net trade creation results are summarized in Table 6.7. It was only possible to estimate net trade creation for EC aggregate manufactures because disaggregated producer price information was unavailable.[16]

For the two markets combined, negative net trade creation obtains in both manufactures and agriculture, totaling $2.4 billion. In Greek manufactures, net trade diversion is relatively small in magnitude ($15 million), but is large in the EC market ($1.2

Table 6.6.--Parametric Estimates for Ex-Post Import Demand Regression Approach

Commodity	Exporting Country	EC(9) a3	EC(9) a1	EC(9) a2	Greece a3	Greece a1	Greece a2
Meat	U.S.	1.70	-.57	-.31	3.4	-.43	-1.08
	Japan	2.70	-.57	-.31	--	--	--
	ROW	1.86	-.57	-.31	3.30	-.43	-1.08
	EC	--	--	--	3.40	-.43	-1.08
	Greece	3.88	-1.87	-.66	--	--	--
Milk	U.S.	.94	-4.10	-1.58	3.70	-.30	-1.58
	Japan	.94	-4.10	-1.58	--	--	--
	ROW	.94	-.85	-.91	1.90	-.30	-.91
	EC	--	--	--	3.70	-.30	-1.59
Maize	U.S.	1.37	-.74	-.85	2.53	-.90	-.85
	Japan	1.37	-.74	-.85	--	--	--
	ROW	.92	-.74	-.85	2.30	-.90	-.85
	EC	--	--	--	2.53	-.90	-.85
	Greece	.46	-.74	-.85	--	--	--
Tobacco	U.S.	.26	-2.30	-2.55	.84	-.50	-1.20
	Japan	1.50	-2.30	-2.55	--	--	--
	ROW	.26	-2.30	- .09	-.50	-1.20	
	EC	--	--	--	.37	-.60	-1.20
	Greece	.71	-2.30	-1.03	--	--	--
Leather P.	U.S.				2.60	-.15	-.29
	Japan				--	--	--
	ROW				4.60	-.15	-.08
	EC				5.00	-.15	-.29
Rubber	U.S.				1.62	-.34	-.99
	Japan				1.62	-.43	-.99
	ROW				1.62	-.42	-.68
	EC				1.62	-.43	-.53
Paper P.	U.S.				1.53	-.27	-.29
	Japan				1.61	-.27	-.29
	ROW				2.05	-.16	-.29
	EC				2.14	-.57	-.29
Textiles	U.S.				1.23	-.52	-1.80
	Japan				.55	-.66	-1.80
	ROW				1.36	-1.17	-1.80
	EC				1.23	-.52	-1.80
Iron/Steel	U.S.				.52	-.13	-4.0
	Japan				.75	-.13	-.74
	ROW				1.00	-.13	-2.60
	EC				.52	-.13	- .35
Total Manuf.	U.S.	1.50	-.31	-1.50			
	Japan	1.10	-.42	- .82			
	ROW	2.10	-.31	-1.1			
	Greece	2.10	-.31	-1.1			

Source: Chapter IV, Tables 4.4-4.6.

Table 6.7.--Ex-Post Import Demand Regression Approach: Trade Creation and Trade Diversion (Millions of U.S. Dollars, 1984 prices)

	EC(9)			Greece			Total
Commodity	TC	TD	NTC	TC	TD	NTC	NTC
Meat	-195.2	268.2	- 463.3	33.2	261.2	-228	- 691.3
Milk	9.3	-138.2	147.6	-15.9	7.4	-228	124.3
Maize	- 80.5	77.5	- 158.0	- 4.0	2.0	- 6.0	- 164.0
Tobacco	-340.3	97.6	- 437.9	13.4	- 6.4	19.8	- 418.1
Leather P.				18.3	- 19.7	38.0	38.0
Rubber				-.9	-.7	-.2	-.2
Paper P.				-36.8	-2.0	-34.9	- 24.9
Textile Yarn				21.1	-7.5	13.6	13.6
Iron/Steel				-56.2	-24.3	-31.9	- 31.9
Total Manu.			-1230.2			-15.4	-1245.6
Total Agr.			- 857.8			-291.3	-1149.1
Total			-2083.0			-306.7	-2394.7

Source: OECD, Foreign Trade by Commodities, Various Issues; and U.N., Commodity Trade Statistics, Various Issues.

billion). However, net trade diversion is negligible, amounting to less than 1 percent of total trade. Positive net trade creation is derived from milk, leather, and textiles. Negative net trade creation is by far the greatest in maize, where U.S. exports suffer the most.

V. Summary

The (adjusted) estimates for the standard normalized, imports-to-apparent-consumption, and import demand regression approaches are presented in Table 6.8.

The magnitudes of the results should not be compared directly, as each model utilized different commodity groups. However, net trade diversion in manufactures and agriculture occurs using all three techniques. Thus, the accession of Greece to the EC has caused a deterioration in resource allocative efficiency in the static model. The values of net trade diversion range from less than 1 to 4.4 percent to total trade.

The ex-post estimates support the results obtained ex-ante for the accession of Greece.[17] Large values of negative net trade creation are derived for total manufactures and agriculture using the PEA, and this is confirmed in direction and order of magnitude by both import growth approaches. The only discrepancy is the ex-post negative net trade creation in EC manufactures, which is not predicted using the PEA. It was mentioned above that this can be attributed to exogenous disturbances, such as increased protectionism in basic industries.

Table 6.8.--Summary of Ex-Post Estimates of Trade Creation and Trade Diversion (Millions of U.S. Dollars)

	Manufactures	Agriculture	Total
Standarrad Normalized Approach	-11658	-15676	-27334
Imports to Apparent Consumption Approach	- 4259	- 4382	- 8641
Import Demand Regression Approach	- 1246	- 1149	- 2395

Sources: Table 6.3, Table 6.5, and Table 6.7

Note: Results from the standard normalized and the imports to apparent consumption approaches are adjusted.

For disaggregated commodity groups, the standard normalized approach calculations are consistent with the ex-ante estimates in all but five categories. Moreover, the imports-to-apparent-consumption results support the PEA estimates in all comparable commodity categories except tobacco, in which there is a relatively minor difference.

Furthermore, the ex-post import demand regression paradigm verifies the ex-ante estimates not only in total categories, but also in the disaggregated commodity groups, save textiles.

NOTES--CHAPTER VI

[1]See, for instance, OECD, Economic Survey: Japan (August 1985), for an analysis of the unique position of Japan in the world economy.

[2]For example, Kreinin (1972, 1981), and McConnel (1981).

[3]The commodities (by SITC classification) used are: chocolate (073), fresh vegetables (0546), meal and flour (046), cocoa (072), cotton fabrics (6521), and woven fabrics ((653).

[4]Over the time-horizon considered, the categories of SITC were revised. In most cases, this did not affect the data at the 2-digit level. However, it was necessary to exclude from the analysis those relevant commodity groups that experienced change in statistical compilation, i.e., in the cases of: chemicals and chemical manufactures (51/25), other transport equipment (79), furniture (82), and footwear (85).

[5]Since the U.S. does not publish 4-digit quantity data using SITC categories, it was necessary to convert the information from U.S. statistical categories to their SITC equivalents.

[6]Production statistics are given in ISIC form and, thus, it was necessary to convert the data to their SITC equivalents in order to compute apparent consumption.

[7]3-4 digit SITC disaggregation for quantities of imports and exports was necessary to correspond to the available production data. However, it was often the case that 3-4 digit SITC classification changed with the revisions of SITC categories that took place over the relevant time span. Hence, these commodities were excluded.

[8]This is true except in the cases of: cocoa (072), chocolate (073), hides and skins (211), and pulp and waste paper (251). These goods are not particularly important imports for the partner countries or third countries. However, because data were readily available in these latter categories for this data-scarce technique, they were included.

[9]In order to circumvent the problem of scarce production data, an attempt was made to derive production volume indices by deflating production value indices by disaggregated producer price indices. However, a replication check showed that this method was unreliable.

[10]This procedure was also useful when there were holes in the data for one year.

[11]This is not true for trade diversion, since the "control" is a scalar.

[12]The accuracy of estimates of effective exchange rates would be enhanced if a more comprehensive effective exchange rate measure than the SDR were used. However, no such measure was available for all countries.

[13]This technique is unbiased as long as exogenous economic disturbances that influence import growth throughout the period under consideration affect external and total import growth equally so the ratio does not change.

[14]Japan's success is mainly confined to woven fabrics; otherwise, trade is diverted away from Japan in most cases.

[15]The adjustment procedure is the same as that undertaken in the PEA.

[16]The elasticity parameters were derived by averaging the disaggregated estimates in the Spanish market, and then adjusting these values using the Balassa and Kreinin technique, where appropriate.

[17]The marginal approach calculations are applicable here because of the ex-post time horizon.

CONCLUSION

THE ECONOMIC EFFECTS OF THE SECOND ENLARGEMENT OF THE EUROPEAN COMMUNITIES

The review of customs union theory undertaken in Chapter I demonstrated that the allocative efficiency effects stemming from relative price changes in a customs union could be either welfare-inhibiting or -increasing. Positive net trade creation values imply a movement toward free trade; negative trade creation values represent a movement in the direction of protectionism. The empirical results obtained in the case of the Second Enlargement suggest a deterioration in allocative efficiency. Table 7.1 presents a summary of the net trade creation results derived using (1) the price-elasticity and the ex-ante import demand regression approaches (marginal phases); and (2) the (adjusted) standard normalized, the (adjusted) imports-to-apparent-consumption, and the ex-post import demand regression models.

Because of the divergent disaggregated commodity groupings, these results are not strictly comparable with respect to numerical magnitude. However, it is clear that all models but one yield net trade diversion. The exception is the positive net trade creation achieved in manufactures using the ex-ante import demand regression approach, although the $31 million in created trade is slightly less

Table 7.1.--The Second Enlargement: Summary of Net Trade Creation Estimates[1] (Millions of Dollars)

	Ex-ante					Ex-Post
	PEA[2]	PEA[3]	IDRA[4]	SNA[5]	IACA[6]	IDRA[7]
Manufactures	- 104	- 514	31	-11658	-4259	-1246
Agriculture	-8929	-7505	-1207	-15676	-4382	-1149
Total	-9032	-8021	-1176	-27334	-8641	-2395

Sources: Table 4.10 and Table 6.8.

[1]Because of divergent commodity groupings in the various paradigms, these results are not strictly comparable.

[2]Price-elasticity approach (marginal phase), Greece's accession to the EC (1980 prices).

[3]Price-elasticity approach (marginal phase), the accession of Spain and Portugal to the EC (1984 prices).

[4]Ex-ante import demand regression approach (marginal phase, 1984 prices).

[5]Standard normalized approach, adjusted estimates (1983/84 prices).

[6]Imports-to-apparent-consumption approach, adjusted estimates (1982/83 prices).

[7]Ex-post import demand regression approach (1984 prices).

than 3 percent of total net trade diversion in that approach. In all models, trade diversion in agriculture is greater than trade diversion in manufactures, but this is particularly true in the PEA estimates. Total net trade diversion ranges from less than 1 to 4.4 percent of total trade.

The reasons for this large degree of net trade diversion can be explained by: (1) changes in relative prices due to customs union formation (ex-ante and ex-post); (2) deterioration in the benefits of GSP with the accession of a newly industrialized country (ex-post); (3) structural changes in EC agriculture designed to promote self-sufficiency (ex-post); and (4) exogenous increase in nontariff protection or basic industries (ex-post).

Another important result is the verification of ex-ante estimates by ex-post results. The PEA estimates of Greece's accession suggest significant net trade diversion, and this is supported by the results of the ex-post models. Moreover, the net trade diversion results obtained via ex-post estimation also question the applicability of the only other ex-ante estimates of trade creation in the Second Enlargement, namely Sawyer (1984) and Donges (1980), both of whom use the Baldwin and Murray technique. The shortcomings of applying this later approach to the case of the Second Enlargement were expounded in Chapter III.

Although the above results deviate from the general results of positive estimates of net trade creation stemming from the establishment of the EC and the First Enlargement, they are consistent with neoclassical predictions of preferential trading

agreements between unequal partners. The creation of the EC and the First Enlargement involved economic integration among countries at the same stage of economic development, whereas the Second Enlargement entails discriminatory trade liberalization between lesser developed countries (Greece, Spain, and Portugal) and developed countries (EC(9)). Relative to the first two stages of integration, the last suggests a far greater potential for trade diversion because the economic structures are dissimilar. The reason for this can be explained intuitively. According to neoclassical theory (factor proportions model), countries at similar stages of economic development will trade with countries at different stages, each specializing in its comparative advantage good. Because nonpartner and partner exports are homogeneous, there is great potential for trade diversion once the nonpartner/partner relative price relationship is distorted in a customs union.

The effect on the exports of nonpartner countries is often significant in specific commodity categories. This is especially true for U.S. agricultural exports, particularly wheat. Being the largest trading bloc in the model, ROW experiences the greatest burden of diverted trade. However, the negative effects are distributed among the many countries that constitute ROW. Furthermore, ex-post estimates of Greece's accession show significant external trade creation for ROW in the EC market. This is attributable to the EC's GSP accorded to LDCs rather than to any policies inherent in the formation of the customs union. Moreover, most of the gains in ROW exports to the EC market are swamped by the

displacement of U.S. (and, to some extent, Japanese) exports in these commodity groups. In addition, the adjustment of the external tariffs of the Three to the Common External Tariff of the EC in some agricultural groups induced trade erosion.

However, the large degree of trade erosion and trade diversion affecting the ROW country grouping is of particular concern to North African agricultural exporters (especially Morocco, Algeria, and Tunisia) and to export manufactures in countries now enjoying GSP status. The competition of efficient Spanish production of oranges, wine, and other types of Mediterranean agricultural products, which will now compete on equal terms with North African exports, could cause a serious deterioration in these important North African exports. Given the EC's dedication to economic development in former colonies, this should be of interest to all parties as the barriers to Spanish exports are slowly diminished. Moreover, the agricultural exports of Canada, New Zealand, and Yugoslavia will decline considerably. In addition, the value of GSP benefits to developing countries producing the same manufactures as the Three should decrease. This may induce the EC to consider alternative means by which to promote international development. Furthermore, manufactured exports of newly industrialized countries will be adversely affected, particularly for Taiwan and Brazil.

Finally, the results of this study indicate that accession will hinder the long-run economic growth of the Three. Net trade diversion implies that they will not only be importing from higher cost sources, but also allocating resources toward comparative-

disadvantage industries. These effects will tend to inhibit economic growth. However, dynamic considerations are excluded from the analysis; their inclusion might mitigate or change the above conclusions.

APPENDICES

APPENDIX A

REVIEW OF EX-ANTE TRADE MODELS

APPENDIX A

REVIEW OF EX-ANTE TRADE MODELS

Author	Goal/Notes	Area	Year (Base)	TC (Millions of $)	TC
A. Price Elasticity Approach					
1. Balassa and Kreinin (1967)	Analyze effects of a 50% reduction in tariffs under the Kennedy Round	U.S. Canada EEC Japan EFTA	1960	I. 251 II. 3236	
	I=export prices increase by 1/3 of tariff reductions.	EEC		I. 74 II. 31	
	II=export prices do not change.			I. 24 II. 26 I. 56 II. 56	
2. Kreinin (1973)	Analyze the effects of the First Enlargement of the EC/	EEC(10)	1970	5300	3900
		U.K.			1060
	EEC(10) includes Norway, which never joined; estimates exclude imports from socialists countries; lion's share of trade diversion is borne by the U.S. ($2 billion)	EFTA			1660

3.	Baldwin and Murray (1977)	Analyzes the importance of GSP to developing countries as opposed to a 50% most-favored nation tariff reduction/ Uses the Baldwin and Murray technique; concludes that reduction in tariffs under MFN is superior to GSP strategy.	U.S. EEC Japan	1971	191 199 25	46 18 1
4.	Donges (1980)	Estimates effects of Spain's accession to the EC/ Uses the Baldwin and Murray technique.	Spain	1977	512	97
5.	Sawyer (1985)	Investigates the effects of the Second Enlargement on U.S. exports to Europe/ Uses the Baldwin and Murray technique.	U.S.	1979	126	5
B.	General Equilibrium Models					
6.	Viaene (1981)	Analyzes the long-term (static and dynamic) effects of Spain's accession/	EEC	1983 1984 1985 1986 1987	37 37 40 43 51	

		The microeconomic system of equations are linked to a macroeconomic model of the Spanish economy; trade creation and and trade diversion are measured in billions of pesetas.	U.S. ROW	1983 1984 1985 1986 1987	-14 -10 - 8 - 7 -14
7.	Christou and Sarris (1980)	Traces of impact of the accession of Greece on production consumption, and trade for 18 major agricultural products in the Greek market/ Trade creation and diversion are not estimated; the figure refers to the total welfare change in Greece (sum of change in producer rent, compensatory variation and state revenue); negative effect on Greece mainly stems from the cessation of government support programs.		1986	-1057
8.	Whalley (1980)	Estimates annual changes in welfare resulting from a simultaneous abolition of tariffs in all regions/	World	1977	27000

		Trade creation and diversion are not estimated; figure refers to equivalent variation (the income that, starting at the prechange equlibrium, would move the agent to his postchange utility level).				
9.	Deardorf and Stern (1986)	Investigates the effects of reductions in tariffs and selected non-tariff barriers in the Tokyo Round on the major industrialized and developing countries/	EC(9)	1976	I.	342
					II.	1555
			U.S.		I.	123
					II.	695
			Portugal		I.	2
					II.	-9
			Spain		I.	5
					II.	-15
			Greece		I.	2
					II.	-3
			All		I.	767
					II.	4458
		I=changes in employment (thousands of workers) II=net change in welfare (millions of dollars)				

C. Import-Demand Regression Approach

10.	Resnick and Truman (1975)	Analyzes the tariff changes accompanying the enlargement of the EC and the creation of a free-trade area between the EC and EFTA/	EEC(6)	1968 546
			New EC members	347
			Noncandidate EFTA members	177
			Total	1070
		Figures refer to changes in imports over what they were prediced to be with the completed Dillon and Kennedy rounds; new EC members are Denmark and the U.K.; noncandidate EFTA members are Austria, Norway, Sweden.		

APPENDIX B

EX-ANTE ESTIMATION

Table B.1.--SITC Commodity Groupings for the Price-Elasticity Approach

SITC	Commodity
01	Meat and meat preparations.
02	Dairy products and birds' eggs.
03	Fish, crustaceans, mullucs, and preparations thereof.
04	Cereals and cereal preparations.
05	Vegetables and fruit.
06	Sugar, sugar preparations, and honey.
12	Tobacco and tobacco manufactures.
51/52	Organic and inorganic chemicals.
61	Leather, leather manufactures, n.e.s., and dressed furskins.
62	Rubber manufactures, n.e.s.
63	Cork and wood manufactures (excluding furniture).
64	Paper, paperboard, and articles thereof.
65	Textile yarn, fabrics, makeup articles, related products.
66	Nonmetallic mineral products, n.e.s.
67	Iron and steel.
74	General industrial machinery and equipment.
77	Electrical machinery, apparatus and appliances n.e.s., and electrical parts thereof.
79	Other transport equipment.
82	Furniture and parts thereof.
84	Articles of apparel and clothing accessories.
85	Footwear

Table B.2.--SITC Commodity Groupings for the Import-Demand-Regression Approach

SITC APPROX.	3-Digit SITC
01	011 Meat and edible meat offals, fresh, chilled, or frozen.
	012 Meat and edible meat offals (except poultry liver), salted in brine, dried, or smoked.
02	022 Milk and cream.
	023 Butter.
	024 Cheese and curd.
04	041 Wheat (including spelt) and meslin, unmilled.
	042 Rice.
	043 Barley.
	044 Maize (corn), unmilled.
	045 Cereals, unmilled (other than wheat, rice, barley, and maize).
	046 Meal and flour of wheat and flour of meslin.
06	061 Sugar and Honey.
	062 Sugar confectionery (except chocolate) and sugar prep.
12	121 Tobacco, unmanufactured, and tobacco refuse.
	122 Tobacco, manufactured.
61	611 Leather.
	613 Furskins, tanned or dressed.
62	621 Materials of rubber
64	641 Paper and paperboard.
	642 Paper and paperboard, cut to size or shape, and articles of paper or paperboard.
65	651 Textiles yarn.
	653 Fabrics, woven, of man-made fibres (not including narrow or special fabrics).
	654 Textile fabrics, woven, over than of cotton or man-made fibres.
	655 Knitted or crocheted fabrics (including tubular knit, pile, and open-work fabrics).
	656 Tulle, lace, embroidery, ribbons, trimmings, and other small wares.
	657 Special textile fabrics and related products.

Table B.2.--Continued.

SITC APPROX.	3-Digit SITC
67	671 Pigiron, spiegeleisen, sponge iron, iron or steel powders and shot, and ferro-alloys.
	672 Ingots, and other primary forms of iron and steel.
	674 Universals, plates, and sheets of iron or steel.
	676 Rails and railway track construction material of iron or steel.
	677 Iron or steel wire (excluding wire rod), whether or not coated, but not insulated.
	678 Tubes, pipes, and fittings of iron or steel.

Table B.3.--Internal and External Trade Creation in Greece and the EC(9): The Price-Elasticity Approach (Millions of U.S. dollars, 1980 Prices)

Commodity	Greece				EC(9)
	Int. TC	External TC			Int. TC
		ROW	U.S.	Japan	
Iron/Steel	.5	.1	.1	.1	
Textiles	3.2	1.9	.1	0	
Clothing	.9	.2	.1	0	
Footwear	0	0	0	0	
Chemicals	13.5	.6	.1	0	
Machinery	2.5	.4	.1	0	
Elec. Mach.	6.5	.5	.1	.2	
Furniture	1.5	.2	.1	.1	
Leather P.	1.9	.5	1.1	.1	
Wood and Cork	.01	7.2	.4	0	
Nonmet. Min. P.	0	.7	.1	.1	
Rubber	.4	.1	0	0	
Paper P.	4.9	5.5	.7	0	
Sugar					2.3
Dairy P.	7.0	4.7	0	0	0
Meat	5.9	7.6	0	0	.1
Cereal	2.0	.4	3.9	0	1.4
Fruit/Veg.	.6	.5	0	0	28.8
Fish	.4	2.5	.4	0	1.9
Tobacco	0	0	-.1	0	22.2
Total Manu.	35.9	17.9	2.9	.6	
Total Agr.	15.8	15.7	4.3	.01	56.6
Total	51.7	33.7	7.2	.61	

Source: OECD, Foreign Trade by Commodities, 1980 issue.

Note: These figures reflect the marginal phase calculations.

Table B.4.--Internal and External Trade Creation in Spain, Portual, and the EC(10): The Prie-Elasticity Approach (Millions of Dollars, 1984 prices)

Commodity	Spain				Portugal				EC(10)
	Int. TC.	Ext. TC			Int. TC	Ext. TC			
		ROW	U.S.	Japan		Row	U.S.	Japan	Int. TC
Iron/Steel	27.2	.5	.5	.8	7.1	1.8	0	.1	
Textiles	12.6	4.3	.9	.9	8.2	2.5	.1	0	
Clothing	2.7	1.5	.1	1.0	.2	.1	0	0	
Footwear	0	0	0	0	0	0	0	0	
Chemicals	51.9	2.2	1.3	.3	2.1	-2.9	-1.0	- .1	
Mchinery	47.2	7.2	6.2	4.0	12.4	1.9	.3	.4	
Elec. Mch.	44.4	5.6	6.2	3.3	10.6	.8	.3	.5	
Furniture	5.9	1.3	.1	.1	.4	.1	0	0	
Leather P.	.7	.1	0	0	.8	.7	0	0	
Wood and Cork	1.5	5.0	.7	0	0	0	0	0	
Nonmet. Min. P.	18.7		2.3	.6	.7	2.7	.7	0	0
Transport Equipment	56.5	3.5	5.6	2.4	--	--	--	--	
Rubber	4.7	.5	.4	.2	3.4	.7	.3	.4	
Paper P.	10.6	2.6	2.2	0	1.5	.3	.1	0	
Meat	2.4	.5	0	0	.1	0	0	0	.7
Cereals	3.3	2.0	3.3	0	.1	.1	1.9	0	.8
Fruit/Veg.	1.2	-2.8	-1.0	0	.8	.1	0	0	110.7
Fish	-	--	--	--	.8	-5.5	0	0	17.3
Sugar	5.0	05.0	0	0	--	--	--	--	5.
Tobacco	0	-34.2	-61.6	0	0	-2.6	- .1	0	.8
Total Manu.	284.8	36,7	25.2	12.9	52.3	7.9	.3	1.5	
Total Agr.	11.9	-39.5	-59.3	0	1.8	-7.9	1.7	0	136.4
Total	196.4	- 2.8	-34.1	12.9	54.1	0	2.0	1.5	136.4

Source: OECD, Foreign Trade by Commodities, 1984 issue.

Note: These figures reflect the marginal phase calculations.

Table B.5.--Trade Diversion Calculations for Greece: The Price-Elasticities Appraoch (Millions of Dollars, 1980 Prices).

Commodity	ROW			U.S.			Japan		
	=2	=2.5	=3	=2	=2.5	=3	=2	=2.5	=3
Iron/Steel	.5	.6	.7	.2	.3	.3	.2	.2	.3
Textiles	12.8	16.0	19.2	.7	.9	1.0	.3	.4	.5
Clothing	5.1	6.3	7.6	1.7	2.1	2.6	.2	.3	.4
Footwear	1.4	1.7	2.1	.3	.4	.5	.1	.1	.1
Chemicals	13.4	16.7	20.1	1.8	2.3	2.7	.4	.5	.6
Machinery	1.9	2.4	2.9	.6	.8	.9	.1	.1	.1
Elec. Mach.	5.1	6.4	7.7	1.1	1.4	1.6	1.5	1.9	2.3
Furniture	.7	.8	1.0	.3	.4	.5	.4	.5	.6
Leather P.	1.6	2.1	2.5	3.8	4.7	5.7	.2	.2	.3
Wood and Cork	27.4	34.2	41.1	1.3	1.7	2.0	.1	.1	.1
Nonmet. Min. P.	0	0	0	0	0	0	0	0	
Rubber	.7	.9	1.1	.3	.4	.4	.4	.5	.6
Paper P.	38.1	47.7	57.2	4.6	5.8	7.0	.1	.1	.1
Dairy P.	3.9	4.9	5.9	0	0	.1	0	0	0
Meat	63.4	79.2	95.1	0	0	0	0	0	0
Cereals	2.1	2.6	3.1	19.5	24.3	29.2	0	0	0
Fruit/Veg.	4.0	5.0	6.0	1.1	1.4	1.6	0	0	0
Fish	4.2	5.2	6.3	.6	.8	1.0	0	0	0
Tobacco	0	0	0	0	0	0	0	0	0
Total Manu.	108.7	135.9	163.1	16.8	21.1	25.3	3.8	4.8	5.7
Total Agr.	77.6	97.0	116.4	21.2	26.5	31.9	0	0	0
Total	186.3	232.9	279.5	38.1	57.1	3.8	4.8	5.8	

Source: OECD, Foreign Trade by Commoditiess, 1980 issue.

Note: These figures reflect the marginal phase calculations.

Table B.6.--Trade Diversion Calculations for the EC(9): The Price-Elasticities Approach (Millions of Dollars, 1980 Prices).

Commodity	ROW			U.S.			Japan		
	σ=2	σ=2.5	σ=3	σ=2	σ=2.5	σ=3	σ=2	σ=2.5	σ=3
Sugar	1410.9	1410.0	1410.9	30.4	30.4	30.4	.3	.3	.3
Dairy P.	268.4	335.5	402.6	2.2	2.7	3.3	0	0	0
Meat	353.4	441.7	530.0	60.2	75.2	90.3	.2	.2	.3
Cereals	200.5	250.6	300.7	427.7	534.7	641.6	2.4	3.0	3.6
Fruit/Veg.	1325.7	1657.1	1988.6	134.6	168.3	202.2	70.7	88.4	106.1
Fish	645.6	807.1	968.5	59.0	73.8	88.5	4.2	5.2	6.2
Tobacco	2527.1	2527.1	2527.1	492.9	492.9	492.9	.2	.2	.2
Total Agr.	6731.7	7430.0	8128.5	1207.1	1378.1	1549.0	78.0	97.4	116.7

Source: OECD, Foreign Trade by Commodities, 1980 Issue.

Note: These figures are applicablae to both the marginal and all-inclusive phases.

Table B.7.--Trade Diversion Calculations for Spain: The Price-Elasticities Appraoch (Millions of Dollars, 1984 Prices).

Commodity	ROW			U.S.			Japan		
	σ=2	σ=2.5	σ=3	σ=2	σ=2.5	σ=3	σ=2	σ=2.5	σ=3
Iron/Steel	2.8	3.5	4.2	3.0	3.7	4.5	4.6	5.8	6.9
Textiles	23.8	29.8	35.8	4.8	6.0	7.2	4.9	6.1	7.3
Clothing	21.4	26.7	32.0	.9	1.2	1.4	1.4	1.7	2.1
Footwear	2.2	2.7	3.3	.2	.3	.4	0	0	0
Chemicals	57.8	72.2	86.6	35.0	43.7	52.4	7.0	8.8	16.5
Machinery	16.0	20.0	24.0	13.9	17.4	20.9	9.0	11.3	13.4
Elec. Mach.	23.0	28.7	34.4	25.6	31.9	38.3	13.8	17.3	20.8
Furniture	2.4	3.0	3.6	.2	.3	.4	.2	.3	.4
Leather P.	54.5	68.1	81.7	1.2	1.5	1.8	1.2	1.5	1.8
Wood and Cork	14.8	18.5	22.2	2.1	2.7	3.2	0	0	0
Nonmet. Min. P.	6.9	8.6	10.3	1.8	2.2	2.7	2.1	2.7	3.2
Trans. Equip.	31.7	39.6	47.5	52.7	65.8	79.0	21.6	27.0	32.3
Rubber	2.5	3.2	3.8	2.2	2.7	3.3	1.0	1.3	1.5
Paper P.	36.9	46.1	55.3	6.2	7.8	9.3	.5	.7	.8
Meat	6.9	8.7	10.4	.6	.7	.8	0	0	0
Cereals	58.0	72.5	87.0	97.1	120.1	144.1	0	0	0
Fruit/Veg.	4.6	5.7	6.9	1.6	2.0	2.4	0	0	0
Sugar	20.9	23.1	23.1	.1	.1	.1	.1	.1	.1
Tobacco	0	0	0	0	0	0	0	0	0
Total Manu.	296.5	370.7	444.8	149.8	187.3	224.7	67.4	84.2	101.1
Total Agr.	84.9	110.0	127.3	98.3	122.9	148.4	.1	.2	.2
Total	381.4	480.6	572.1	248.1	310.2	372.2	67.5	84.4	101.3

Sources: OECD, Foreign Trade by Commodities, 1984 issue.

Note: These figures reflect the marginal phase calculations.

Table B.8.--Trade Diversion Calculations for Portugal: The Price-Elasticities Appraoch (Millions of Dollars, 1984 Prices).

Commodity	ROW			U.S.			Japan		
	σ =2	σ =2.5	σ =3	σ =2	σ =2.5	σ=3	σ =2	σ =2.5	σ =3
Iron/Steel	26.4	33.0	39.6	.4	.5	.6	2.1	2.7	3.2
Textiles	37.0	46.3	55.5	1.6	1.9	2.3	.7	.9	1.1
Clothing	2.3	2.9	3.4	0	.1	.1	0	0	0
Footwear	.4	.5	.6	0	0	0	0	0	0
Chemicals	5.2	6.5	7.8	1.8	2.2	2.7	.2	.2	.2
Machinery	19.7	24.6	29.5	2.9	3.7	4.4	4.0	4.9	5.9
Elec. Mach.	12.2	15.2	18.3	4.8	6.0	7.2	7.7	9.7	11.6
Furniture	.7	.9	1.0	.1	.2	.2	.1	.1	.1
Leather P.	9.6	12.1	14.5	.4	.5	.6	.4	.5	.6
Wood and Cork	3.8	4.7	5.7	0	0	0	0	0	0
Nonmet. Min. P.	5.3	6.6	8.0	.2	.3	.4	.3	.3	.4
Rubber	33.4	41.8	50.1	13.9	17.4	20.9	17.2	21.5	25.8
Paper P.	4.9	6.1	7.3	1.6	2.0	2.4	.2	.2	.2
Dairy P.	14.0	17.5	21.0	.7	.8	1.0	.2	.3	.3
Meat	.7	.9	1.1	0	0	0	0	0	0
Fruit/Veg.	4.0	5.0	6.0	.1	.1	.1	0	0	0
Fish	54.4	59.8	59.8	0	0	0	0	0	0
Tobacco	0	0	0	0	0	0	0	0	0
Total Manu.	174.9	218.7	262.4	28.5	35.6	42.7	33.0	41.3	49.5
Total Agr.	64.2	82.0	74.4	94.8	118.4	142.1	0	0	0
Total	239.1	290.7	336.8	123.3	154.0	184.8	33.0	41.3	49.6

Source: OECD, Foreign T Trade by Commodities, 1984 issue.

Note: These figudres are applicable to both the maraginal and the all-inclusive phases.

Table B.9.--Trade Diversion Calculations for EC(10): The Price-Elasticities Appraoch (Millions of Dollars, 1984 Prices).

Commodity	ROW			U.S.			Japan		
	σ=2	σ=2.5	σ=3	σ=2	σ=2.5	σ=3	σ=2	σ=2.5	σ=3
Sugar	969.4	969.4	969.4	22.4	22.4	22.4	.8	.8	.8
Dairy P.	205.8	257.2	308.7	1.9	2.4	2.9	0	0	0
Meat	449.0	561.3	673.5	27.8	34.7	41.7	0	0	0
Cereals	173.0	216.3	259.5	182.6	228.3	273.9	.8	1.0	1.1
Fruit/Veg.	820.2	1025.3	1230.3	80.1	100.1	120.2	1.5	1.8	2.2
Fish	523.7	654.6	785.6	47.0	58.8	70.6	21.0	26.2	31.4
Tobacco	2404.0	2404.0	2404.0	561.5	561.5	561.5	.7	.7	.7
Total Agr.	5545.0	6088.0	6630.9	923.4	1008.3	1093.1	24.7	30.5	36.3

Source: OECD, Foreign Trade by Commodities, 1984 issue.

Note: These calculations are applicable to both the marginal and all-inclusive phases.

Table B.10.--Trade Diversion Creation and Trade Diversion in Greece: The Price-Elasticity Approach

Commodity	TC	ROW			U.S.			Japan		
		σ =2	σ =2.5	σ =3	σ =2	σ =2.5	σ =3	σ=2	σ=2.5	σ=3
Iron/Steel	2.3	1.6	2.0	2.4	.7	.9	1.1	.6	.7	.8
Textiles	9.7	23.7	29.6	35.6	1.3	1.6	1.9	.6	.8	.0
Clothing	1.3	5.1	6.3	7.6	1.7	2.1	2.6	.2	.3	.4
Footwear	0	2.5	3.1	3.7	.6	.7	.9	.1	.1	.2
Chemicals	22.1	13.9	17.3	20.8	1.9	2.3	2.8	.4	.5	.6
Machinery	7.9	4.3	5.4	6.4	1.4	1.7	2.1	.1	.1	.2
Elec. Mch.	16.5	9.3	11.7	14.0	2.0	2.5	3.0	2.7	3.4	4.1
Furniture	2.3	.7	.8	1.0	.3	.4	.5	.4	.5	.6
Leather P.	6.1	4.3	5.3	6.4	9.8	12.3	14.7	.5	.6	.7
Wood and Coke	.1	34.8	43.5	52.2	1.7	2.1	2.6	.1	.1	.1
Nonmet. Min. P.	11.9	3.4	4.2	5.1	.4	.5	.5	.6	.7	.8
Rubber	.6	.7	.9	1.1	.3	.4	.4	.4	.5	.6
Paper P.	7.2	38.1	47.7	57.2	4.6	5.8	7.0	.1	.1	.1
Dairy P.	24.3	12.9	16.1	19.4	.1	.2	.2	0	0	0
Meat	8.6	63.4	79.3	95.1	0	0	0	0		
Cereals	3.0	2.1	2.6	3.1	19.5	24.3	29.2	0	0	0
Fruit/Veg.	.9	4.0	5.0	6.0	1.1	1.4	1.6	0	0	0
Fish	.8	11.5	14.4	17.2	1.7	2.2	2.6	.1	.1	.1
Tobacco	0	0	0	0	0	0	0	0	0	0

Source: OECD, Foreign Trade by Commodities, 1980 issue.

Note: These figures reflect the all-inclusive phase calculations: extgernal tade creation is the same as in Appendix B.3.

Table B.11.--Internal Trade Creation and Trade Diversion in the EC(9): The Price-Elasticity Approach (Millions of Dollars, 1980 Prices)

Commodity	TC	ROW			U.S.			Japan		
		σ =2	σ =2.5	σ =3	σ =2	σ =2.5	σ =3	σ =2	σ =2.5	σ =3
Iron/ Steel	20.5	836.3	1045.4	1254.5	62.4	78.0	93.6	73.0	91.3	109.5
Text.	67.3	907.1	1133.9	1360.7	159.4	199.2	239.1	50.0	62.5	75.0
Cloth.	398.1	2982.4	3728.0	4473.5	132.7	165.8	199.0	33.6	41.9	50.3
Foot.	11.2	338.6	423.3	507.9	6.4	7.9	9.5	1.5	1.9	2.3
Chem.	3.1	1308.1	1635.1	1962.2	551.1	688.9	826.6	105.9	132.4	158.9
Mach.	.8	382.8	478.5	574.2	283.4	354.3	425.0	69.7	87.1	104.5
E. Mach.	4.1	691.4	864.2	1037.1	553.0	691.3	829.5	189.8	237.2	284.7
Furn.	.1	130.5	163.1	195.7	7.5	9.4	11.3	1.9	2.4	2.9
Lth. P.	9.0	118.6	148.3	177.9	9.2	11.5	13.8	2.7	3.3	4.0
Wood/Cork	.2	117.7	147.2	176.6	12.2	15.3	18.3	.6	.8	1.0
Nonmet. Min. P.	1.9	1489.9	1862.4	2234.8	90.5	113.1	135.7	39.9	49.9	59.9
Trans. Equip.	.3	85.3	106.6	128.0	20.7	25.9	31.1	12.7	15.9	19.0
Paper P.	1.3	1275.4	1594.3	1913.2	156.8	195.9	235.1	32.3	40.4	48.5

Source: OECD, Foreign Trade by Commodities, 1980 issue.

Note: These figures reflect calculations for the all-inclusive phase; for agricultural commodities, see Appendices B.3 and B.6

Table B.12.--Internal Trade Creation and Trade Diversion in Spain: The Price-Elasticity Approach

Commodity	TC	ROW			U.S.			Japan		
		σ =2	σ =2.5	σ =3	σ =2	σ =2.5	σ =3	σ=2	σ=2.5	σ=3
Iron/ Steel	31.7	35.9	44.9	53.9	3.5	4.4	5.3	5.4	6.8	8.2
Text.	15.3	29.7	37.1	44.5	5.9	7.4	8.9	6.1	7.6	9.1
Cloth.	3.4	28.7	35.9	42.9	1.2	1.6	1.9	1.1	1.4	1.7
Foot.	0	3.8	4.8	5.8	.4	.5	.6	.1	.1	.1
Chem.	63.4	76.8	96.0	115.2	46.5	58.1	69.7	9.3	11.6	14.0
Mach.	70.7	23.7	29.7	35.6	20.7	25.8	31.0	13.3	16.6	19.9
E. Mch.	56.5	30.3	37.9	45.5	33.7	42.2	50.6	18.2	22.8	27.3
Furn.	7.8	3.4	4.2	5.0	.3	.4	.5	.4	.5	.6
Lth. P.	1.3	11.6	14.5	17.4	.3	.3	.4	.3	.3	.4
Wood/Cork	2.3	21.7	27.1	32.5	3.1	3.9	4.7	0	0	0
Nonmet. Min. P.	24.3	9.2	11.5	13.8	2.4	3.0	3.6	2.9	3.6	4.3
Trans. Equp.	67.1	37.9	47.4	56.9	63.1	78.9	94.6	25.8	32.3	38.7
Rubber	6.4	3.7	4.6	5.5	3.2	4.0	4.8	1.5	1.8	2.2
Paper P.	10.6	36.9	46.1	55.3	6.2	7.8	9.4	.5	.7	.8
Meat	3.1	8.4	10.5	12.5	.7	.8	1.0	0	0	0
Cereals	3.8	69.8	87.3	104.8	115.7	144.6	173.6	0	0	0
Fr./Veg.	.8	3.9	4.9	5.8	1.4	1.7	2.1	0	0	0
Sugar	5.0	20.9	23.1	.1	.1	.1	.1	.1		
Tobacco	0	0	0	0	0	0	0	0	0	0

Source: OECD, Foreign Trade by Commodities, 1984 issue.

Note: These figures reflect calculations for the all-inclusive phase: for external trade creation, see Appendix B.4.

Table B.13.--Internal Trade Creation and Trade Diversion in EC(10): The Price-Elasticity Approach (Millions of Dollars, 1984 prices)

Commodity	TC	ROW			U.S.			Japan		
		σ =2	σ=2.5	σ =3	σ =2	σ =2.5	σ =3	σ=2	σ =2.5	σ=3
Iron/ Steel	128.8	549.1	686.3	823.6	0	0	0	29.5	36.9	44.3
Text.	112.5	693.3	866.6	1039.9	64.5	80.6	96.8	45.4	56.7	68.1
Cloth.	291.6	2514.1	3142.6	3771.1	42.4	53	63.6	18.1	22.6	27.1
Foot.	109.5	22.9	278.6	334.4	5.9	7.4	9.7	1.2	1.6	1.9
Chem.	81.4	1075.0	1343.8	729.0	486.0	607.5	729.0	115.0	143.7	172.5
Mach.	34.5	288.8	361.0	433.1	236.3	295.4	354.5	75.5	94.4	113.2
E. Mach.	108.1	697.3	871.7	1046.0	628.3	785.4	942.5	328.3	410.4	492.5
Furn.	14.6	102.0	127.5	152.9	6.3	7.8	9.4	1.4	1.7	2.1
Lth. P.	21.8	89.1	111.3	133.6	6.4	8.0	10.2	2.0	2.5	3.0
Wood/Cork	14.7	74.8	93.5	112.2	9.7	12.1	14.5	.4	.5	.6
Nonmet. M. P.	41.6	624.3	780.3	936.4	85.7	107.2	128.6	28.3	35.4	42.5
Trans. Equip.	22.0	169.0	211.3	253.5	367.8	459.8	551.7	89.1	111.4	133.7
Rubber	29.0	50.3	62.9	75.5	17.7	22.2	26.6	13.5	16.9	20.3
Paper P.	59.1	1187.6	1484.5	1781.5	102.3	127.9	153.5	16.7	20.9	25.1

Source: OECD, Foreign Trade by Commodities, 1984 issue.

Note: These figures reflect calculations for the all-inclusive phase: for agricultrual commodities, see Appendices B.3 and B.9.

Table B.14.--Parametric Estimates for the Ex-Ante Import Demand Regression Approach.

Commodity	U.S.		ROW		Japan		EC		Portugal	
	-a1	-a2	-a1	-a2	-a1	-a2	-a1	-a2	-a1	-a2
Spain										
Meat	.81	1.08	.81	1.08	--	--	.81	1.08	.81	1.08
Dairy P.	.46	1.58	.46	.91	--	--	.46	1.58	1.16	.87
Cereals	1.36	.85	1.36	.85	--	--	1.36	.85	1.36	.85
Sugar	3.70	.12	3.70	.12	--	--	3.70	.12	3.70	.12
Tobacco	1.16	1.20	1.16	1.20	--	--	1.40	1.2	1.30	1.20
Leather P.	.22	.29	.22	.08	.22	.29	.22	.29	.22	.29
Rubber	1.00	.99	1.00	.68	1.00	.99	1.00	.53	1.37	.53
Paper P.	.63	.29	.37	.29	.63	.29	1.33	.29	1.33	.29
Textiles	.79	1.80	1.00	1.80	1.77	1.80	.79	1.80	1.10	1.30
Iron/Steel	.20	4.00	.20	2.60	.20	.74	.20	.35	.20	.35
Portugal										
	U.S.		ROW		Japan		EC		Spain	
Meat	.35	1.08	.35	1.08	--	--	.35	1.08	.35	1.08
Dairy P.	.39	1.41	.39	1.41	--	--	.39	1.41	.52	1.60
Cereals	.58	.77	.58	.77	--	--	.58	2.62	.58	2.62
Sugar	1.61	.12	1.61	.12	-	--	1.61	.12	1.61	.22
Tobacco	.50	1.20	.60	1.20	--	--	.60	1.20	.55	1.20
Leather P.	.10	.29	.10	.08	.10	.29	.10	.29	.10	.29
Rubber	.43	.99	.43	.68	.43	.68	.42	.53	.59	.53
Paper P.	.27	.39	.16	.60	.27	.39	.57	.29	.57	.67
Textiles	.74	1.37	.74	1.37	.74	1.20	.28	1.37	.80	1.37
Iron/Steel	.54	1.80	.54	1.80	.50	.70	.54	1.80	1.05	1.80
EC										
	U.S.		ROW		Japan		EC		Spain	
Meat	.57	.31	.57	.31	--	--	1.87	.66	1.87	.66
Dairy P.	4.10	1.58	.85	.91	--	--	4.10	.87	4.10	.87
Cereals	.74	.85	.91	4.10	-	--	7.60	.85	7.60	.85
Sugar	.20	1.14	.20	1.14	--	--	1.10	1.14	1.10	1.14
Tobacco	2.16	.09	2.16	.09	--	--	2.30	.09	2.30	.09
Leather P.	.12	.29	.12	.08	.12	.29	.13	.29	.12	.29
Rubber	.55	.99	.55	.68	.55	.99	.76	.53	.75	.53
Paper P.	.35	.29	.20	.29	.35	.29	.73	.67	.73	.29
Textiles	.43	1.80	.55	1.80	.97	1.80	1.00	1.37	.61	1.30
Iron/Steel	.11	4.00	.11	2.60	.11	.74	1.34	1.80	.11	.35

Source: Tables 4.6 to 4.8.

Table B.15.--Trade Creation and Trade Diversion: The Import Demand Regression Approach (Millions of Dollars, 1984 Prices)

Commodity	Spain			Portugal			EC(10)		
	TC	TD	Net TC	TC	TD	Net TC	TC	TD	Net TC
Meat	1.8	4.0	-2.3	.1	.4	- .3	1.2	73.9	-72.7
Diary P.	9.4	.2	9.2	.4	0	.4	1.4	95.1	-93.7
Cereals	12.9	65.5	-52.6	3.1	38.4	-35.3	5.1	151.5	-146.4
Sugar	0	1.3	- 1.3	26.1	3.3	22.8	6.0	565.8	-538.3
Tobacco	-135.7	0	-135.7	-7.2	0	- 7.2	1.9	134.3	-132.4
Leather P.	.4	2.5	- 2.2	.7	.5	.2	--	--	--
Rubber	8.8	2.4	6.3	5.0	2.5	2.5	--	--	--
Paper P.	15.8	6.3	9.5	5.4	4.4	1.0	--	--	--
Textiles	37.0	30.2	6.8	19.4	23.8	-4.8	--	--	--
Iron/Steel	10.0	11.3	-1.3	24.4	11.5	12.8	--	--	--
Total Agr.	-111.6	71.0	-182.6	22.6	42.1	-19.5	15.6	1020.6	-1005.0
Total Manu.	72.0	52.8	19.2	54.4	42.7	11.7	--	--	--
Total	-39.7	123.7	-163.4	77.0	84.8	-7.8	15.6	1020.6	-1005.0

Source: OECD, Foreign Trade by Commodities, Various Issues

Note: These figures reflect the marginal phase calculations.

Table B.16.--Trade Creation and Trade Diversion: the Import Demand Regression Approach (Millions of Dollars, 1984 Prices)

Commodity	Spain			EC(10)		
	TC	TD	Net TC	TC	TD	Net TC
Meat	2.7	4.9	-2.2	1.2	98.6	-97.4
Dairy P.	9.4	.2	9.2	1.5	90.3	-88.8
Cereals	13.7	78.9	- 65.2	4.9	115.4	-146.5
Sugar	7.1	1.3	5.8	6.0	905.3	-899.2
Tobacco	-135.7	0	-135.7	1.9	134.0	-132.1
Leather P.	.6	4.2	-3.6	1.2	14.1	- 12.9
Rubber	12.8	3.6	9.2	6.8	32.6	- 25.8
Paper P.	19.3	6.3	13.0	17.5	189.4	- 171.9
Textiles	27.6	37.5	- 9.9	32.8	722.8	- 690.0
Iron/Steel	11.6	13.4	- 1.8	45.1	764.8	- 719.7
Total Agr.	-102.8	85.2	-188.0	15.5	1379.6	-1364.1
Total Manu.	71.9	65.0	7.0	103.4	1723.7	-1620.3
Total	- 30.8	150.2	-188.0	118.9	3103.4	-2984.4

Source: OECD, Foreign Tade by Commodities, Various Issues.

Note: These figures reflect the all-inclusive phase calculations; for trade creation and trade diversion in the Portuguese market, see Appendix B.15.

APPENDIX C

REVIEW OF EX-POST TRADE MODELS

APPENDIX C

REVIEW OF EX-POST TRADE MODELS

Author	Goal/Notes	Area	Year (Base)	TC (Millions of $)	TD
A. Import Growth Approaches					
1. Longhammer (1981)	Analyze the effects of EC preferences to developing countries. Uses normalized IAC, with the U.S. as the control country.	EC	1968 1974/75	-3970	-60162
2. McConnel (1981)	Estimates changes in economic efficiency due to the First Enlargement and the free-trade area between the EC and EFTA. Employs the SNA, where: I = unadjusted II = adjustments for price III = adjustments for income Uses Japan and the U.S. as a combined control.	EC(9) EFTA	1970/71 1977/78	I 31470 II 27090 III 36780	7880 7880 7880
3. McConnel (19810	Same as above. Utilizes the IAC, with Canada and the U.S. as a combined control; I, II, and III are defined above.	EC(9), EFTA	1970/71 1977/78	I 28390 II 26830 III 32090	7880 7880 7890

4. Kreinin (1981)	Analyzes the efficiency effects of the First Enlargement. Employs thse IAC with the U.S. and Canada as a combined control.	EC(9)	1977-1978	4500	8000
5. Kreinin (1972)	Estimates efficiency effects of the creation of the EC Uses the SNA, where: I = U.S. control II = U.K. control III = Japan control IV = US control and adjusted for price and income divergencies.	EC(6)	1969-1970	I 8500 II 16000 III 20500 IV 7200	1700 -2800 -4200 2400
6. EFTA Secretariat (1972)	Estimates effects of creation of the EFTA and EEC. Uses the EFTA IAC	EC(6) EFTA 	1965 1966 1967 1965 1966 1967	1700 2200 2300 700 900 1300	600 700 900 500 700 900
7. Truman	Analyzes the effects of the creation of the EC. Employs the EFTA IAC.	EC(6)	1958 1960	6700 3100	600 1900
B. Gravitational Models					
1. da Silva (1985)	Calculates effects of EFTA and EEC tariff preferences given to Portugal Includes an extensive set of explanatory variables, including dummy variables for social and cultural factors.	EC(9) EFTA 	1978 1979 1980 1978 1979 1980	823.8 342.9 1346.9 434.3 490.9 732.9	

9. Spain	Analyzes effects of EEC GSP on trade flows. Concludes that the EEC GSP has significantly expanded manufactured exports from semi-industrialized countries.	EC(9)	1976 1977 1978	1442 1835 2139	
10. Aiken and Lowry (1973)	Estimates the effects the formation of the Central American Common Market and the Latin American Free-Trade Area	CACM LAFTA	1967 1967	200 360	
11. Verdoon and Schwartz (1972)	Analyzes the effects of the formation of the EC and EFTA. Stresses the importance of a promotional effect and the decrease in risk due to regional integration.	EC(6) EFTA	1968	10100	1100
C. Import Demand Regression Approach					
12. Resnick and Truman (1965)	Estimates effects of the formations of the EEC and EFTA Since trade diversion is greater than trade creation in all cases, impact on world efficiency is negative, suggesting that there is a greater substitution between alternative sources of imports than between total imports and domestic production.	EEC EFTA Europe	1968	1849 212 1061	300 625 1566
13. Reiling and Scaperlanda (1973)	Estimates the effects of the formation of the Latin American Free-Trade Area	LAFTA	1969	2600	3700

14. Kreinin (1969)	Analyzes the efficiency effects of the creation of the EC	EC(6)	I 1962	25	49
			1963	55	24
			1964	34	40
	Limitations on the availability of domestic and international price data precludes any commodity disaggregation I = 1953-1961 data-base II = 1954-1962 data base		II 1963	51	18
			1964	80	6
			1965	40	89
15. Kreinin (1969)	Estimates trade creation and diversion for the creation of the EFTA.	EFTA	1965	54	33

APPENDIX D

EX-POST ESTIMATION

APPENDIX D

EX-POST ESTIMATION

Table D.1.--SITC Commodity Listings for the Standard Normalized Approach

SITC	Commodity
01	Meat and meat preparations.
02	Dairy products and birds' eggs.
03	Fish, crustaceans, mollucs, preparations thereof.
04	Cereals and cereal preparations.
05	Vegetables and fruit.
06	Sugar, sugar preparations, and honey.
12	Tobacco and tobacco manufactures.
61	Leather, leather manufactures, n.e.s., and dressed furskins.
62	Rubber manufactures, n.e.s.
63	Cork and wood manufactures (excluding furniture).
64	Paper, paperboard, and articles of paperpulp, of paper, or of paperboard.
65	Textile yarn, fabrics, make-up articles, related products.
66	Nonmetallic mineral manufactures, n.e.s.
67	Iron and steel.
77	Electrical machinery, apparatus and appliances n.e.s., and electrical parts thereof.
84	Articles of apparel, clothing accessories

Table D.2.--SITC Commodity Listings for the Import-to-Apparent-Consumption Approach

SITC	Commodity
011	Meat and edible offals, fresh, chilled, or frozen.
023	Butter.
024	Cheese and curd.
046	Meal and flour of wheat, and flour of meslin.
0546	Vegetables, fresh.
072	Cocoa.
073	Chocolate and other food preparations containing cocoa.
122	Tobacco, manufactured.
211	Hides and skins (except furskins), raw.
251	Pulp and wastes paper.
641	Paper and paperboard.
6521	Cotton fabrics.
653	Fabrics, woven, of man-made fibres.
6612	Cement.
6651	Glassware.
6712	Pig iron.
6731	Iron and steel bars.
677	Iron and steel rods.
6783	Iron and steel tube pipes.

Table D.3.--SITC Commodity Listings for the Import Demand Regression Approach

SITC	Commodity
011	Meat and edible meat offals, fresh, chilled, or frozen.
022	Milk and cream.
044	Maize (corn), unmilled.
121	Tobacco, unmanufactured; tobacco refuse.
611	Leather.
621	Materials of rubber (e.g., pastes, plates, shears, rods, etc.)
641	Paper and Paperboard.
651	Textile yarn.
672	Ingots and other primary forms of iron and steel.

Table D.4.—Standard Normalized Approach: Unadjusted Estimates of Net Trade Creation (Millions of U.S. Dollars)

Commodity	EC(9) Market						Greece Market					
	TC 82/83	TD 82/83	NTC 82/83	TC 83/84	TD 83/84	NCT 83/84	TC 82/83	TD 82/83	NTC 82/83	TC 83/84	TD 83/84	NCT 83/84
Meat	1558.1	-1.3	1559.4	1292.1	-1.1	1293.2	357.5	352.6	4.9	382.7	370.5	-7.8
Dairy	- 353.3	-.2	- 353.1	- 467.4	-.1	- 467.2	139.4	17.3	122.0	128.0	18.1	-109.9
Fish	- 63.6	2.4	- 66.0	- 281.7	2.4	- 285.1	- 14.4	6.0	-8.4	- 2.1	3.7	- 5.8
Cereals	-6285.2	- .2	-6285.0	-3407.1	- .2	-6408.9	- 32.6	67.2	-99.8	-40.3	53.4	-93.7
Fruit/Veg.	-6282.5	- 7.9	-6270.4	-6036.9	- 7.6	-6029.4	7.4	6.3	1.1	14.5	5.7	8.9
Sugar	10.6	-.7	11.3	- 215.6	- .7	- 215.0	3.4	-5.5	3.8	3.4	- .6	4.0
Tobacco	- 811.6	0	- 811.6	- 650.1	0	- 650.2	33.4	16.8	16.6	34.7	16.8	17.9
Leather P.	-1228.0	- 11.8	-1216.2	-1582.0	0	-1582.0	206.7	51.1	155.6	188.4	44.1	124.3
Rubber	103.2	1.7	101.5	- 128.4	-67.2	- 61.2	- 7.6	6.6	-14.2	10.7	6.5	-17.2
Wood and Cork	114.7	0	114.7	- 255.0	0	- 255.0	- 5.7	2.2	-7.9	-4.2	3.1	- 7.3
Paper P.	- 703.0	- 6.4	- 696.6	-2852.2	- 6.1	-2846.1	-33.5	17.5	-51.0	-31.5	19.2	-50.6
Textiles	-1122.2	0	-1122.2	1115.4	0	1115.4	123.3	4.6	118.8	151.3	6.5	144.8
Nonmet. Man. P.	-3934.4	-603.6	-3331.2	-5947.9	-604.0	-5353.9	34.9	-1.9	36.9	36.8	-3.6	40.3
Iron/Steel	-2348.6	0	-2348.6	-3228.3	0	-3228.3	169.9	58.7	111.2	222.7	79.3	143.3
Elec. Mach.	-2848.6	0	-2848.6	-5597.4	223.5	-5820.9	3.0	26.1	-22.1	3.9	19.5	-15.6
Clothing	-3974.5	-266.4	-3708.1	-7973.0	212.8	-8185.8	37.5	- .2	33.6	45.9	.3	45.6
Total Manu.			-15055.3			-29007.9			363.8			407.8
Total Agr.			-12195.4			-17779.4			40.2			33.1
Total			-27250.6			-43787.4			404.0			440.9

Table D.5.--Trade Diversion Estimates for the EC(9): The Standard Normalized Approach (Millions of Dollars)

	ROW		U.S.		Japan	
Commodity	(82-83)	(83-84)	(82-83)	(83-84)	(82-83)	(83-84)
Meat	-14.4	18.6	13.5	17.1	-.4	.4
Dairy P.	51.0	101.8	- 31.3	- 11.2	- 19.8	.2
Fish	-113.8	103.4	20.8	17.4	95.4	88.3
Cereals	- 85.5	237.9	87.7	240.5	- 2.4	- 2.7
Fruit/Veg.	-140.8	156.4	121.0	136.2	12.0	12.7
Sugar	10.4	13.0	- 11.0	- 13.4	0	- .3
Tobacco	- 29.4	10.0	28.1	8.9	1.4	1.1
Leather P.	5.3	2.6	- 20.7	- 4.6	3.6	7.2
Rubber	15.4	40.9	14.6	15.2	- 28.3	- 41.5
Wood/Cork	9.5	2.3	- 20.7	- 10.3	11.3	12.6
Paper P.	-171.3	156.7	144.6	124.2	20.2	26.4
Textiles	-151.6	247.4	300.4	370.4	-148.8	-123.0
Nonmet. Min. P.	-390.7	419.3	-168.8	-144.9	- 44.2	- 38.3
Iron/Steel	-493.1	495.3	34.0	46.2	459.1	449.1
E. Mach.	192.1	306.2	-302.5	- 24.8	110.4	-57.8
Clothing	-91.5	71.3	75.8	114.2	-242.7	27.3

Source: OECD, Foreign Trade by Commodities, various issues.

Table D.6.--Trade Diversion Estimates for Greece: The Standard Normalized Approach (Millions of Dollars)

	ROW		U.S.		Japan	
Commodity	(82-83)	(83-84)	(82-83)	(83-84)	(82-83)	(83-84)
Meat	353.2	371.0	- .5	-.5	0	0
Dairy P.	17.0	17.8	.3	.3	0	0
Fish	0	-4.4	.5	2.1	5.4	6.0
Cereals	- .8	- 4.0	68.0	57.4	0	0
Fruit/Veg.	.4	- 1.7	5.8	7.4	0	0
Sugar	-.5	- .7	.1	.1	0	0
Tobacco	- 1.0	- 1.2	17.8	13.1	0	0
Leather P.	10.9	9.5	40.0	34.4	.2	.2
Rubber	1.4	1.1	.3	.5	4.5	5.0
Wood/Cork	2.1	2.9	0	.1	.1	.1
Paper P.	14.4	15.2	2.8	3.7	.4	.3
Textiles	-14.2	-14.8	19.8	21.6	-1.0	-.3
Nonmet. Min. P.	-1.6	- 3.4	1.4	1.6	-1.8	-1.8
Iron/Steel	-5.7	10.3	- .5	1.6	64.9	67.4
E. Mach.	11.2	3.0	6.4	6.8	3.6	4.7
Clothing	1.1	-.1	-1.1	.5	-.2	-.1

Source: OECD, Foreign Trade by Commodities, Various Issues.

Table D.7.--Standard Normalized Approach: Adjusted Estimates of Trade Creation (Millions of Dollars)

Commodity	EC(9)		Greece	
	TC 82/83	TC 83/84	TC 82/83	TC 83/84
Meat	168.4	1525.0	358.5	383.2
Dairy P.	-324.2	- 433.1	139.4	132.9
Fish	30.0	- 107.0	- 14.2	-121.9
Cereals	-5992.6	-7898.4	- 31.9	- 61.9
Fruit/Veg.	-5843.5	-8259.1	7.5	13.4
Sugar	83.2	- 81.8	3.4	3.3
Leather P.	- 709.3	- 445.3	200.3	180.1
Rubber	-1973.5	-1270.8	- 12.2	-130.0
Wood and Cork	133.9	80.9	- 7.0	- 4.8
Paper P.	287.5	107.5	- 45.4	- 43.6
Textiles	- 185.2	-1556.5	-106.5	132.3
Nonmet. Min. P.	- 377.4	2618.7	29.1	30.6
Iron/Steel	-3254.2	-1421.8	148.4	197.8
Elec. Mach.	-1413.8	-3239.5	- 25.1	- 7.0
Clothing	-1706.6	-5848.6	35.8	41.2

Source: OECD, Foreign Trade by Commodities, Various Issues; IMF, International Financial Statistics, Various Issues.

Table D.8.--Imports-to-Apparent-Consumption Approach: Unadjusted Estimates of Trade Creation, Trade Diversion and Net Trade Creation)($ x 10^3, 1982/83 avg.)

	EC(9)			Greece		
Commodity	TC	TD	Net TC	TC	TD	Net TC
Meat	-4757.6	.3	-4757.9	337.8	350.4	- 12.6
Butter	- 992.2	0	- 992.2	4.9	1.3	3.7
Cheese and Curds	- 40.5	2.3	- 42.8	56.4	22.4	34.0
Flour	12.1	.3	1.8	- 1.4	- .1	- 1.3
Vegetables	-80.4	-.5	- 79.9	1.9	- .9	2.8
Cocoa	989.7	.1	988.9	- 13.9	4.4	-18.1
Chocolate	- 53.2	.1	-53.3	2.8	1.4	1.4
Tobacco Manu.	NA	NA	NA	11.3	2.8	3.5
Hides and Skins	-839.2	- 2.2	- 837.1	4.1	2.5	1.5
Pulp and Paper Waste	-5710.5	- .3	-5710.1	55.4	- 2.9	58.3
Paper P.	674.0	- 4.9	67.90	40.5	9.5	- 50.0
Cotton Fab.	140.6	- 1.0	141.6	- 23.1	87.1	-110.2
Fabrics, Woven	671.4	9.3	662.1	- 20.7	.3	- 21.0
Cement	16.4	1.2	15.2	NA	NA	NA
Glassware	- 336.2	-18.8	-317.4	- 3.1	- .5	3.0
Pig Iron	- 89.9	- .4	- 89.5	- 6.5	0	-6.5
Iron/St. Bars	21.4	1.1	20.2	- 14.0	5.2	-19.2
Iron/St. Rods	12.3	- .4	12.7	- 15.3	.6	-15.9
Iron/St. Tube Pipes	-141.1	- .6	- 140.5	- 9.4	.4	- 9.8
Total Manu.			-5563.9			-169.3
Total Agr.			-4935.5			18.2
Total			-10499.4			-151.1

Source: UN, Yearbook of Industrial Statistics, Various Issues; and U.N. Commodity Trade Statistics, Various Issues.

Table D.9.--Imports-to-Apparent-Consumption Approach: Adjusted Estimates of Trade Creation, Trade Diversion and Net Trade Creation ($ x 10^3, 1982/83 avg.)

	EC(9)			Greece		
Commodity	TC	TD	Net TC	TC	TD	Net TC
Meat	- 4358.4	.3	- 4358.7	340.0	350.4	- 10.4
Butter	- 996.8	0	- 966.8	5.0	1.3	3.7
Cheese and Curds	- 12.9	2.3	- 15.1	56.5	22.4	34.1
Flour	2.4	.3	2.1	-1.2	- .1	-1.1
Vegetables	- 71.3	-.5	- 70.8	2.0	- .9	2.9
Cocoa	1041.2	.9	1040.4	0	4.4	- 4.4
Chocolate	- 48.2	.1	- 48.2	3.1	1.4	1.7
Tobacco Manu.	NA	NA	NA	11.3	2.8	8.5
Hides and Skins	- 719.4	- 2.2	- 717.2	.6	2.5	- 1.9
Pulp and Paper Waste	- 5260.8	- .3	- 5260.5	55.3	- 2.9	58.3
Paper P.	1070.9	- 4.9	1075.9	-55.0	9.5	- 64.1
Cotton Fab.	231.9	- 1.0	232.9	-22.1	87.1	- 109.2
Fabrics, Woven	929.3	9.3	920.0	12.9	.3	12.6
Cement	17.2	1.2	16.1	NA	NA	NA
Glassware	- 324.4	-18.8	- 305.6	2.6	- .5	3.1
Pig Iron	- 69.2	- .4	- 68.8	- 6.7	0	- 6.7
Iron/St. Bars	73.5	1.1	72.4	-17.1	5.2	-22.3
Iron/St. Rods	28.9	- .4	29.3	-16.5	.6	-17.0
Iron/St. Tube Pipes	- 94.7	- .6	- 94.0	-11.4	.4	-11.8
Total Manu.			-4100.0			- 159.0
Total Agr.			4417.2			34.9
Total			-8517.24			-124.1

Source: UN, Yearbook of Industrial Statistics, Various Issues; and U.N. Commodity Trade Statistics, Various Issues.

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