Tariffication of European Community Corn Imports

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Problem

In July 1989, U.S. negotiators presented a tariffication proposal at the General Agreement on Tariffs and Trade (GATT) meeting in Geneva. According to that proposal, all agricultural nontariff barriers (NTBs) such as quotas and variable import levies would be converted to equivalent ad valorem tariffs. The following formula, known as the price gap method, was proposed for converting the NTBs to tariffs:

$$TE = [(P_D - P_W)/P_W] \cdot 100,$$

where TE is the tariff equivalent, P_D is domestic price, and P_W is world price.

If an agreement on tariffication is reached, the next step will be to develop a schedule for a phased reduction of tariffs. The purpose of tariffication and phased reduction is to eliminate market access barriers and thus provide treatment of imports no less favorable than that accorded to domestic commodities and products. Advantages of tariffication are that (1) tariffs establish a direct link between domestic and world market prices and allow for the direct transmission of world market signals, (2) tariffs are transparent and thus help exporters to assess their impacts, and (3) fewer administrative costs are required to implement tariff policies. This analysis computed the tariff equivalent for the European Community (EC) variable levy for corn imports and evaluated the dynamic impacts of a phased reduction of tariff equivalents on U.S. corn exports, trade share, EC corn imports, and world trade and price.

Method

The Center for Agricultural and Rural Development (CARD) feed-grain model was used for the analysis. The model contains 21 country/regional submodels, and each submodel contains a detailed specification of the feed-grain market, including domestic and trade policies. The base period used

for computing the tariff equivalent was 1987/88 through 1988/89, and the tariff equivalent was phased out over a ten-year period from 1991/92 to 2000/01. For the out-years, CARD's Food and Agricultural Policy Research Institute 1989 ten-year outlook was utilized as a baseline. The modified Swiss formula was used for the phased reduction of the tariff equivalent.

The tariff equivalent of a variable levy is often calculated by comparing the levy to the average world price for the reference period (variable levy method). The U.S. proposal recommends the price gap method. The variable levy method would generally yield a higher tariff equivalent than would the price gap method because the threshold price is significantly higher than the domestic market price for most commodities. Because corn is an imported commodity for the European Community, the domestic market price is generally linked to the threshold price. Furthermore, data on EC domestic corn price are not available. For these reasons, the variable levy method was used in calculating the tariff equivalent of the EC corn variable levy.

Results

The average tariff equivalent of the variable levy for corn imports computed by using the variable levy method over the base period was 141.5 percent. The EC corn threshold price after tariffication declined by only 12 ECUs (5.6 percent) per metric ton (mt) in 1991/92 relative to the baseline projection. However, the threshold price declined by 58 ECUs (26.9 percent) in 1995/96, relative to the baseline. The increase in EC corn imports ranges from 0.7 million mt in 1991/92 to 3.3 million mt in 1995/96. Because of the higher import demand by the European Community, U.S. corn exports increased by 0.6 million mt from 1991/92 to 2.4 million mt in 1995/96. The corresponding U.S. Gulf port price of corn increased by $4.30 per mt by 1995/96. Evaluating tariffication for a single commodity provides insight on the practical problems of implementation and estimates of orders of magnitude of impacts, relative to the baseline. This paper emphasizes that the baseline and the variable levy reference period are critical to assessing tariffication impacts and results for phased reduction.

TARIFFICATION OF EUROPEAN COMMUNITY CORN IMPORTS

Agricultural trade restrictions have received wide attention in the current Uruguay Round of the General Agreement on Tariffs and Trade (GATT). Member countries were asked to submit proposals that would establish rules for substantial progressive reductions in agricultural trade barriers. Toward this goal, the United States proposed an approach called tariffication—conversion of nontariff barriers (NTBs) to tariffs—in its submission for the November 9, 1988, GATT meetings (USTR 1988). U.S. negotiators presented a paper further elaborating on the tariffication concept at the July 1989 GATT meetings in Geneva (USTR 1989a).[1]

The U.S. tariffication proposal consists of two steps: converting all agricultural nontariff import barriers such as quotas, variable import levies, and voluntary export restraints to equivalent tariffs and developing a schedule of phased reduction of the tariff equivalent over a specified period of time (USTR 1989a). The general objective of the tariffication proposal is to phase out all market access barriers and thus provide treatment for imports that is no less favorable than the treatment accorded to domestic commodities and products.

Advantages attributed to tariffication are that (1) tariffs establish a direct link between domestic and world market prices and allow for the transmission of world market signals, (2) tariffs are transparent and thus help exporters to easily assess their impacts, and (3) fewer administrative costs are required for implementation. Furthermore, converting NTBs to tariffs would bring agriculture more fully under GATT rules and disciplines. Most of the Cairns Group countries plus Japan were initially supportive of the tariffication proposal.

The formula proposed by the United States for converting NTBs to an equivalent ad valorem tariff is

$$TE = [(P_D - P_W)/P_W] \cdot 100, \quad (1)$$

where TE is the tariff equivalent, P_D is domestic price, and P_W is world price (USTR 1989a). This computation of the tariff equivalent is termed the *price gap method.* The purpose of this study is to compute the tariff equivalent for the European Community (EC) variable levy for corn imports and analyze the dynamic impacts of a phased reduction of the tariff equivalents on U.S. corn exports, trade shares, EC corn imports, world trade, and price. The knowledge gained by studying the tariffication of a single commodity may be useful in analyzing tariffication in a multimarket framework and providing information on orders of magnitude for associated impacts.

EC Cereal Support Mechanism

The policies implemented within the Common Agricultural Policy (CAP) to provide price supports are based on regulating markets by using selected policy instruments to maintain grain prices to producers at predetermined levels. These prices generally have been greater than world market prices. The market supplies are controlled through government intervention arrangements, import restrictions, and aggressive export policies. The EC cereal support mechanism is illustrated in Figure 1. The policy instruments in operation are the target price, threshold price, intervention price, and variable levy.

The target price is the price considered to be politically acceptable in the area with the greatest grain deficit (Duisburg, Germany). The intervention price is equal to the target price minus the transportation cost from the largest grain-surplus area (Ormes, France) to Duisburg and a "market element" to the intervention price. The intervention price is the price at which government agencies buy commodities for storage and thus is a supported price level. The threshold price represents the lowest price at which imported grain can enter the European Community without depressing prices

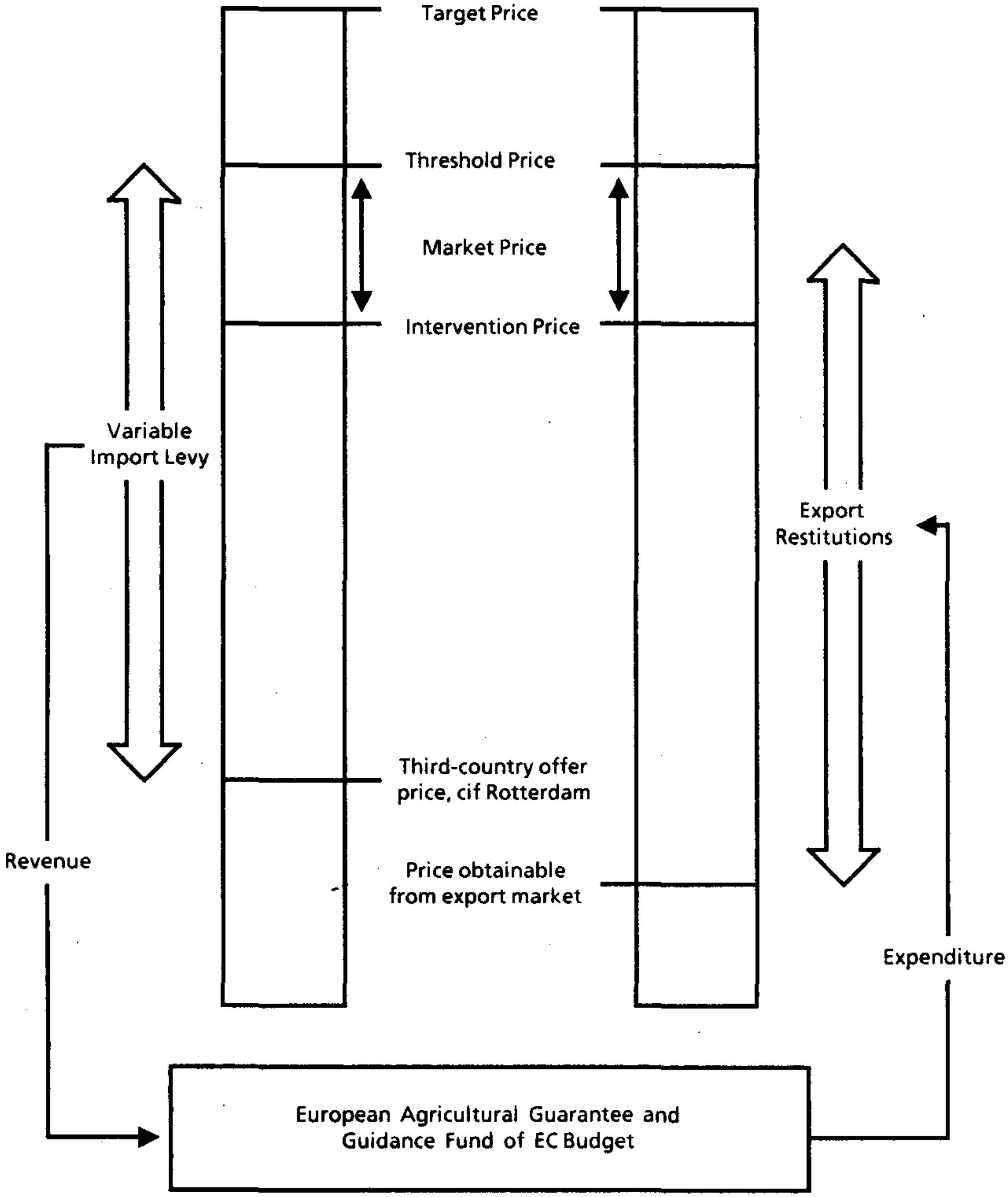

Figure 1. Schematic representation of EC grain policies

SOURCES: Adapted from Miller (1987) and Burtin (1987) below the target price level. The threshold price is equal to the target price minus the transportation and marketing costs from Rotterdam to Duisburg.

The variable levy for corn imports is equal to the threshold price minus the import price. The variable levy paid by importers is a source of revenue for the EC budget, or the European Agricultural Guarantee and Guidance Fund (EAGGF). Export restitutions are export subsidies paid to grain exporters, bridging the gap between internal market price and world market price and making EC exports competitive on the world export market. Thus, the export payments are a drain on the EAGGF. Further details on EC grain policies can be found in Burtin (1987), Miller (1987), and Organization for Economic Cooperation and Development (1987).

Methods

The U.S. proposal suggests that the domestic market price (i.e., the price gap method) be used in computing the tariff equivalent and thus the EC variable import levy (USTR 1989a). However, the tariff equivalent of the variable levy is often computed as the percentage of the variable levy over the world price (variable levy method). That is,

$$TE_V = [(P_T - P_W)/P_W] \cdot 100, \tag{2}$$

where TE_V is the computed tariff equivalent using the variable levy method and P_T is the threshold price. The European Community, if it agrees to the tariffication proposal, will likely prefer the variable levy method. This method would generally produce a higher tariff equivalent and thus a greater level of protection for domestic producers than would the price gap method because the threshold price is significantly higher than the domestic market price for most major commodities in the European Community. Because corn is an imported commodity, the domestic market price will generally be linked to the threshold price. In our judgment, the price gap method of computing the tariff equivalent is not likely to be negotiated for the EC corn market. For this reason, the variable levy method is used in developing tariffication estimates of the EC corn market.

Another issue for developing a method for analyzing the tariffication of EC corn imports is how the EC intervention price for corn should be modeled. For this study, the corn intervention price has to be lowered because implementing the tariff reduction would cause the threshold price to fall below the intervention price. If the intervention price were not kept below the threshold price, imported corn could be placed in intervention stocks. Although the EC intervention program has not been the significant price-determining instrument for corn in most years, if threshold prices were reduced to intervention levels virtually all domestic corn producers would utilize the intervention program to the maximum potential. Access to the intervention program is now relatively restricted. Thus, the EC producer price for nonintervention sales is determined by the import price. In short, an assumption of a change in the intervention price is necessary to complete the tariffication analysis.

One of the policy issues in the tariffication analysis is the reference, or base, period. Because the magnitude of the tariff equivalent can vary widely from year to year depending on the world price and the threshold price, the choice of reference period is important. The U.S. proposal (USTR 1989a, 4) indicates that "using 1986 . . . as a base period would lead to significant distortions, since world prices for most commodities have risen significantly in the past three years. Conversions made on the basis of 1986 prices would result in an immediate, significant jump in import protection in many cases and could seriously disrupt world trade. Using the most recent year that is not distorted by drought or other exceptional circumstances and for which data are available would provide a more accurate approximation of the current levels of protection." In this analysis, 1987 and 1988 were used for the reference period.

The next step in tariffication is developing a schedule for phased reduction. A number of adjustment mechanisms can be considered for the phased reduction of the tariff equivalent: (1) the radial formula, (2) the constant reduction formula, (3) the benchmark formula, (4) the Swiss formula, and (5) the modified Swiss formula. A brief review of each formula is provided for perspective on the formula applied in this analysis.

Radial Formula

The radial formula is

$$TE_{t+1} = a \cdot TE_t \qquad a < 1, \tag{3}$$

where a is the adjustment coefficient. Applying this formula leads to a uniform percentage reduction in tariffs. Although this method is simple, easy to administer, and easy to incorporate from a modeling viewpoint, it may not appeal to trade negotiators interested in reducing distortions because the formula does not allow for a temporal path in tariff reductions. That is, the mechanism for progressive tariff reduction over a specific period is not built into the formula.

Constant Reduction Formula

The constant reduction formula is

$$TE_{t+1} = TE_t - TE_0 \cdot 1/X, \tag{4}$$

where TE_0 is the initial tariff equivalent and X is the number of years over which the tariff is reduced to zero. Thus, the constant reduction formula reduces the tariff equivalent by 1/X of the *initial* tariff equivalent level in each year. Although this concept is most intuitive and reasonable from a modeling viewpoint, it results in small percentage decreases in the early years and would not appeal to those who want larger early cuts.

Benchmark Formula

The benchmark formula is

$$TE_{t+1} = b + 1/N\,(TE_t - b) \quad \text{for } TE_t > b$$
$$= b \qquad\qquad \text{for } TE_t \leq b, \tag{5}$$

where b is the benchmark level of the ad valorem tariff and N is the number of reductions before TE_t reaches b. This formula progressively reduces the tariff levels that are greater than the benchmark and does not affect the tariff levels that are less than the benchmark or require additional mechanisms to reduce the tariffs that are less than the benchmark level. This formula therefore achieves reductions in disparities but is not universal; that is, it does not reduce tariffs at all levels. Furthermore, the tariff level chosen as a benchmark has special significance as the medium-term target level for tariffs.

Swiss Formula

The Swiss formula is defined as

$$TE_{t+1} = c \cdot TE_t/(c + TE_t), \tag{6}$$

where c is the negotiated adjustment coefficient. This formula is both progressive and universal and was used by most developed GATT member countries during the Tokyo Round (Tangermann, Josling, and Pearson 1987). The mechanism of this formula allows that, for practical levels of the adjustment coefficient, the brunt of the adjustment takes place in the early years. Furthermore, this formula does not allow for full reduction of the tariff equivalents; that is, the tariff equivalent does not reach zero at the end of the adjustment period.

Modified Swiss Formula

The modified Swiss formula is

$$TE_{t+1} = (R/T) \cdot c \cdot TE_t/[(R/T) \cdot c + TE_t], \tag{7}$$

where c is the negotiated adjustment coefficient, T is the negotiated length of the adjustment period, and R is the number of years remaining in the negotiated adjustment period. The advantage of this formula over the Swiss formula is that it allows for total elimination of the tariff at the end of the adjustment period. Furthermore, the modified Swiss formula admits a wide range of adjustment paths. Wahl, Hayes, and Williams (1987, 1991) use this formula in analyzing the trade liberalization of the Japanese beef market.

Five tariff adjustment paths computed by using the formulas in equations (3) through (7) are shown in Figure 2.[2] When using the variable levy method, the tariff equivalent for the reference period is phased out for the alternate adjustment formula over a ten-year period starting in 1991. The year 1991 is selected as the beginning year of the phased reduction because the current GATT negotiations are scheduled to end in 1990 and implementation of resulting agreements will likely occur in 1991. Figure 2 shows that the Swiss and modified Swiss formulas make larger initial cuts in tariffs, but relatively smaller cuts toward the end of the period.

The modified Swiss formula is used to analyze a reduced tariff for EC corn. The appropriate value of the adjustment coefficient c is crucial because it determines the adjustment path of the phased reduction. To illustrate the importance of this coefficient, adjustment paths computed for various values of c are shown in Figure 3. For values of c equal to 200, the initial annual reductions in the tariff are significantly larger than those for values of c ranging from 350 to 1,200. At the end of the period, the tariff levels remain relatively higher for larger values of c. A constant of 350 was chosen for the adjustment coefficient used in this analysis.

Analysis of Tariffication of EC Corn Imports

The framework for analyzing the tariffication of EC corn imports is illustrated in Figure 4, which depicts corn supply and demand for the EC, the rest of the world (ROW), and world trade. The intervention price is at P_I, at which point the domestic supply is Q_S. The threshold price is at

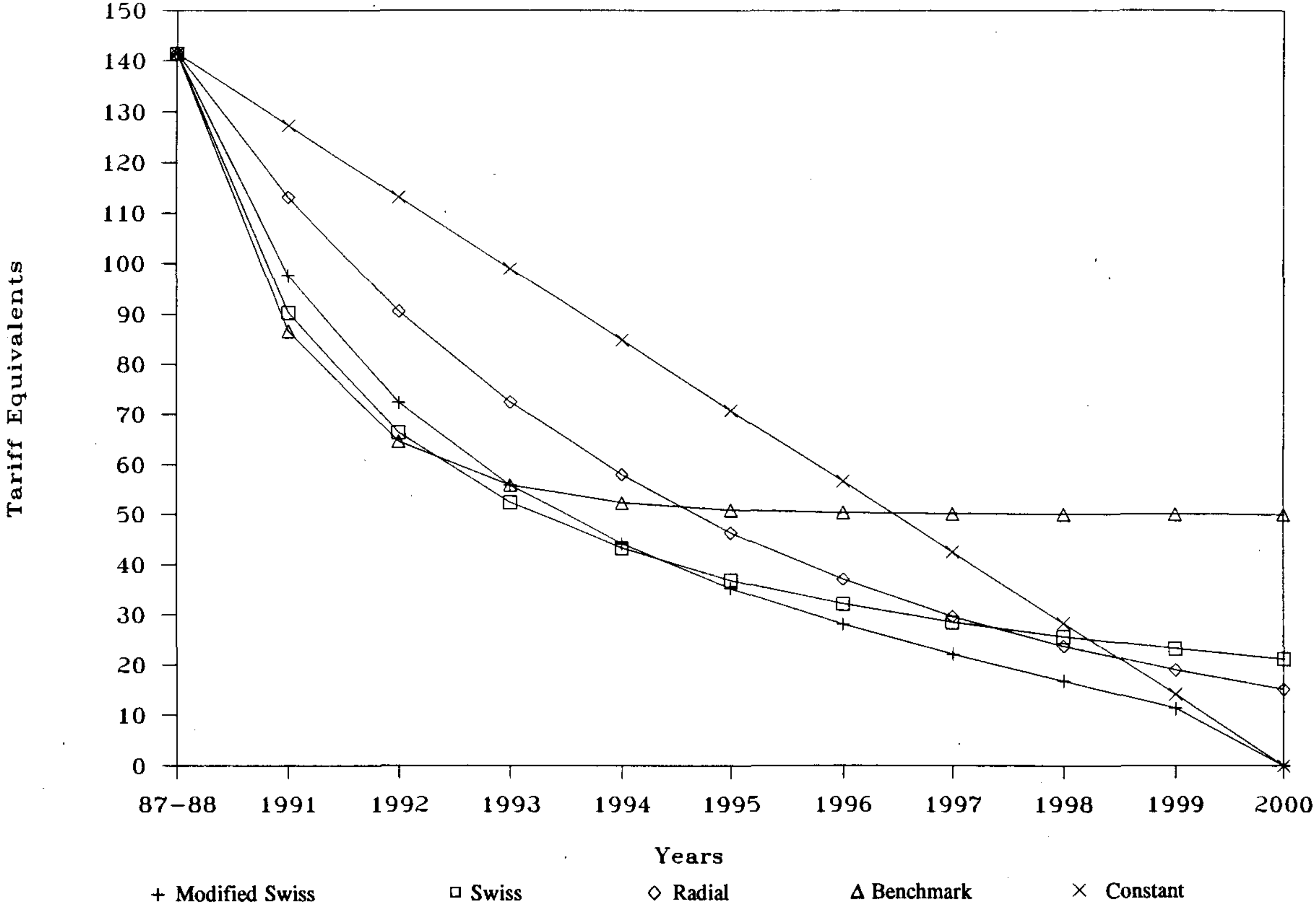

Figure 2. Estimated adjustment paths of tariff equivalents for selected formulas using the variable levy method

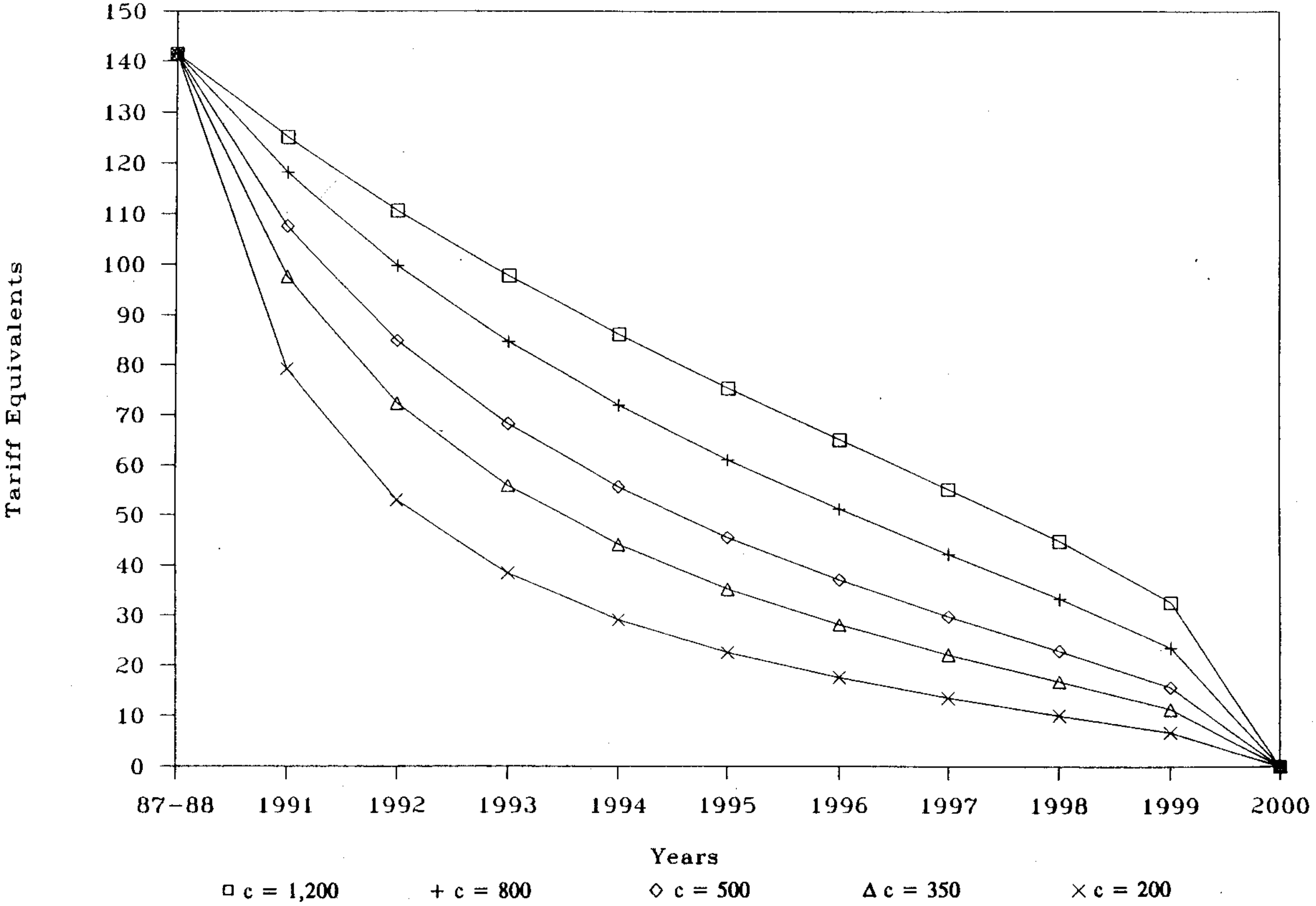

Figure 3. Modified Swiss formula: alternative adjustment paths computed by using the variable levy method

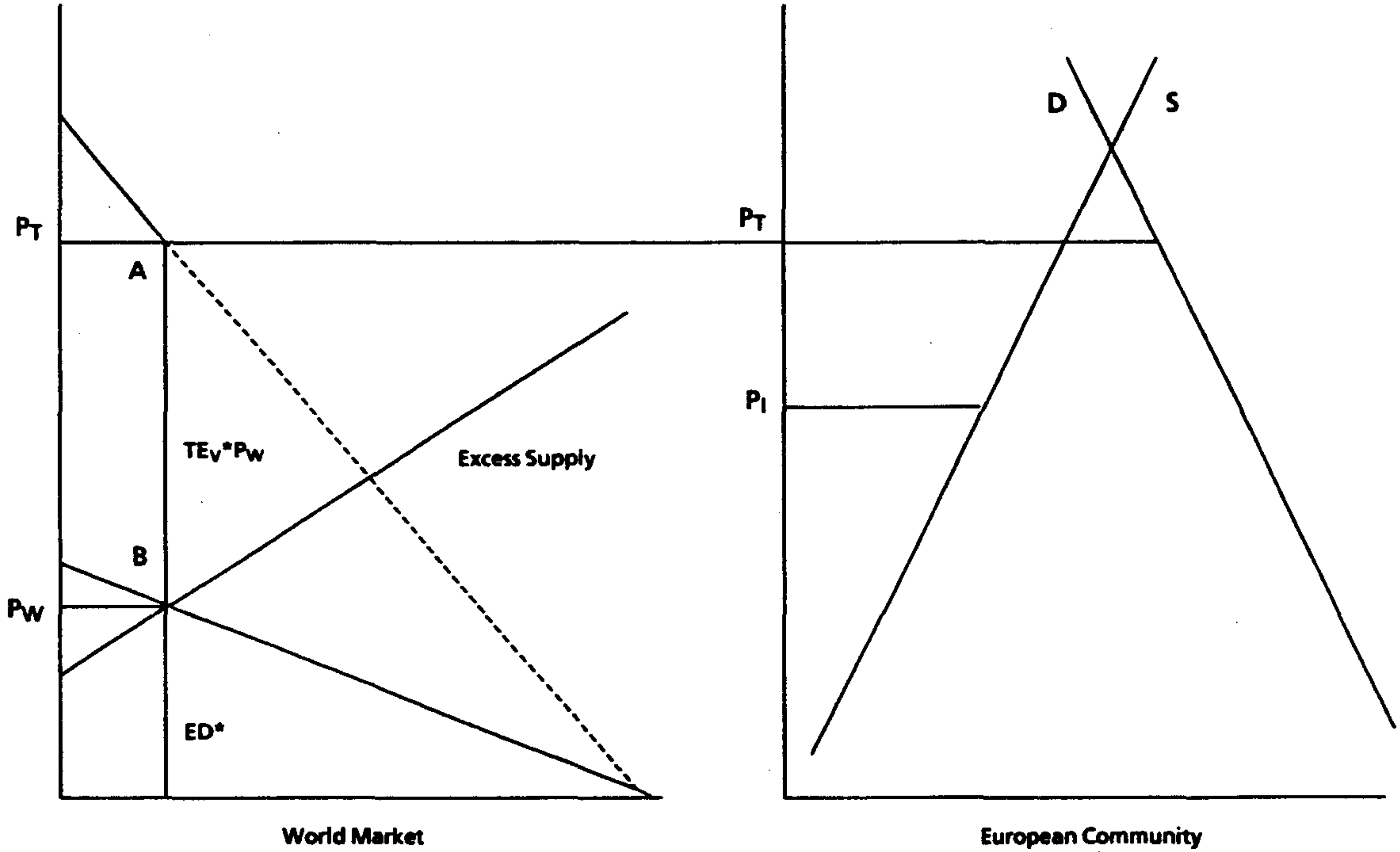

Figure 4. Tariffication of EC corn imports

P_T. With the threshold price in operation, the EC adjusted excess demand curve is ED^* and the world price is P_W. The variable levy corresponding to P_T and P_W is AB (equal to $P_T - P_W$). The tariff equivalent (TE_v) of this variable levy is

$$TE_v = (P_T - P_W)/P_W.$$

Thus, the variable levy AB is equal to $TE_v \cdot PW$.

Table 1 presents the 1987 and 1988 tariff equivalents computed by using the variable levy [equation (2)]. The Rotterdam price was used as the world price because it is indicative of the border or landed price of imports. The average tariff equivalent over the reference period was 141.5 percent.

In the empirical analysis, this tariff equivalent is phased out over a ten-year period starting in 1991. The adjustment path of phased reduction is determined by using the modified Swiss formula. During the phased reduction period, the threshold price is linked to the world price to allow for the transmission of world market signals into the EC market. As discussed in the previous section, the intervention price is also lowered in the analysis. Specifically, the intervention price is set relative to the threshold price by a constant margin of 36 ECUs per metric ton (mt) to reflect the transportation and marketing costs.

The World Feed-Grain Trade Model

The feed-grain trade model used for this analysis is a nonspatial, partial equilibrium model: nonspatial because it does not identify trade flows between specific regions, and partial equilibrium because only feed grains are modeled (Helmar, Devadoss, and Meyers 1991). The model is dynamic and determines trade equilibrium through price adjustments to clear excess supply and demand. The model contains 21 country/regional submodels. Feed-grain exporters in the model include the United States, Canada, the European Community, Argentina, Australia, Thailand, China, and South Africa.

Table 1. Tariff equivalents for EC corn imports

Year[a]	Rotterdam Price (ECUs)	Threshold Price (ECUs)	Tariff Equivalent (Percent)
1987/88	85.14	248.11	192
1988/89	117.30	223.38	91

[a]July/June marketing year.

Importers include the USSR, Japan, Eastern Europe, Brazil, Mexico, Egypt, Saudi Arabia, Other Latin America, Other Africa and Middle East, High-Income East Asia, Other Asia, and the rest of the world.

The basic elements of a nonspatial equilibrium supply and demand model are illustrated in Figure 5. The U.S. export supply curve (ESUS) is the difference between domestic supply (SUS) and domestic demand (DUS), which represents the quantity supplied in the world market at various price levels. Other exporters' supply and demand schedules are given in the lower panel of Figure 5. The curve ESO is the combined excess supply of all competing exporters, which is derived as the difference between the supply and the demand of all exporters. The import demand schedule (EDT) of all importers is total demand minus total supply. Other competitors' export supply and importers' import demand are represented in the top panel, third diagram from the left. The export demand schedule (EDN) facing the United States is the difference between the import demand of all importers and the export supply of competitors.

The kinked and less elastic nature of the EDN is attributable to restrictive trade policies pursued by selected foreign countries that insulate domestic prices from world price variability. A trade

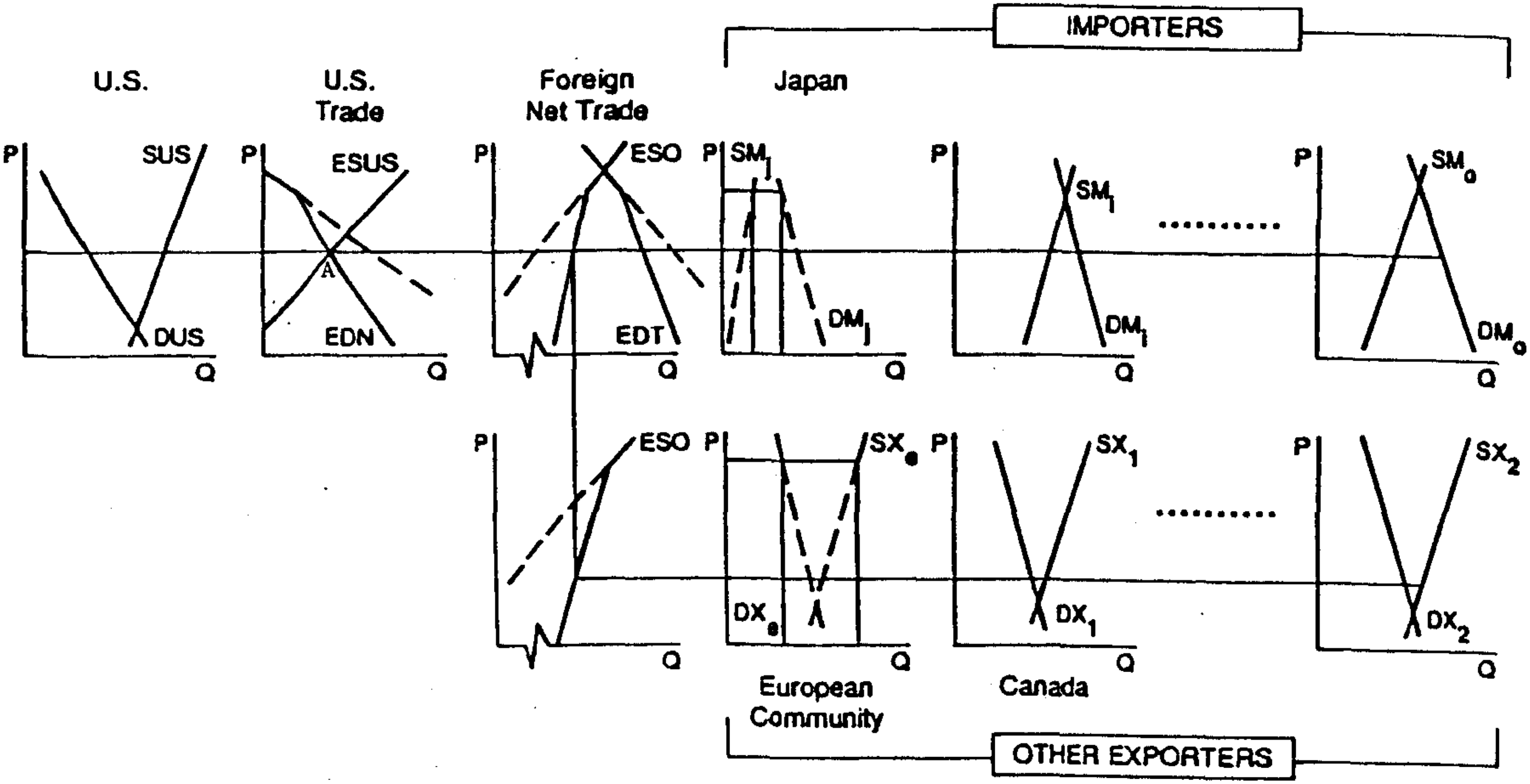

Figure 5. Determination of equilibrium prices and quantities in the feed-grains trade model

equilibrium is implemented by the clearing of excess demands and supplies generated within each region. The algebraic forms for the key components of the model follow.

Consider importers ($i = 1, \ldots, m$) with the following disaggregation of domestic supply and demand:

$FOD_i(PD_i, X_{1i})$ = domestic food demand,

$FED_i(PD_i, X_{2i})$ = domestic feed demand,

$SD_i(PD_i, X_{3i})$ = domestic stock demand, and

$S_i(PS_i, X_{4i})$ = domestic supply.

The excess demand function (EDT), the sum of domestic demand minus domestic supply of all importers ($i = 1, 2, \ldots, m$), can be written

$$EDT = \sum_{i}^{m} [FOD_i(PD_i, X_{1i}) + FED_i(PD_i, X_{2i}) + SD_i(PD_i, X_{3i}) - S_i(PS_i, X_{4i})], \qquad (8)$$

where X_{ki} is a vector of demand shifters ($k = 1, 2, 3$), X_{4i} is a vector of supply shifters, PD_i is domestic market price, $PS_i = PD_i + DC_i$ is equal to supply price, and DC_i is the difference between supply price and domestic market price.

The domestic market price, PD_i, is linked to world price by

$$PD_i = G_i(P_W \cdot e_i, Z_i), \qquad (9)$$

where P_W is the world price, e_i is the exchange rate, and Z_i is a vector of policy variables that influence the price transmission.

The excess supply (ESO), the sum of domestic supply minus domestic demand of other exporters ($j = 1, \ldots, n$) excluding the United States, is

$$ESO = \sum_{j}^{n} \{S_j(PS_j, X_{4j}) - [FOD_j(PD_j, X_{1j}) + FED_j(PD_j, X_{2j}) + SD_j(PD_j, X_{3j}]\}. \quad (10)$$

The price linkage equation of the exporting countries is

$$PD_j = G_j(P_W \cdot e_j, Z_j). \quad (11)$$

The variable definitions are as stated, except that subscript j refers to the exporting countries. The excess demand function (EDN) facing the United States is

$$EDN = EDT - ESO$$

$$= \sum_{i}^{m} (FOD_i + FED_i + SD_i - S_i) - \sum_{j}^{n} (S_j - FOD_j - FED_j - SD_j). \quad (12)$$

The export supply function (ESUS) originating from the United States is

$$ESUS = S_u(P_u, X_{4u}) - [FOD_u(P_u, X_{1u}) + FED_u(P_u, X_{2u}) + SD_u(P_u, X_{3u})]. \quad (13)$$

For equation (13), the variable definitions are as stated except that subscript u refers to the United States.

The world market equilibrium is given by the identity

$$ESUS = EDN, \quad (14)$$

which corresponds to point A in Figure 5.

The U.S. domestic market price is linked to the world price by

$$P_W = G_u(P_u, Z_u). \quad (15)$$

Supply is determined as yield times acreage harvested and is endogenously estimated. One of the salient features of the model is the inclusion of government programs in the estimated acreage functions. Particularly in the United States, program participation rate is endogenously estimated as a function of expected net returns. Area planted under programs is determined from participation rate, base acres, and the acreage reduction rate. Nonprogram planted acreage is endogenously estimated. Total planted area is the sum of program and nonprogram planted area. Food demand is specified to include own price, prices of competing goods, and income.

Because feed is used as an input in livestock production, feed demand is estimated as a function of own price, prices of competing feed products, and livestock product prices. Stock demand is endogenized in the model by using speculative and transaction motives of inventory demand theory. Current price, expected production for the next crop year, and government stocks are used to capture the speculative motive. Current production is used to reflect the transaction motive.

Equilibrium prices, quantities, and net trade are determined by equating excess demand and supplies across regions [equation (14)] and explicitly linking domestic market prices in each region to the world price [equations (9) and (11)]. Except where they are set by government, domestic prices are linked to world prices reflecting price linkage equations, including bilateral exchange rates and transfer service margins. Inclusion of price linkage equations allows endogenizing the stabilizing and insulating behaviors of governments. Where some degree of insulation of domestic prices from external market conditions exists, the free adjustment of trade flows is restricted by limiting the quantity traded at the given level of domestic prices. Thus, the price linkage equation defines the degree of price transmission of external market conditions into the country. Trade occurs whether or not price transmission is introduced. The quantity traded adjusts only to domestic conditions if there is no price transmission.

The model is estimated over the sample period 1965-86 (or shorter intervals where data were unavailable at the time of estimation) by using annual data (Helmar, Devadoss, and Meyers 1991). The supply, use, and price data for the U.S. component of the model came from various issues of the U.S. Department of Agriculture's *Agricultural Statistics*. Policy variables such as target prices and loan rates were collected from fact sheets of the Agricultural Stabilization and Cooperative Service (ASCS). Supply and use data for foreign countries were obtained from the Foreign Agricultural Service (FAS) of the U.S. Department of Agriculture. Prices are from the Food and Agricultural Organization (FAO) of the United Nations, *Grain Trade of Canada*, and *EC Grains, Oil Seeds, and Livestock: Selected Statistics*. Macroeconomic data for all countries are from the *International Financial Statistics* (IFS) of the International Monetary Fund.

The functional forms of the behavioral equations in the model have linear parameters. All supply and demand equations are estimated in quantity-dependent form by using real prices and incomes. The estimation procedure used is ordinary least squares (OLS). The OLS estimation technique is used for simplicity and because, with the large number of exogenous variables and limited number of observations, simultaneous estimation poses degrees-of-freedom problems.[3] Also, in many countries, prices are set by government policies. Only in a few countries are prices determined simultaneously by supply and demand. As a result, the gain that could be achieved by simultaneous estimation is likely offset by potential misspecification biases. Serial correlation in the error structure is corrected by using the Cochrane-Orcutt procedure.

In general, the statistical fit of the model was good, and the estimated coefficients in the behavioral equations conform to the a priori expectations.[4] The empirical model adequately reflects the structure of the world feed-grain market. Furthermore, because the model is frequently used for forecasting and policy analysis, rigorous validation tests have been conducted on the overall ability the model to replicate the observed values of the endogenous variables. In the validation runs, the structural form of the model is dynamically simulated over the sample period.

Empirical Results

The EC tariff equivalent of 141.5 percent for the base period 1987/88-1988/89 was reduced over a period of ten years (1991/92-2000/01) by using the modified Swiss formula. The year 1991/92 is considered as the initial year for the phased reduction. The chosen adjustment path (with the coefficient value of 350 in Figure 3) implies significant reductions in the tariff equivalent in the first few years. The tariff equivalent is reduced by 43.86 percent (from 141.5 percent to 97.6 percent) in the first year and by 25.2 percent (from 97.6 percent to 72.4 percent) in the second year. The reduction in the tariff equivalent in the final year (1995/96) is proportionately lower at 11.38 percent. Once the adjustment path for tariff reduction is chosen, the threshold price is linked to the world price through the ad valorem tariff.

The impacts of the tariffication analysis are shown in Table 2. Although the tariff equivalent is phased in over a period of ten years, the results reported are only for the first five years, from 1991/92 through 1995/96, because the baseline simulation used for the reference was carried out to only 1995/96. The EC corn threshold price after tariffication declines by only 12.12 ECUs per mt in 1991/92. This relatively small change in the threshold price is a result of the baseline scenario containing a small variable levy relative to the 1987/88 period used in calculating the 141.5 percent tariff equivalent.

These results underscore the importance of achieving agreement on a reference period with a relatively small tariff equivalent. The longer term effects of the tariff reduction are significant, however. In 1995/96, the threshold price declines by 41 percent, or 58.04 ECUs per mt. The lower threshold price leads to an increase in EC domestic use of corn. The increase in domestic use ranges

Table 2. Impacts of tariffying the EC corn market

	Year				
	1991/92	1992/93	1993/94	1994/95	1995/96
European Community					
Corn Production (Base, 1,000 mt)	26,104	26,355	26,582	26,804	27,018
Impact (1,000 mt)	-110	-304	-565	-891	-1,222
Percent change	-0.42	-1.15	-2.13	-3.33	-4.52
Corn Domestic Use (Base, 1,000 mt)	29,217	29,739	30,050	30,348	30,665
Impact (1,000 mt)	490	910	1,368	1,797	2,037
Percent change	1.68	3.06	4.55	5.92	6.64
Corn Imports (Base, 1,000 mt)	3,171	3,438	3,518	3,592	3,695
Impact (1,000 mt)	664	1,265	1,980	2,735	3,273
Percent change	20.94	36.79	56.28	76.14	88.58
Threshold Price (Base, ECUs/mt)	215.42	215.42	215.42	215.42	215.42
Impact (ECUs/mt)	-12.12	-23.90	-36.21	-49.77	-58.04
Percent change	-5.62	-11.09	-16.81	-23.10	-26.94
Intervention Price (Base, ECUs/mt)	167.32	155.54	143.23	129.67	121.40
Impact (ECUs/mt)	-12.12	-23.90	-36.21	-49.77	-58.04
Percent change	-6.75	-13.32	-20.18	-27.74	-32.34
Rotterdam Price (Base, ECUs/mt)	101.92	108.68	112.06	110.61	111.57
Impact (ECUs/mt)	0.96	2.41	2.89	4.34	4.83
Percent change	0.94	2.22	2.58	3.92	4.33
United States					
Corn Production (Base, 1,000 mt)	203,911	200,736	206,096	212,572	214,325
Impact (1,000 mt)	0.00	406	813	914	1,499
Percent change	0.00	0.20	0.39	0.43	0.70
Corn Domestic Use (Base, 1,000 mt)	150,724	150,444	150,673	150,952	150,723
Impact (1,000 mt)	-229	-559	-635	-940	-1,016
Percent change	-0.15	-0.37	-0.42	-0.62	-0.67
Corn Exports (Base, 1,000 mt)	51,587	53,645	56,972	60,401	64,186
Impact (1,000 mt)	559	965	1,524	2,032	2,388
Percent change	1.08	1.80	2.68	3.36	3.72
Farm Price (Base, $/bu.)	1.99	2.13	2.20	2.17	2.19
Impact ($/bu.)	0.02	0.05	0.06	0.09	0.10
Percent change	1.01	2.35	2.73	4.15	4.57
Gulf Port price (Base, $/mt)	91.01	97.00	100.00	98.72	99.57
Impact ($/mt)	0.85	2.15	2.57	3.85	4.29
Percent change	0.94	2.22	2.57	3.90	4.31

from a short-run impact of 1.7 percent in 1991/92 (0.49 million mt) to a medium-term impact of 6.6 percent in 1995/96 (2.04 million mt).

Because the intervention price is set at less than the threshold price by a constant margin of 36 ECUs per mt, the magnitudes of decline in the intervention price are the same as those in the threshold price. The lower intervention price causes production to fall. The production decline ranges from a short-run impact of 0.5 percent in 1991/92 (0.11 million mt) to 4.5 percent in 1995/96 (1.22 million mt). Because of lower supply and higher domestic use, EC corn imports increase by 21 percent in 1991/92 (0.66 million mt) and by 88.6 percent in 1995/96 (3.3 million mt). The higher corn import demand increases world demand and causes world prices to rise. The increase in the Rotterdam corn price ranges from 1 percent in 1991/92 to 4.3 percent in 1995/96; that is, from 0.96 ECUs per mt in 1991/92 to 4.83 ECUs per mt in 1995/96. The U.S. Gulf port price shows almost identical percentage increases.

The short-run increase in U.S. exports is 1 percent in 1991/92 (0.56 million mt), and the medium-term increase is 3.7 percent in 1995/96 (2.39 million mt). Because of the increase in exports, the U.S. farm price rises by 4.6 percent by the end of the five-year period. U.S. corn production and domestic use show smaller changes in response to price changes. The impacts on competing exporters and other importers are small.

Conclusions and Implications

The chief result of the analysis is that the EC corn threshold price decreases, which leads to higher domestic use in the European Community. The EC support price is also lowered in this study to keep it less than the threshold price. The lower EC support price causes corn production to decline. Because of the increase in domestic use and decline in production, EC corn imports rise 88.6 percent by 1995/96. In response to higher corn import demand by the European Community, the United States increases its corn exports. U.S. exports rise 3.7 percent by 1995/96. The world price of corn increases by 4.3 percent ($4.29/mt) by 1995/96.

An important caveat for the results is based on the partial equilibrium structure (i.e., single-commodity specification): interactions with the other grain and livestock sectors are not included. It is conceivable that the reduction in corn prices in the European Community would lead to reduced support and market prices for livestock and reduced feed demand. The opposite would be the case in the United States and other countries facing world market price fluctuations. Also, the current U.S. proposal deals not only with trade policies related to import access, but also with reforms related to export competition and domestic polices that distort trade.

As is evident from this analysis, in most cases tariffication analyses would require changes in both domestic and export policies. A comprehensive analysis of all policy changes is required to evaluate the U.S. proposal. Still, the analysis of tariffication, even for a single commodity, provides insights into the practical problems of administration and orders of magnitudes on associated impacts.

ENDNOTES

1. The tariffication proposals were further elaborated in the U.S. submission of a comprehensive long-term agricultural reform proposal, which explains the tariff-rate quota system of phased reduction on nontariff barriers (USTR 1989b). In this study, only straight tariffication is analyzed. Research analyzing the tariff-rate quota system is underway.

2. The computation of the tariff equivalent for the reference period is shown in Table 1 as the average of the 1987 and 1988 tariff equivalents.

3. The principal component technique is frequently used to circumvent the degrees-of-freedom problem. Because the number of exogenous variables is too large in the wheat trade model, the principal component technique was not used to estimate the model.

4. Space limitations do not allow reporting complete details of the feed-grain trade model. Readers interested in the modeling approach, structural coefficients, estimated equations, and model validation may refer to Helmar, Devadoss, and Meyers (1991).

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