Volume Title: Issues in US-EC Trade Relations

Volume Author/Editor: Robert E. Baldwin, Carl B. Hamilton and Andre Sapir, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-03608-1

Volume URL: http://www.nber.org/books/bald88-1

Publication Date: 1988

Chapter Title: EC-US Agricultural Trade Confrontation

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Chapter URL: http://www.nber.org/chapters/c5957

Chapter pages in book: (p. 101 - 132)

4 EC-US Agricultural Trade Confrontation

Alexander H. Sarris

4.1 Introduction

As the process leading to a new round of international trade negotiations in the framework of the General Agreement on Tariffs and Trade (GATT) begins, it is clear that agricultural trade will be one of the most crucial areas of negotiation and confrontation. The most prominent participants in this area are the United States and the countries of the European Community (EC). Much of the success of the new round will depend on how these two entities resolve their agricultural trade relations and, in particular, their problems vis-à-vis grain trade.

While much has been written about the impact of EC domestic and international agricultural policies on international trade, not nearly as much has been written about possible U.S. responses and the interactions between U.S. and EC policies. The purpose of this paper is to examine the agricultural trade rivalry between the United States and the EC mainly from a conceptual viewpoint. The objective is to uncover viable U.S. policy responses to EC agricultural policies and to discuss whether EC policies are always detrimental to the U.S., as is commonly believed. Empirical estimates will be used to illuminate the arguments.

Every government in the world interferes in its agricultural sector. It seems that this is a necessity arising out of different political and economic objectives and realities at different stages of each country's development. Thus in the early stages of development, governments tend to tax the agricultural sector because it offers the largest (if not the only) opportunity for generating savings for growth. At later stages of development, as the agricultural sector shrinks relative to the in-

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dustrial and tertiary sectors, taxation not only declines but turns into subsidization; the intersectoral adjustments are usually not fast enough to offset production increases caused by technological advances. Excess supplies in the face of inelastic demands often lead to sharp secular declines in terms of trade for agricultural products. The almost inevitable response by governments faced with such problems has been support for agricultural producers, usually price guarantees. The supports in turn lead to excess resources being drawn into agriculture, faster technological development, and faster attendant production increases. Unless larger external markets are found, larger subsidies are needed, and this process feeds on itself as it generates powerful lobbies for keeping the support policies intact.

This, in very general terms, is the historical pattern behind the current EC-U.S. agricultural trade confrontation. Both entities have agricultural support policies with very long historical roots (Butler 1983; Petit 1985). When these policies were put in force, in the 1930s for the United States and the post–World War II period for the EC countries, trade in agricultural products was a small part of the countries' trade. Consequently, the external aspects of these policies were not of foremost concern, and trade policies were viewed as a necessary appendage to policies directed mainly at domestic producers. It is largely for this reason that liberalizing trade in agricultural products was strongly resisted by the U.S. in the early days of GATT. In fact, in 1955 the United States sought and obtained a formal "waiver" from its obligation to apply GATT rules to primary products.

In the early days of the EC's Common Agricultural Policy (CAP), the U.S. tried in the Kennedy Round to limit the CAP to farmer-income supports rather than trade controls. Although the EC exhibited a willingness to negotiate by offering to freeze the level of protection, the U.S. did not accept, and agreement was not reached. Subsequent negotiations in the International Wheat Council (IWC) and the Tokyo Round produced little more than a vague statement to the effect that no country was to grant any export subsidies on primary products in a manner that would give it "more than an equitable share of world export trade."

International trade in agricultural products tends to be dominated by grains. Hence, the world grain situation and policies figure prominently in international discussions. During the last 20 years, the world grain situation has changed from a period of abundance in the 1960s and early 1970s to a period of shortage in the mid- and late 1970s and back to a surplus currently. While U.S. agriculture has borne the largest cost of adjustment in the periods of surplus, it also gained the most by far in the period of shortage. It is probably not unreasonable to state that a large part of the U.S. surplus in the late 1970s and early 1980s

was due to the overinvestment in agriculture arising out of excess profits in the mid-1970s. Of course, it is politically expedient for the U.S. to blame its economic problems in agriculture on another country, but the EC policies have been in place with the same form throughout this whole period. Not surprisingly, it is only in periods of world surplus and sagging prices that the EC becomes the obvious scapegoat and the tone of the rhetoric rises. While these points have been made repeatedly by EC officials (Green Europe 1985a), they do not move the current U.S. administration, which is particularly sensitive to rises in public spending and less eager than previous administrations to undertake costly farm programs.

This paper first reviews the discussion of agricultural protection in the U.S. and EC, and the impacts of their policies on world trade and prices. Then a simple model designed to capture the essence of the U.S. and EC grains policies is used to explore the effects of those policies on the two trading rivals (section 4.4). In section 4.5 three possible U.S. reactions to the EC policies—optimal export taxes, buffer stocks, and export subsidies—are explored. Section 4.6 presents some empirical estimates of the potential effects of the various policies. The final section summarizes the main conclusions.

4.2 Protection and the Impact of EC and U.S. Policies on International Trade

One of the main differences between EC and U.S. agricultural policies is their relative transparency. The EC's objective in the formulation of the CAP is not only farmer income but also price stability. The main instruments are variable import levies and export subsidies that achieve both objectives simultaneously. While direct income support to the farmers would lead to smaller welfare losses, the huge direct transfer to producers would then be both visible and beyond the limits of the EC budget. In theory, the higher real incomes of consumers could be taxed to provide for the transfer, but the institutional structure of EC revenues prohibits direct income taxes on consumers. Under the current policy, the budget cost to the Community largely covers the quantities traded and stored, and the EC consumers foot the largest share of the total transfer invisibly by means of higher prices.

U.S. farm policy, on the other hand, has not used direct trade and price controls such as export subsidies. It has relied mostly on supply management and storage operations, in addition to the loan rate scheme (which is essentially a guaranteed price floor), extensive subsidization of research, and extension programs. Despite U.S. claims not to have used direct export subsidies, the massive food aid program instituted via PL 480 in the 1960s can be viewed as nothing more than an indirect

export subsidy. While U.S. law provides that PL 480 shipments are not supposed to replace commercial flows, research (Abbott 1979) has shown that food aid was largely substituted for commercial imports by developing countries and thus contributed to displacing other exporters.

What protection is afforded the agricultural sectors in the U.S. and EC? With the multitude of farm support mechanisms (and they differ from country to country), protection in the traditional sense is difficult to measure. Furthermore, primary agricultural production is characterized by unpredictable yields because of environmental factors and large price fluctuations. Hence, the measurement of protection should not involve simply the comparison of prices with and without the various policy instruments, but rather the comparison of price distributions with and without the policies. However, this implies that not only price levels but also the higher moments of the price distributions should be computed, and this has not been done to any extent yet. While some initial attempts to measure protection empirically under uncertainty have been reported in the literature (Eldor 1984), all researchers have been computing traditional measures of nominal and effective protection. For instance, Sampson and Yeats (1977) report effective protection coefficients for the EC between 83 percent (corn) and 1,323 percent (butter) for the year 1974.

Given the instability of world prices, it is clear that traditional measures of protection will yield numbers that fluctuate from year to year. This is most obvious in the series for producer-subsidy equivalents published by the Food and Agricultural Organization of the United Nations (FAO 1975, 1983, 1985). That series is supposed to measure the proportion of total farmer receipts for one product that are due directly or indirectly to government policies (both internal and external). Table 4.1 clearly shows that, depending on the product and the year, both EC and U.S. policies have been influencing farmer incomes significantly. There are large fluctuations in these numbers, depending on the year of calculation.

The numbers in table 4.1 do not indicate the degree of protection. They simply show how policies in place affect farm incomes. Since they are derived by dividing total policy-induced excess farm receipts by total realized farm sales, they also depend on the level of production, which is largely stochastic.

What is the impact of EC agricultural policies on international trade? Several studies have attempted to measure the impact on world prices and trade flows of removing the EC export subsidies and variable levies. Almost all of them employ a nonstochastic partial-equilibrium framework, and they look at trade liberalization as the removal of a tariff the average size of which is computed by reference to the average levies over a period. In other words, the framework is standard partial-

Table 4.1 Producer-Subsidy Equivalents for the EC and U.S. (percent)

	Wheat		Maize		Rice		Sugar		Milk Products[a]	
Year	EC	U.S.	EC	U.S.	EC	U.S.	EC	U.S.	EC	U.S.
1974/75	−9.0	0.1	−10.0	1.7	−26.6	3.7	−243.2	5.7	79.2	8.5
1975/76	23.1	0.5	21.4	0.9	23.9	1.2	29.5	7.5	78.3	21.3
1976/77	59.2	2.5	42.4	1.3	34.7	0.0	89.0	26.9	92.5	32.9
1977/78	63.7	26.4	56.3	2.1	16.0	6.5	127.9	59.9	80.4	30.8
1978/79	68.5	15.5	57.8	4.2	31.9	0.1	162.1	61.0	77.2	25.6
1979/80	50.4	1.2	54.7	1.7	24.9	0.1	64.7	14.7	23.9	20.8
1980/81	41.8	3.3	38.4	1.0	0.4	0.1	−7.4	3.6	18.8	8.9
1981/82	46.4	7.7	48.9	2.2	21.9	1.4	80.0	35.6	16.1	−1.6
1982/83	58.5	7.8	48.8	4.2	43.9	23.6	123.7	117.2	16.9	2.7
1983/84	44.9	38.0	26.3	51.7	32.5	81.0	134.7	124.9	22.0	17.7
1984/85	37.6	17.2	22.1	7.6	27.0	35.7	142.1	139.6	23.1	21.2

Source: For years 1974/75 to 1978/79, see FAO (1983); for the rest, FAO (1985).

[a]From 1979/80 and later, the producer-subsidy equivalent is only for milk and not all milk products.

equilibrium trade liberalization (for instance, Valdes and Zietz 1980). The results depend on the average levy that is assumed as well as on the supply and demand elasticities.

Sampson and Snape (1980) find that the abolition of the EC variable levies and export subsidies would lead to a rise in world wheat prices of 3.3 to 11 percent, depending on the elasticities assumed, a rise in world barley prices of 3.4 to 11 percent, and a rise in world maize (corn) prices of 2 to 11 percent. For the same products, Koester (1982) finds that world prices would increase by 9.6 percent for wheat, 14.3 percent for barley, and 2.2 percent for maize. Sarris and Freebairn (1983) find that EC liberalization in the wheat market would raise average world prices of wheat by 11 percent, while de Gorter and Meilke (1985) find only a 1.8 percent net increase in world wheat prices when EC intervention is removed.

While these studies differ in the magnitude of the effects from EC liberalization, they are uniform in their prediction of an overall rise in average world prices. A rise in prices of products exported by the U.S. would clearly benefit the U.S. In fact, Koester (1982, 30) points out that liberalized EC grain trade would boost U.S. net export revenues by $2.3 billion and would increase net U.S. welfare by $6.11 million.

Little attention has been given to the fact that by stabilizing domestic markets, EC farm policies tend to destabilize external markets. However, Sarris and Freebairn (1983) have shown empirically that the removal of EC wheat policies would lead to a decline in the standard deviation of world price of 20 percent.

There has been even less examination of the impact of removal of U.S. agricultural policy on world trade and prices. Table 4.1 shows that U.S. policies also have a significant impact on farmer income and consequently on production and trade.

While much has been written about the EC protective policies in agriculture, it is not as widely known that the EC producers are equally and often more efficient than their U.S. counterparts in agriculture. A recent detailed study by Stanton (1986) reviewed a large number of micro cost-survey studies in the EC and compared costs of production for various cereal grains in the EC and the United States. Table 4.2 displays some of the interesting results of this study. It shows that EC cereal producers are quite competitive with their U.S. rivals. The French and English produce wheat more cheaply than does the U.S., while the Italians on average are more expensive. In the coarse grains category, the U.S. producers seem to have the edge. But these conclusions depend significantly on the foreign exchange rates assumed, and these comparisons are based on rather well-organized, efficient farmers. Of course, protection would help many of the marginal farmers stay in business, but as is quite evident in both the United States and the EC, reducing the total number of farmers will not necessarily lessen the resources, such as land, used in agriculture. In fact, as small inefficient farms are taken over by larger better-organized ones, the sector's efficiency increases, and the amount of total production may increase by more than if small farms are kept in business. In the EC, in fact, real farm-product prices (which include the cost of protection) have fallen steadily since 1970 by about 15 percent (Sheehy 1984), but agricultural production has increased rapidly. If protection slows the rate of structural transformation of EC agriculture toward more efficient production, it might not be detrimental to the United States, although it would still be quite harmful for the EC itself.

Both EC and U.S. policies have long historical roots that cannot be removed easily. The pressure to change a particular policy usually comes from internal conflicts. In the case of the CAP, the conflict has already appeared in the form of budgetary pressures. Hence, the EC is already examining ways to amend the CAP (see, for example, the Green Paper of the Commission [Green Europe 1985b]). The key question that concerns us here, however, is how the U.S. can react to the current EC policies and whether, through meaningful reaction, it can even derive benefits from the EC policies.

4.3 An Analytical Model of EC-US Agricultural Trade in Grains

The United States and EC both produce and trade a wide variety of agricultural products. Grains have been the source of the greatest conflict, so we refer to them in our simple trade model.

Table 4.2 **Comparison of Production Costs for Wheat, Maize, and Barley in the U.S. and the European Community, 1982–1984 (In US$ per bushel)**

		1982		1983		1984	
		A[a]	B[a]	A	B	A	B
Wheat							
U.S.	CVE[b]	1.62	1.62	1.45	1.45	1.55	1.55
	TCEL[b]	3.25	3.25	3.01	3.01	3.22	3.22
	TCIL[b]	4.16	4.16	3.93	3.93	4.10	4.10
France	CVE	1.06	0.79	1.23	0.92	—	—
	TCIL	3.60	2.71	3.88	2.92	—	—
U.K.	CVE	1.53	1.17	—	—	1.35	1.03
	TCEL	3.01	2.30	—	—	2.59	1.98
	TCIL	3.75	2.87	—	—	3.28	2.51
Italy	CVE	1.53	1.18	1.93	1.49	—	—
	TCEL	5.12	3.95	4.92	3.79	—	—
	TCIL	6.13	4.73	5.70	4.40	—	—
Maize							
U.S.	CVE	1.14	1.14	—	—	1.27	1.27
	TCEL	1.99	1.99	—	—	2.24	2.24
	TCIL	2.44	2.44	—	—	2.71	2.71
France	CVE	1.65	1.24	—	—	1.76	1.33
	TCIL	3.89	2.93	—	—	4.17	3.14
Italy	CVE	1.48	1.14	1.49	1.15	—	—
	TCEL	4.81	3.71	4.40	3.40	—	—
	TCIL	5.36	4.14	4.89	3.77	—	—
Spring Barley							
U.S.	CVE	1.12	1.12	1.11	1.11	1.13	1.13
	TCEL	2.28	2.28	2.39	2.39	2.45	2.45
	TCIL	2.86	2.86	3.04	3.04	3.06	3.06
U.K.	CVE	1.15	0.88	—	—	1.02	0.78
	TCEL	2.74	2.09	—	—	2.40	1.83
	TCIL	3.52	2.69	—	—	3.16	2.41

Source: Stanton (1986).

[a] Column A figures use 1982 exchange rates; column B figures use 1984 exchange rates.

[b] CVE - Cash Variable Expenses.
TCEL - Total Costs Excluding Land.
TCIL - Total Costs Including Land.

Consider three trading countries: the U.S., the EC, and the rest of the world. In the following, subscript 1 will denote the U.S., and subscript 2, the EC. Production and consumption in the first two countries are given by the following linear stochastic supply and demand curves:

$$(1) \qquad S_{it}(p_{it}) = -a_i + k_i p_i + b_i(p_{it} - p_i) - z_{it}, \qquad i = 1,2$$

$$(2) \qquad D_{it}(p_{it}) = c_i - l_i p_i - d_i(p_{it} - p_i) + w_{it}, \qquad i = 1,2$$

where a_i, k_i, b_i, c_i, l_i, $d_i > 0$ are constants, p_{it} is the domestic price in country i in period t, and z_{it}, w_{it} are random supply and demand shocks,

uncorrelated over time and among themselves, with mean zero. In (1) and (2), p_i is the expected value of p_{it}, or the underlying long-run internal price, which for simplicity is assumed not to be a function of time. If $k_i = b_i$ and $l_i = d_i$, then (1) and (2) collapse into the standard supply-demand framework. However, the above formulation allows for differences between the short-run supply and demand responses to price (represented by the parameters b_i and d_i) and the long-run responses (represented by the parameters k_i and l_i).

It is assumed in (1) and (2) that producer and consumer prices are equal within each country. Although this is not strictly true, it is a fair approximation for both the U.S. and the EC settings which employ agricultural policies that largely manipulate the whole market rather than only the producers or consumers. Furthermore, private stockholding behavior is already included in the demand curve. This is reasonable since the end-of-season demand for speculative stocks is a negative function of the difference between current and future expected prices. If future expected prices are set equal to p_i, it can be readily seen that an adjustment to the parameter d_i is all that is needed to include speculative stock behavior in a linear fashion.

The excess supply functions of the two countries modeled above are given by the differences between the domestic supply and demand curves.

$$(3) \qquad ES_{it}(p_{it}) = -e_i + m_i p_i + f_i(p_{it} - p_i) - v_{it}, \qquad i = 1,2$$

where

$$e_i = a_i + c_i \qquad m_i = k_i + l_i$$

$$f_i = b_i + d_i \qquad v_{it} = z_{it} + w_{it}$$

The random variable v_{it} is assumed to have variance equal to σ_i^2.

The rest of the world will be represented only by an excess demand function

$$(4) \qquad WD_t(p_t) = g - np - h(p_t - p) + u_t,$$

where $g, n, h > 0$, p_t is the world price in period t, p is the underlying expected or trend value of p_t, and u_t is a zero mean correlated over time and with v_{it} $(i = 1, 2)$ random variable, with variance equal to σ^2. Implicit in (4) is the view that the rest of the world retains fixed policies. This is appropriate since we are only interested here in the US-EC conflict.

World equilibrium in period t is found by setting the sum of the two countries' excess supplies equal to world excess demand:

$$(5) \qquad ES_{1t}(p_{1t}) + ES_{2t}(p_{2t}) = WD_t(p_t).$$

Agricultural policies in the two countries influence both the average value of domestic prices and the allowed deviation of domestic prices from their average values. These effects are modeled here as follows:

$$p_i = \alpha_i p \tag{6}$$

$$p_{it} - p_i = \beta_i (p_t - p) \tag{7}$$

where α_i, β_i ($i = 1,2$) are positive parameters that are meant to summarize the net effects of domestic policies.

If $\alpha_i = \beta_i = 1$ for some i, it is evident that the relevant country is behaving as if it is pursuing free trade.

By inserting (6) and (7) in expression (3) and subsequently in (5), we can solve for the free-trade price which is given by the following expression:

$$p_t = p + \tilde{p}_t, \tag{8}$$

where p is the expected value of p_t, while $\tilde{p}_t = p_t - p$. These two variables can be expressed as follows:

$$p = \frac{g + e_1 + e_2}{n + \alpha_1 m_1 + \alpha_2 m_2} \tag{9}$$

and

$$\tilde{p}_t = \frac{u_t + v_{1t} + v_{2t}}{h + \beta_1 f_1 + \beta_2 f_2}. \tag{10}$$

The price resulting when both the United States and the EC pursue free trade can be found simply by setting $\alpha_1 = \alpha_2 = \beta_1 = \beta_2 = 1$ in (9) and (10).

$$p_{ft} = p_f + \tilde{p}_{ft} \tag{11}$$

where

$$p_f = \frac{g + e_1 + e_2}{n + m_1 + m_2} = \frac{n + \alpha_1 m_1 + \alpha_2 m_2}{n + m_1 + m_2} p = \frac{p}{A(\alpha_1, \alpha_2)} \tag{12}$$

and

$$\tilde{p}_{ft} = \frac{u_t + v_{1t} + v_{2t}}{h + f_1 + f_2} = \frac{h + \beta_1 f_1 + \beta_2 f_2}{h + f_1 + f_2} \tilde{p}_t = \frac{\tilde{p}_t}{B(\beta_1, \beta_2)} \tag{13}$$

In (12) and (13), the last two expressions just define the factors A and B by which the mean value and the standard deviation of the observed world price exceed their respective free-trade figures. If $\alpha_i \geq 1$ and $\beta_i \leq 1$ ($i = 1,2$), indicating a tendency of internal policies to support on average as well as stabilize domestic prices, then clearly $A \leq 1$

while $B \geq 1$, indicating that world prices are depressed on average, as well as destabilized from their free-trade values.

The above arguments and expressions were derived assuming fixed exchange rates. However, the recent wide swings in the value of the dollar have deep implications for the world markets, quite apart from policy interventions. Assume that U.S. and rest-of-world prices are expressed in U.S. dollars, while EC prices are expressed in EC currency (assumed to be unique for ease of exposition). Let E represent the EC foreign-exchange rate in terms of units of EC currency per U.S. dollar. Inserting Ep_t and Ep instead of p_t and p, respectively, in the expression for the excess supply of country 2, and assuming free trade for simplicity, we obtain the following expressions for the new free-trade price p'_{ft}:

$$p'_{ft} = p'_f + \frac{u_t + v_{1t} + v_{2t}}{h + f_1 + Ef_2}, \tag{14}$$

where

$$p'_f = \frac{g + e_1 + e_2}{n + m_1 + E m_2}. \tag{15}$$

Comparing these expressions with the ones in (12) and (13), it can be seen that a U.S. dollar appreciation (depreciation), which means an increase (decrease) in E, implies a lower (higher) average world price (in U.S. \$) and smaller (higher) world price fluctuations.

The foreign-exchange markets are heavily influenced by general macro policies. Schuh (1974) was among the first to point out that tight U.S. monetary policies negatively affect the agricultural export market for U.S. products. Chambers and Just (1981) calculated that the short-run impact on U.S. wheat prices of a dollar appreciation of 10 percent was -12.4 percent while the long-run impact was -7.9 percent. For corn prices the short- and long-run impact was -1.9 percent and -13.8 percent, respectively, and for soybean prices, -26.4 percent and -21.7 percent, respectively. Clearly, the effects of such large price changes are dramatic, but since they are not due to agricultural policies, we shall ignore them in the sequel by setting $E = 1$.

Welfare in both countries is affected by the policies of the other. Comparing the distorted situation with one with free trade, producers in country i gain in period t a producer surplus (negative, if a loss) equal to

$$GP_{it} = \tfrac{1}{2}(p_i - p_f)[S_i(p_i) + S_i(p_f)] + \{\tfrac{1}{2}(p_{it} - p_i) \cdot [S_{it}(p_{it}) + S_{it}(p_i)] - \tfrac{1}{2}(p_{ft} - p_f)[S_{it}(p_{ft}) + S_{it}(p_f)]\}. \tag{16}$$

In (16), the first term represents the trapezoidal area above the long-run supply curve between the distorted and free-trade average prices (S_i (p_i) is only the long-run portion of the supply curve (1), that is, $-a_i + k_i p_i$), while the second term inside the brackets represents the difference between the distorted and undistorted gains from short-run fluctuations. In figure 4.1, GP_{it} is represented as the following sum of areas:

$$GP_{it} = AEGB + BGHD - AEFC. \tag{17}$$

In a similar vein, the gain in consumer surplus in country one compared to free trade is equal to

$$GC_{it} = \tfrac{1}{2}(p_f - p_i)[D_i(p_f) + D_i(p_i)] + \{\tfrac{1}{2}(p_i - p_{it}) \cdot [D_{it}(p_i) + D_{it}(p_{it})] - \tfrac{1}{2}(p_f - p_{ft})[D_{it}(p_t) + D_{it}(p_{ft})]\}. \tag{18}$$

To maintain the price differential between the domestic and international markets, the government must intervene by, in essence, main-

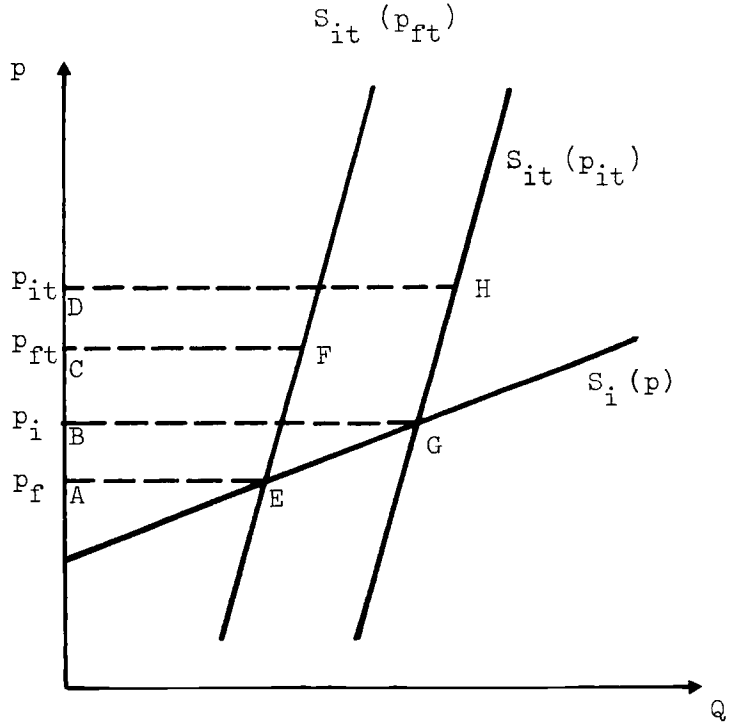

Fig. 4.1 Gain in producer surplus from domestic price distortion.

taining at the border a tariff or tax and claiming the proceeds. It is assumed at this point that no government stockholding is taking place, hence, all extra domestic supplies are disposed of in world markets. The treasury's gain from such operations is equal to

$$GG_{it} = (p_t - p_{it})ES_{it}(p_{it}). \tag{19}$$

The total welfare in country i in period t, if producers, consumers, and the treasury are counted equally, is given by the sum of the three expressions in (16), (18), and (19):

$$G_{it} = GP_{it} + GC_{it} + GG_{it}. \tag{20}$$

Substituting (1)-(4), (6), and (7), in (16), (18), and (19), and taking the expected value of (20), we arrive after some manipulations at the following expression for average total welfare gain of country i compared to free trade [E (.) denotes expected value]:

$$\begin{aligned} G_i &= E(G_{it}) = GP_i + GC_i + GG_i \\ &= GL_i(\alpha_1, \alpha_2) + GS_i(\beta_1, \beta_2), \end{aligned} \tag{21}$$

where

$$GL_i(\alpha_1,\alpha_2) = p_f(A - 1)\left\{ - e_i + m_i p_f\left[\frac{\alpha_i A^2(2 - \alpha_i) - 1}{2(A - 1)}\right]\right\}, \tag{22}$$

and

$$GS_i(\beta_1, \beta_2) = \frac{(\sigma^2 + \sigma_1^2 + \sigma_2^2)}{(h + f_1 + f_2)}(B - 1)\left\{\left[\frac{\beta_i B^2 (2 - \beta_i) - 1}{2 (B - 1)}\right] \cdot \frac{f_i}{(h + f_1 + f_2)} - \frac{\sigma_i^2}{\sigma^2 + \sigma_1^2 + \sigma_2^2}\right\}, \tag{23}$$

where A and B were defined in (12) and (13). In (21), $GL_i(\alpha_1,\sigma_2)$ represents the average welfare gain arising out of induced changes in long-run supply and demand patterns, while $GS_i(\beta_1,\beta_2)$ represents the average welfare gain arising out of changes in the short-run fluctuations. It is quite clear that $GL_i(1,1) = GS_i(1,1) = 0$, as it should be. We thus see that there are two independent effects of the policies, one that influences the long-run trends and the other that changes the probability distributions of domestic and external prices.

4.4 The Impact of U.S. and EC Policies on Each Other

We shall first consider the impact of average protection policies. Consider the expression for GL_i in (22). If $A < 1$, it can be shown that the term multiplying $m_i p_f$ in the brackets is greater than one, if α_i is

sufficiently large; otherwise, it is smaller than one. For the United States, $-e_1 + m_1 p_f > 0$, because the United States is a net exporter of grains. If the term multiplying the $m_1 p_f$ is not too small, the term inside the brackets will still be positive, and since $A < 1$, $GL_1 < 0$. In other words, the United States will lose on average from EC protection (assuming $\alpha_2 > \alpha_1 \geq 1$). The EC, however, does not necessarily lose. If under free trade the EC is a net importer, that is, $-e_2 + m_2 p_f < 0$, it is quite possible that the expression in the brackets is negative and then $GL_2 > 0$. These results are not surprising, as in this model both the U.S. and the EC are treated as large countries and hence, according to standard theory, are expected to be able to gain or lose from protection, according to whether under free trade they are net importers or exporters, but the precise figures will depend on the parameter values.

Turning now to the expressions GS_i, it can be noticed first that, if $0 \leq \beta_2 \leq \beta_1 \leq 1$, as is the case between the United States and the EC, then $B > 1$. However, the expression in β_1, β_2 inside the brackets, which, incidentally, is identical to the expression in α_1, α_2 inside the brackets of (22), does not always have a definite sign. The sign of GS_i therefore, depends on β_1, β_2, as well as on the magnitude of the relative slope of the excess supply curve of country i vis-à-vis the world, and the magnitude of its excess supply fluctuations compared to those of the world. It is thus possible that $GS_i \gtrless 0$. In cereal trade, the EC in effect largely stabilizes internal grain prices, while in the United States the domestic price fluctuations are similar to the world ones. In terms of this model, $\beta_1 \cong 1$, $\beta_2 \cong 0$. For $\beta_2 = 0$ and $\beta_1 = 1$, it can be seen from (23) that $GS_2 < 0$, while the sign of GS_1 depends on the sign of the expression

$$\frac{(B + 1) f_1}{2 (h + f_1 + f_2)} - \frac{\sigma_1^2}{\sigma^2 + \sigma_1^2 + \sigma_2^2}, \tag{24}$$

and could be positive or negative. It is thus possible that the U.S. could benefit *ceteris paribus* from the EC's internal stabilization of cereal markets.

How do changes in the protective structure of the internal cereal markets affect the two trade partners? Consider the derivative of GL_1 with respect to α_2.

$$\frac{\partial GL_1}{\partial \alpha_2} = p_f \frac{\partial A}{\partial \alpha_2} [- e_1 + m_1 p_1 (2 - \alpha_1)], \tag{25}$$

where $p_1 = \alpha_1 A p_f = \alpha_1 p$.

From the definition of A in (12), it is clear that $\partial A / \partial \alpha_1 < 0$ and $\partial A / \partial \alpha_2 < 0$. Also, $-e_1 + m_1 p_1$ is the average U.S. excess supply of the

product under consideration, in the distorted market. For all grains, this is positive. If α_1 is close to one (denoting small average U.S. protection, which is the case for grains), the bracket in (25) is also positive. Hence, $\partial GL_1/\partial\alpha_2 < 0$, meaning that an increase in average EC protection will, on average, hurt the United States. The other way around, however, is not as clear cut. Considering the change in GL_2 with respect to α_1, we have

$$\frac{\partial GL_2}{\partial \alpha_1} = p_f \frac{\partial A}{\partial \alpha_1} [- e_2 + m_2 p \alpha_2 (2 - \alpha_2)]. \tag{26}$$

The expression $\alpha_2 (2 - \alpha_2)$ is always smaller than one. If the EC is close to being an average net importer at price p, that is, if $-e + m_2 p < 0$, then *a fortiori* the whole bracket in (26) is negative, and hence, $\partial GL_2/\partial\alpha_1 > 0$. The EC is an average net importer in feed grains, and even in wheat it probably would be a net importer if the average internal price was equal to the average world one. This means that an increase in average protection for the American grain farmers would benefit overall, rather than hurt, the EC. An increase in average American protection would also not benefit the U.S., as can be seen by considering the derivative of GL_1 with respect to α_1. After some manipulation, it can be shown that

$$\frac{\partial GL_1}{\partial \alpha_1} = \frac{\partial GL_1}{\partial \alpha_2} + m_1 p^2 (1 - \alpha_1) \leq \frac{\partial GL_1}{\partial \alpha_2} . \tag{27}$$

The last inequality follows from the assumption that $\alpha_1 \geq 1$. Since $\partial GL_1/\partial\alpha_2 < 0$, it is clear that $\partial GL_1/\partial\alpha_1 < 0$ as well.

Nothing definite can be said about $\partial GL_2/\partial\alpha_2$. Also, nothing definite can be said about the derivatives of GS_i with respect to β_1 and β_2.

4.5 U.S. Responses to the EC Policy

What are the alternatives for the United States in response to the policy instituted by the EC? In this section we investigate some options under the simplifying assumption that the long-run and short-run supply and demand price elasticities for the U.S. are equal. This simplifies the analytical expressions in order to focus on the ideas. The assumption implies $m_1 = f_1$ in the model posed earlier.

Since the United States, being a large trader, has monopoly power and is an exporter, economic theory suggests that an optimal export tax in every period will maximize welfare for the U.S. (country 1), given the policy of the EC (country 2).

Given the country 2 policy, country 1 will face an excess demand for its exports equal to

$$ED_{1t} = g' - h' p_t + \epsilon_t , \tag{28}$$

where

$$g' = g + e_2 - (n + \alpha_2 m_2 - h - \beta_2 f_2) p, \tag{29}$$

$$h' = h + \beta_2 f_2 , \tag{30}$$

$$\epsilon_t = u_t + v_{2t} , \tag{31}$$

and p is, as before, the average world price in the distorted market,

$$p = \frac{g + e_1 + e_2}{n + f_1 + \alpha_2 m_2}. \tag{32}$$

The optimal export tax of country 1 in period t can be found by equating the marginal curve of (28) with the excess supply of country 1, which is now equal to

$$ES_{1t} = - e_1 + f_1 p_t - v_{1t}. \tag{33}$$

Assuming that no other policy besides an export tax is pursued by country 1, the domestic U.S. price and the world price in period t are given by the following expressions:

$$p_{1t} = \frac{g' + 2e_1}{2f_1 + h'} + \frac{\epsilon_t + 2v_{1t}}{2f_1 + h'} \tag{34}$$

and

$$p_t = \frac{g' (f_1 + h') + e_1 h'}{h' (2f_1 + h')} + \frac{\epsilon_t (f_1 + h') + v_{1t} h'}{h' (2f_1 + h')}. \tag{35}$$

Notice that since the average value of p_t is implicit in the nonstochastic part of (35) (because of (29)), it can be found by solving the equation,

$$p = \frac{g' (f_1 + h') + e_1 h'}{h' (2 f_1 + h')}, \tag{36}$$

and is given by the following expression:

$$p' = \frac{(f_1 + h')(g + e_2) + h' e_1}{(f_1 + h')(n + \alpha_2 m_2) + h' f_1}. \tag{37}$$

Under the assumption that the United States is an exporter under no tax, it can easily be shown, as expected, that p' in (37) is higher than the average world price without the export tax as given in (32). The price p' in (37) will now be the one dictating the value of g' in (29), instead of p in (32).

The welfare that will be gained by country 1 (the sum of producer, consumer, and treasury gain) by applying an optimal export tax in every

period, compared to a situation of no export tax, has been computed by Sarris (1982). Its expected value is equal to the following expression:

$$(38) \qquad W_{1E} = \frac{f_1 (f_1 g' - e_1 h')^2 + f_1 (f_1^2 \sigma_\epsilon^2 + h'^2 \sigma_1^2)}{2h' (2f_1 + h') (f_1 + h')^2}$$

where $\sigma_\epsilon^2 = \sigma^2 + \sigma_2^2$.

In (38), the expression $(f_1 g' - e_1 h')/(f_1 + h')$ is equal to the average country 1 exports after the export tax, and in this context, it is naturally assumed to be positive.

The expression W_{1E} is positive and additional to G_1 found in (21). In other words, U.S. welfare can be raised on average by applying an optimal export tax in every period. However, it can readily be shown that $dW_{1E}/d\alpha_2 < 0$. In other words, the maximum average gain that country 1 can have by applying a variable optimal export tax will decline as the support level in country 2 is raised.

The effect of a U.S. variable export tax on the EC would probably be positive for commodities for which the EC is a net exporter, such as wheat, while it would be negative for commodities for which it is a net importer, such as coarse grains. This is based on the results of the previous section which showed that the derivative of GL_2 with respect to α_1 is most probably positive if country 2 is an importer and negative if it is an exporter. An export tax in the United States will lower internal U.S. prices, implying $\alpha_1 < 1$, and hence would benefit (hurt) the EC in products that on average the EC exports (imports). However, an export tax by the United States is probably politically untenable, since it penalizes farmers.

A much more viable policy, and one that directly benefits farmers when they need it most, is one of public or publicly supported stockholding. Suppose that in period t, the public induces, by some means, carryover stocks larger than normal ones by an amount I_t. Since I_t is defined as the difference between actual and normal stocks, its value can be positive or negative. Suppose for simplicity that the annual cost of the extra storage is quadratic and equal to γI_t^2. By this definition, a negative deviation is also penalized, since it implies smaller-than-normal carryover stocks and hence, a loss of convenience yield. If at the end of period t an amount I_t has been accumulated, world price is raised above the no-interference level p_t to the level p_t', where

$$(39) \qquad p_t' = p_t + \frac{I_t - I_{t-1}}{f_1 + h'} = \frac{g' + e_1}{f_1 + h'} + \frac{\epsilon_t + v_{1t}}{f_1 + h'} + \frac{I_t - I_{t-1}}{f_1 + h'}.$$

Notice that if the average value of I_t is zero, the average world price is not changed from the value in (32).

There is a welfare gain to producers of country 1 and a loss to its consumers. However, a storage cost is incurred, as well as the cost of purchasing the stock (gain, if sold). If we denote by L_{1t} (I_t) the total amount of welfare gain in year t by country 1 (the sum of producer and consumer gains as well as gains from storage operations), and we solve the stochastic control problem,

$$W_{1T} = \max_{I_1,\ldots,I_1} E\left[\sum_{t=1}^{T} L_{1t}(I_t)\right], \tag{40}$$

we can find by stochastic dynamic programming the optimal steady-state solution for $T \to \infty$. This is given by the following expression (for the derivation, see Sarris 1982):

$$I_t^0 = \frac{-2x\, v_{it} + w\epsilon_t}{2(x + \gamma - \pi)} + \frac{x}{x + \gamma - \pi} I_{t-1}^0, \tag{41}$$

where

$$x = \frac{f_1 + 2h'}{2(f_1 + h')^2}, \tag{42}$$

$$w = -\frac{h'}{(f_1 + h')^2}, \tag{43}$$

and

$$\pi = \tfrac{1}{2}(\gamma - \sqrt{\gamma^2 + 4x\gamma}) < 0. \tag{44}$$

The optimal gain per unit of time is given (Sarris 1982) by the following expression:

$$W_{1B} = \lim_{T\to\infty} \frac{W_{1T}}{T} = \delta\sigma_1^2 + \zeta\sigma_\epsilon^2 \tag{45}$$

where

$$\delta = \frac{x^2}{(x + \gamma - \pi)}, \tag{46}$$

and

$$\zeta = \frac{w^2}{4(x + \gamma - \pi)}. \tag{47}$$

The most significant aspects of these expressions are the following: First, it can be seen that country 1 can increase its average welfare by instituting an optimal buffer-stock scheme. Second, the average welfare benefit per unit time in (45) does not depend on α_2. Hence, if country

2 varies its domestic support price, it will not change the benefit that can be had by country 1 as in the case of a variable export tax. The average benefit that country 1 can reap through buffer stocks, expression (45), even though it pays for them itself, can be shown (Sarris 1982) under certain conditions to be larger than the average benefits that are derived by means of the optimal yearly export tax, expression (38). Finally, while W_{1B} in (45) does not depend on α_2, it depends on β_2, but the sign of $dW_{1B}/d\beta_2$ is not determinate.

Interestingly enough, a buffer-stock policy by country 1 could benefit country 2. To see this, consider the welfare gain above the no-stock situation accruing to country 2 by a buffer stock policy of country 1. This is equal to

$$W_{2t} = \tfrac{1}{2}(p_t' - p_t)[ES_2(p_t') + ES_2(p_t)], \tag{48}$$

where p_t' is the world price that obtains with the stock policy, equation (39).

The expected value of W_{2t} is the following. (The derivation is cumbersome and is omitted.)

$$W_{2B} = -\frac{w\sigma_2^2}{2\theta(f_1 + h')} + \frac{\beta_2 f_2}{2(f_1 + h')^2}\left[\sigma_1^2 \frac{2x}{\theta}\left(\frac{x}{\theta(2 - \phi)} - 1\right) + \sigma_\epsilon^2 \frac{w}{\theta}\left(1 + \frac{w}{2\theta(2 - \phi)}\right)\right] \tag{49}$$

where $\theta = x + \gamma - \pi$, $\phi = (\gamma - \pi)/\theta$.

The term multiplying σ_2^2 in (49) is positive, see equation (43), while it can be shown that the terms multiplying σ_1^2 and σ_ϵ^2 inside the bracket in (49) are both negative. Hence, for a very low value of β_2, that is, a policy of strong internal stabilization as is the case in the EC, a buffer-stock policy by the United States could benefit the EC as well. Thus, stockholding by the U.S. creates an international free-rider problem.

A final policy that might be considered by the United States is using an export subsidy, which raises prices to U.S. producers and consumers while it decreases international prices by placing a wedge between domestic and world prices. Suppose a fixed per-unit export subsidy equal to s is applied by country 1. If p_t' is the new world price, it can readily be shown that it will be equal to

$$p_t' = p_t - \frac{f_1 s}{f_1 + h'} = \frac{g' + e_1}{f_1 + h'} + \frac{\epsilon_t + v_{it}}{f_1 + h'} - \frac{f_1 s}{f_1 + h'} \tag{50}$$

where p_t is the world price without the subsidy. Domestic price in country 1 will be equal to $p_t' + s$.

Average producer and consumer welfare in country 1 will increase (over the situation with no subsidy) by the following amount:

$$(51) \quad \Delta (GP_1 + GC_1) = E \{ \tfrac{1}{2} (p_t' + s - p_t) [ES_{1t} (p_t' + s) + ES_{2t} (p_t)] \} = \frac{s h'}{f_1 + h'} \left(- e_1 + f_1 p - \frac{f_1^2 s}{2 (f_1 + h')} \right),$$

where p is the average value of p_t given in (32). However, the cost of the subsidy to the government will be very large. The average treasury "gain" is equal to

$$(52) \quad \Delta (GG_1) = E [- s ES_{1t} (p_t' + s)] = - s (- e_1 + f_1 p) - \frac{f_1 h' s^2}{f_1 + h'}.$$

This loss is larger than the gains to producers and consumers combined. This can be found by adding (51) and (52) and observing that the sum is negative.

An export subsidy by country 1 will hurt country 2 by lowering overall world prices. In fact, if it is assumed that the average internal EC price p_2 is not changed, only the treasury of country 2 is damaged; producers and consumers there are not affected. The average "gain" to country 2 of an export subsidy by country 1 can then easily be found to be equal to

$$(53) \quad \Delta (GG_2) = - (- e_2 + f_2 p_2) \left[\frac{f_1 s}{f_1 + h'} + \frac{(\alpha_2' - \alpha_2) m_2}{n + f_1 + \alpha_2' m_2} p \right],$$

where $\alpha_2' > \alpha_2$ is the new value of α_2 needed to keep p_2 constant, and p is given in (32). If $\alpha_2' \cong \alpha_2$, and $-e_2 + f_2 p_2 < -e_1 + f_1 p$, in other words, if the EC average net exports are smaller than the average U.S. net exports, as is the case between the U.S. and EC grain exports, it is clear by comparing (53) and (52) that

$$(54) \quad | \Delta (GG_2) | < | \Delta (GG_1) |,$$

in other words, the U.S. treasury loss is larger than the loss inflicted on the EC.

This last point has been supported empirically. Paarlberg and Sharples (1984) found that a budget cost to the United States of $1.9 billion would be required to increase the wheat subsidy costs of the EC by $100 million. Similarly, Anderson and Tyers (1983) estimated an annual U.S. Treasury cost for wheat of between $800 million and $1 billion to increase the annual EC budget by $130–200 million.

As recent literature on the political economy of protection has illustrated (Baldwin 1984), governments do not usually adopt policies on

total welfare grounds; the differential political power of the affected groups determines the final outcome. In the U.S. grain trade, there are four major affected groups: producers, consumers, the Treasury, and the international grain-trading industry. Of the three policies mentioned above, the first, export taxes, will hurt producers and the grain traders (by decreasing exports), and benefit consumers, and the Treasury. The second, buffer stocks, will tend to benefit producers and hurt consumers, the Treasury, and grain traders, although the average effects over the cycle will be small. The main effect of this policy will be a tendency toward stabilization of receipts or expenditures of the main groups. Finally, export subsidies will benefit producers and grain traders and hurt consumers and the Treasury. The relative magnitudes of the gains and losses, of course, would be different under the three policies. Furthermore, over the market cycle the effects of the policies will not be the same. While export taxes and subsidies will generate the same effects on the interest groups under both tight and surplus conditions, buffer stocks will tend to generate the opposite effects in the two situations. The U.S. reliance mostly on buffer stocks and partially on export subsidies (guised as food aid) might be an indication of the relatively balanced strengths of the various private interests and a weakness of the Treasury.

4.6 Some Empirical Estimates for Cereals

The theory outlined in the previous sections illustrated the potential effects of the US-EC agricultural trade conflict. In this section, the magnitudes involved are quantified in the case of wheat and coarse grain trade. No detailed econometric estimates of elasticity parameters are derived, and the numbers should be considered as reasonable approximations.

The basic data in the computations and the results are shown in table 4.3. While all the quantity and price data have been estimated empirically by the author, the elasticity figures come from several published estimates, including those of the GOL model (Liu and Roningen 1985). As simulated, only EC policies are represented, while for the United States it is assumed that an approximately free and open market prevails. This is quite realistic for 1981–1983, as the numbers in table 4.1 indicate.

The results show that both the United States and the EC lose substantial amounts on average because of the EC grain-support and stabilization policies. The total average annual U.S. welfare loss for all grains is $1,401 million; for the EC, $404 million. The U.S. and the EC would gain these amounts if both switched to free trade. It is interesting that the EC loses in the long run and because of fluctuations on all

Table 4.3 **Data Parameter Values and Effects of Wheat and Coarse Grain Policies (Quantity figures are in thousand metric tons (mt), prices in US$/mt, GL_i and GS_i in million US$)**

	Wheat			Coarse Grains[b]		
	U.S.	EC	Rest of World	U.S.	EC	Rest of World
Average production[a]	72,305	57,828	—	211,873	68,166	—
Average consumption[a]	29,410	45,953	—	153,488	71,792	—
Average net exports[a]	42,895	11,875	−54,774	58,385	−3,626	−54,759
Short-run supply price elasticity	.17	.05	—	.07	.05	—
Long-run supply price elasticity	.17	.40	—	.07	.25	—
Short-run demand price elasticity	−.14	−.14	−.1[e]	−.80	−.11	−.18[e]
Long-run demand price elasticity	−.14	−.28	−.3[e]	−.80	−.31	−.28[e]
Value of α_i	1.0	1.3	—	1.0	1.3	—
Value of β^i	1.0	.28	—	1.0	.3	—
Value of σ_i	3,367	1,932	3,129	17,853	6,023	3,724
Value of p_i	170.7	221.8	—	129.4[d]	168.2	—
Long-run gain GL_i[c]	−989	−309	—	−422	−95	—
Short-run gain GS_i[c]	5.5	−9.9	—	.4	−4.9	—

Sources: *FAO Production and Trade Yearbook* (various years), Sarris (1985), and own estimates based on several published studies. GL_i and GS_i computed.

[a]The figures are averages for the 1981–83 years.

[b]Includes maize, rye, barley, sorghum, oats, millet and mixed grains.

[c]For the definitions of GL_i and GS_i, see equations (22) and (23) in the text.

[d]For coarse grains, the maize price is taken as the representative price.

[e]For the rest of the world, the elasticities refer to the excess demand.

products, while the U.S. gains because of the changes in the probability distributions, but not enough to overcome the huge losses caused by the average price depression.

If the EC were to switch to free trade, that is, if we set $\alpha_2 = \beta_2 = 1$, the model predicts that the average world wheat price would increase by 10.8 percent and the average world coarse-grain price would increase by 5.3 percent, while the standard deviation of the world wheat price would decline by 18 percent and by 3.8 percent for coarse grain. The estimates for wheat are close to those of Sarris and Freebairn (1983).

The gains the United States can obtain by applying an optimal export tax in every period, see equation (38), are substantial. For wheat, they average $3,116 million, and for coarse grains, $3,335 million annually. The reason for this large potential gain is that the U.S. export tax substantially raises the average world price (by an average 56 percent

for wheat and 90 percent for coarse grains). Domestic U.S. prices are heavily depressed, however, and the large gainer is the U.S. Treasury. Notice that the estimated gains are larger than the CAP-inflicted losses. But such a policy is politically untenable unless the Treasury proceeds are redistributed to farmers, which is unlikely to happen.

The net gains to the United States from instituting an optimal buffer-stock policy, which is wholly financed by the U.S. Treasury, are small but positive. For wheat, they average $14.6 million a year, and for coarse grains, $5.8 million annually (assuming a value of γ equal to .01, which corresponds to $10 per metric ton annual storage cost when total excess government stocks are 1 million tons). The maximum gains from the buffer stock, that is, when $\gamma \cong 0$, are $56.8 million for wheat and $142.2 million annually for coarse grains. The interesting result here is that an optimal U.S. government stock policy does not burden the Treasury on average and is very beneficial for farmers, since prices for their products are substantially stabilized.

Finally, we can estimate how much the U.S. Treasury would lose by inflicting a budget loss on the EC by means of export subsidies. Using the expressions derived earlier and the results of table 4.3, it can be shown that to inflict a $100 million annual loss on the EC budget in the wheat sector, the average U.S. wheat export subsidy would need to be $12.30 per metric ton and the average annual U.S. budget cost would be $530 million, or about five times as much as the EC's loss. This roughly five-to-one ratio of U.S. losses to EC losses is close to what Anderson and Tyers (1983) also found, using a more complex empirical model.

The recent weakness of the U.S. dollar implies that a given percentage increase in the EC export subsidy would necessitate an even larger U.S. budget outlay. The fact that the United States is currently (mid-1986) pursuing this policy, despite the low value of the dollar and a budget-conscious government, might be an indication of the enormous pressures from producers and the grain industry, strengthened by electoral politics.

4.7 Summary and Conclusions

The Common Agricultural Policy of the EC entails heavy economic costs to both the United States and the EC, and it distorts the world markets substantially. Since CAP reform is a slow and tedious process, given the structure of decision making within the EC, we have explored some options by which the U.S. might defend itself from the detrimental effects of CAP policies. While it was shown both theoretically and empirically that an optimal U.S. export tax, a measure that exploits U.S. monopoly power, would more than compensate the United States for the CAP-induced losses, it is probably politically infeasible. A U.S.

export subsidy designed to strain the EC budget would be too costly for the U.S., since for every dollar of damage inflicted on the EC budget, about five U.S. budget dollars would have to be spent.

The only policy that seems to alleviate the political strains induced by the U.S. farmer is a government stockholding policy. By buying for storage when world prices are low and selling when world prices are high, the U.S. Treasury is not hurt, the producers benefit when they need it most, and the consumers get more stable prices. U.S. grain carryover figures from the last two decades show that the United States has indeed been manipulating stocks. Whether this has been done in an optimal way is a subject for further empirical research. The results of this paper suggest that the U.S. ought to consider a more deliberate long-term storage policy, rather than be forced to stockpile as a last resort by the inevitable swings of the market.

Finally, it appears that a combination of a small export subsidy and a stockholding policy might allow the United States to recoup the welfare losses inflicted on it by the EC without hurting U.S. farmers in periods of market downturns.

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Comment

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The papers presented by Hayes/Schmitz and Sarris* are interesting and animating. It has been a pleasure reading them and commenting on

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*Chapters 3 and 4 in this volume.

them. I want to discuss the papers together and put them in the framework of the current US-EC confrontation in agricultural trade. There are basically two problems to be dealt with: (1) Does the EC's Common Agricultural Policy (CAP) have a negative impact on the United States? and (2) Is the present U.S. reaction justified?

Evaluation of the CAP

National agricultural policies are orientated towards domestic problems and possible trade effects principally have to be considered as mere by-products. This is widely agreed upon and has clearly been stated in the papers. It is in particular true for the CAP, but the 1985 Farm Bill seems to indicate that it is also true for the United States.

The basic feature of the CAP is to support farmers' income by price policy and, thus, protectionism. The shortcoming of such a policy approach have been extensively discussed and the main criticism is summarized in the Hayes/Schmitz paper. There is no need to discuss these arguments further. From an economic point of view, the CAP certainly cannot be considered a first- or second-best policy. To put it in other words: the objective function that is maximized by the CAP is difficult to imagine, let alone to describe.

CAP Impact on the United States

Price Level on World Markets

There is no doubt that EC agricultural protectionism tends to decrease the price level on several world markets. Hayes/Schmitz and Sarris give an overview of a multitude of studies that all demonstrate this effect, but differ in their empirical estimates. It is obvious that a price decrease on world markets is harmful to U.S. exports such as wheat.

The price level effect is less certain, however, if dynamic aspects are taken into account. In this regard the papers are somewhat contradictory and confusing. The general question to be answered refers to the link of protectionist policies and structural change in agriculture. Hayes/Schmitz argue that the CAP tends to shift out the supply curve in European agriculture. I can follow their argument that a possible risk reduction may increase output; the rough comparison of the yield developments in the EC and the United States, however, is not sufficient to examine the thesis empirically.

Sarris argues exactly the opposite. According to him high agricultural prices would leave marginal farms in production and would thus hamper structural change. This sounds reasonable and the argument has in fact been discussed extensively in the German agricultural economics literature (Koester 1977). It may indeed be described as a reversed infant

industry argument. In any case—a comprehensive analysis on the link between price support policies in agriculture and structural change, integrating the arguments presented in the papers, still has to be given.

Price Instability on World Markets

The traditional argument has been introduced by Johnson (1975) who stated that the CAP would tend to fix internal prices and thus would make world market prices more volatile. Sarris confirms the recent analyses (Schmitz and Koester, 1984) that such a statement only reflects part of the problem and may indeed be wrong. The CAP may also help to stabilize world market prices, for instance, by stabilizing expectations and thus production in European agriculture, and possibly, by shifting world production to less risky production areas. The actual impact of the CAP on world market price instability therefore can only be judged case by case and must be derived by means of comprehensive empirical analysis.

Sarris's Model

In this context a brief discussion of Sarris's model is justified. Sarris seems to be restrained in his comments on the "standard partial equilibrium trade liberalization exercise" as he calls it—and then proceeds himself in a similar way. The genuine feature of his model, of course, is its stochastic formulation. The model underlines the fact that policy analysis under uncertainty will seldom yield definite, but rather conditional results which require a concise discussion of relevant parameters. Politicians will not like this kind of result, though complexity is not a shortcoming of the model, but rather of reality. The importance of stochastic modeling for policy analysis is therefore emphasized and, in particular, the reader's attention is drawn to some interesting particularities of Sarris's model, notably the simultaneous consideration of short- and long-term effects and the modeling of currency effects under uncertainty.

Some questions concerning Sarris's model should nevertheless be asked. First, both the agricultural policy of the United States and the EC have been modeled by introducing a variable price differentiation between the domestic and the world market price. The CAP, however, can rather be described as a price-fixing protectionist policy, and I wonder why Sarris did not model it this way (Kirschke 1985). Second, the analysis of, for instance, a U.S. export tax is based on a state contingent policy concept which could hardly be implemented under real world conditions. A preferable way might be to model policies on the basis of a quasi-deterministic concept according to which policy interventions are based on expected supply and demand functions. Third, Sarris derives explicit formulas for expectations and higher mo-

ments, which is welcome as a precise analytical exercise, but practically restricts the analysis to linear functions and additive uncertainty. It is therefore suggested to equally take into account approximation formulas in stochastic calculus and stochastic simulation. In this context I agree with Sarris who says that "not only price levels but also the higher moments of the price distributions should be computed," but I have got to contradict him when he states that "this has not been done to any extent yet." In fact, several analyses have been done in recent years though these have not always been published in Anglo-Saxon journals.[1]

Aggregation of CAP Effects

Summarizing the discussion it is difficult to state that the United States has actually and undoubtedly suffered from the CAP. This is only obvious if the classical static price level effect is considered. It is less obvious if dynamic effects and CAP effects on world market instability are taken into account. It finally becomes doubtful if indirect effects are to be included in the analysis, such as an increased EC demand for cereal substitutes due to the CAP. The papers by Hayes/Schmitz and Sarris concentrate on partial market effects and do not really deal with such additional effects. This is not a shortcoming of the analyses, but simply points to the complexity of the problem to which there is no clear-cut answer available.

U.S. Policy Options

Let us now stop complicating the discussion and take a simplified view of the world. Consider a single commodity, say wheat, that is exported by the United States and that is protected by the EC's protectionist policy, and suppose that only the classical static price level effect of the CAP on the world market is taken into account. Under these restrictive conditions the CAP's negative impact on the U.S. is evident. From an economic point of view, the interest of the United States would then be to pursue policies that could help to raise the world market price. What kind of policy options would the U.S., in fact, have?

Inducement of a CAP Change

The U.S. could obviously plead for a CAP change in order to reduce EC surplus production and thus increase the world market price level. The selfish way would be to enforce EC surplus reduction by any

1. Kirschke (1987) gives an overview of such studies and analizes the CAP's price-fixing protectionist policy under uncertainty by means of different stochastic methods.

possible CAP change, no matter how EC economic welfare is affected. The altruistic way would, however, mean to help the EC to implement a first-best CAP from an economic point of view, which could be beneficial for both sides. The perspective for such a CAP change is widely agreed upon and would consist of a separation of efficiency and distribution objectives in European agriculture. This would mean the abolition of price supports and protectionism and the establishment of direct income subsidy schemes.

The proposal for a CAP change presented by Hayes/Schmitz goes in this direction, but unfortunately not very far. They suggest to support farmers' income by differentiated production subsidies which, in my view, is a combination of a partial price differentiation and a partial quota system. It very much resembles the former French approach for a CAP reform and might also be considered as a new variation of the "small is beautiful" concept in agricultural policy formulation. Even if the nondebatable argument of political feasibility is admitted I cannot see that their proposed system will be easier to implement and administer than some direct income support scheme. Therefore I wonder why Hayes/Schmitz did not go some step further towards a first-best CAP.

Adjustment to the CAP

In a more passive way the United States could also take the CAP for granted and adjust its policies accordingly. A first option would then be to use market power on the world market and thus increase export revenues. Sarris has clearly pointed out that such a policy could be realized by an optimal export tax which equates the domestic price in the United States to the marginal export revenues. In fact, this is the well-known terms-of-trade argument for trade interventions in order to increase national economic welfare. Sarris has also stated that a buffer stock policy could equally help to enhance U.S. economic welfare even if it were to be financed by the U.S. alone. A final U.S. reaction to the CAP might be the demand for compensation for CAP-induced losses. This alternative has not really been discussed by the authors.

The Actual U.S. Behavior

Increasing Complaints

The actual U.S. behaviour in the present agricultural trade confrontation does not really reflect the stated options. In the context of the simplified scenario developed here, U.S. complaints about the CAP are certainly justified, but they increase at a time when this could not be expected. First, EC protectionism has rather diminished than in-

creased for several agricultural commodities in recent years. This is first of all a currency phenomenon due to changes in the dollar's value, but also indicates a change to a more modest price policy in the EC. Second, the EC has introduced and discusses the introduction of further specific policy measures to cut surplus production such as producer coresponsibility levies and quotas for milk production, which may be questioned from an EC welfare point of view, but, from a U.S. point of view, lead in the right direction. It should, finally, be kept in mind that an overall assessment of CAP impacts on the United States cannot really be given. Furthermore, the U.S. itself carries a major responsibility for the current GATT regulations which have allowed the establishment of the CAP as it is. This has clearly been stated by Hayes/Schmitz and Sarris.

Uneconomic Reactions

Much of the present U.S. complaint is based on the market share argument. It is true that EC protectionism tends to reduce U.S. shares in the world markets, but it is also true that there is no monocausal relationship between the CAP and export market shares. Following the discussions above, in particular, the drop from 53 percent to 43 percent in the U.S. share of the world's grain trade between 1975 and 1984, as documented by Hayes/Schmitz, cannot simply be attributed to the CAP, but may rather reflect the change in the U.S. monetary policy. Hence, thinking in terms of a simple market share does not really consider the economics involved.

Another astonishing feature discussed by Hayes/Schmitz is the recent U.S. agricultural policy change. The United States seems to be willing to repeat the same mistakes the EC has made under the CAP. Direct price support schemes, for instance, are strengthened under the 1985 Farm Bill. The U.S. has introduced an enormous export subsidy program with the interesting abbreviation "bicep." This is directly opposed to the optimal export tax argument and Hayes/Schmitz convincingly argue that this program directly wastes resources and transfers wealth to cereals-importing countries, many of which are centrally planned economies. From a classical economic point of view, indeed, the U.S. behaviour cannot be described as anything else but irrational.

Political Economics in Agricultural Trade

The U.S. reactions may, however, be rationalized if the purely economic view of the present agricultural trade conflict is broadened and some aspects of political economy are taken into account. In view of the evident difficulties for a fundamental CAP reform the U.S. behavior may simply be explained as a calculated attempt to change the CAP at all and, thus, reflect strategic behavior. It may also be a response to a

change in public opinion or increased lobbyist activities. There is no need to say that internal policy restrictions often dominate rational policies in a economic sense which may, indeed, be illustrated by the CAP itself. Finally, some persons argue that the U.S. reactions should most of all be considered as an attempt to turn away from negative domestic policy impacts on agriculture.

Apart from this, a seemingly institutional shortcoming in economic policy formation is worth being considered. According to Harvey's Abilene Paradox people in committees agree on decisions that, as individuals, they know are stupid (Dixon 1986). In other words: economic decision making or economic negotiations often end with policies that cause damage to all parties involved. A possible explanation to this phenomenon is given by Fisher and Ury (1981), who describe position bargaining as a central shortcoming of negotiations. This is the defence of a position once taken by whatever reason which does not reflect one's real interest. This is rather a psychological than an economic phenomenon. The current U.S. market-share thinking in the confrontation with the EC may be interpreted as a typical case in point. It is a position that may not be economically reasonable, but which has been taken and will be defended. Some more examples for unfruitful position bargaining in international economic negotiations and especially in the context of the CAP could easily be identified. In general one is tempted to state a "Law of Economic Negotiations" that could read as follows:

If there are economic negotiations
there will be a position
no matter how uneconomic it is.

The avoidance of an open agricultural trade war between the United States and the EC in the summer of 1986 raises some hopes that both sides are willing to reduce the conflict and come back to the economics involved. The excellent papers presented by Hayes/Schmitz and Sarris and the discussion during this conference may further help to strengthen economic reasoning in the current US-EC confrontation.

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