Agricultural policies in industrial countries

In the United States, the government pays farmers not to grow grain; in the European Communities, farmers are paid high prices even if they produce excessive amounts. In Japan, rice farmers receive three times the world price for their crop; they grow so much that some of it has to be sold as animal feed—at half the world price. In 1985, farmers in the EC received 18¢ a pound for sugar that was then sold on the world markets for 5¢ a pound; at the same time, the EC imported sugar at 18¢ a pound. Milk prices are kept high in nearly every industrial country, and surpluses are the result: Canadian farmers will pay up to eight times the price of a cow for the right to sell that cow's milk at the government's support price. The United States subsidizes irrigation and land clearing projects and then pays farmers not to use the land for growing crops.

The main purpose of such policies is simple: to raise farmers' incomes from what they otherwise would be. But why do the policies produce such anomalous results? And what costs do they impose on the industrial countries that implement them and on the developing countries that are affected by them? This chapter addresses these questions in three sections:

- The first section explains the characteristics of agricultural policies in industrial countries. It shows that, although the objective of raising farm incomes is straightforward, the results have been complicated. As each policy runs into trouble, a new one is added. This increases administrative complexity, raises costs, and makes agriculture more and more subject to political rather than economic decisions.
- The second section counts the costs and benefits of these policies to industrial countries and concludes that, while they have surprisingly little effect on farmers' incomes in the long run, they impose heavy costs on taxpayers and consumers. The net costs are large—more than $40 billion a year in industrial countries.
- The final section examines the impact on developing countries of agricultural policies in industrial countries. Though some developing countries suffer less than others, farming is hurt in all of them. Prices for their products are depressed because industrial countries import less, and their subsidized exports even undercut developing countries' farmers in their own markets.

The characteristics of agricultural policies

The main objectives of agricultural policies in industrial countries are to stabilize and increase farmers' incomes and slow the migration of people out of the sector. Underlying these objectives are the social and political aims of stable food prices and self-sufficiency in production, particularly in countries that have experienced wartime food shortages. These aims go hand in hand with such other goals as preventing environmental damage to the countryside and preserving the traditional unit of farming. Support of farm incomes, however, has contributed to rapid technical change and higher production. The basic problem that many industrial countries now face is how to counteract excessive production while maintaining farm incomes at politically acceptable levels.

How policies evolve

Most industrial countries impose controls on agricultural prices, output, and acreage, as well as on international trade. Agricultural policies do not change predictably in response to each new eco-

nomic shock or shift in priorities. They evolve unevenly, balancing changing economic circumstances and a variety of often conflicting interests: the legacy of past policies, the political influence of farm lobbies, and the constraints arising from public spending limits, administrative convenience, and international treaty obligations. And, while direct income supplements may be the most efficient way of raising farmers' incomes, governments almost invariably try to do so by means of agricultural price supports or cost-reducing subsidies. Within that broad approach, however, there are different policies for different circumstances:

- If a country has a large enough share of the world market to influence the price, net importers will favor policies that reduce world prices; net exporters will favor the opposite. The EC—a large importer of cereals when its common agricultural policy (CAP) was designed—protects grain producers with tariffs and import levies, which tend to depress world prices; the United States, currently the world's biggest grain exporter, imposes acreage controls that are intended to raise prices.
- If public spending limits are tight, governments will—other things being equal—favor import taxes over export subsidies. Both drive a wedge between domestic and world prices, but, while import taxes earn revenue for the government, export subsidies absorb it.
- Some markets are easier to support than others. Support is easiest and cheapest for crops and products in which supply and demand are inelastic, that is, quantities do not respond much to changing prices. As a rule of thumb, land-intensive products have lower short-run elasticities of supply than others. It is no coincidence that governments intervene more often in the market for cereals than in those for poultry and pork. Administrative convenience is also important. More complicated rules are needed if products are heterogeneous and markets are geographically dispersed. Governments can control the prices of fruits and vegetables, which are highly perishable, less easily than they can those of cereals, sugar, and milk. Because sugar and milk are marketed almost entirely through relatively centralized processing facilities, governments are able to monitor their output without much difficulty.
- Exchange rate and macroeconomic fluctuations since 1972 have at times dominated commodity policies. In the early 1970s the worldwide commodity boom and the weak U.S. dollar pushed world grain prices above the levels that had been established by U.S. price supports. In the early 1980s the strong dollar caused even nominally constant U.S. support prices to be very high from the point of view of grain importers and non-U.S. exporters. This led to drastic cuts in U.S. support prices in 1986.
- International commitments sometimes constrain domestic policies. Because of international ties dating back to colonial times, the EC still imports sugar even though it has become self-sufficient and even exports surplus sugar.
- The legacy of past policies weighs heavily upon current ones. Policymakers are averse to dismantling an administrative machinery that has been laboriously constructed. Farm interest groups are adept at defending gains from previous policies. It is difficult to change a policy even if its failure can be demonstrated. Instead, a new policy is introduced to offset its shortcomings. During the 1970s, improvements in milk yields reduced dairy costs below official milk support prices, which were actually raised. Governments found themselves flooded with milk surpluses, and spending soared, increasing sixfold in the EC and fivefold in the United States between 1974 and 1984. Instead of lowering prices and letting consumers benefit from the technical progress, however, governments have attempted to limit the amount of milk sold at guaranteed prices (see Box 6.1).

How much protection?

The first and most obvious effect of industrial countries' agricultural policies is to raise domestic prices. Estimates of nominal protection coefficients (NPCs)—domestic prices divided by border prices—for several industrial countries and areas are shown in Table 6.1.

These estimates need to be treated with caution. With variable world prices but relatively stable domestic ones, nominal protection coefficients vary widely over time. Table 6.1 shows values for 1980–82, but in 1985 protection was typically greater because world market prices were lower. Domestic prices can be measured at several stages: the farmgate, the intervention board, or the wholesale market. Different countries report prices at different stages, which makes comparison difficult. Qualities and varieties of commodities also vary; for example, many types of rice are consumed, and their importance varies from country to country. Because agricultural policies affect world prices, the estimates do not measure what would happen to world prices if the policies were abolished. Finally, nominal protection coefficients do not mea-

Box 6.1 Price support in the dairy industry

The world market for dairy products is a creature of protection. Nearly every industrial country isolates and protects its dairy farmers with import barriers and through domestic market intervention. Producer prices are determined by governments and are unrelated to the value of milk products in international trade. In the OECD countries, average domestic prices have been roughly double world prices for the past twenty years; however, because such large quantities of dairy products are dumped in international trade, the world market price is greatly depressed. Farmers have responded to the high internal prices in a rational manner: they have invested heavily in animals and equipment, they have adopted technical innovations to improve yields, and consequently they have increased output (see Box figure 6.1). Governments have therefore found themselves buying increasing amounts of milk and have accumulated huge stocks. These stocks usually have to be disposed of on depressed world markets or given away as food aid.

In some extreme cases, EC farmers paid more to import feedstuff for their cows than they could have received on world markets for the milk which the feed helped to produce. Not only was no surplus generated to cover the costs of domestic inputs—labor, transport, dairy equipment, processing, and so on—but the EC even lost foreign exchange. The European Communities would have been better off as a whole if some of the farmers had not worked at all—indeed, if they had been paid not to work.

The EC's budgetary rules compound the inefficiencies of its dairy support program. The financial burden of agricultural support is shared among the member countries roughly in proportion to their GNP, but receipts from price supports are proportional to milk output. So countries race to increase national milk output, for they receive the full intervention price from the CAP but have to contribute only a fraction of that price. In fact, they are even encouraged to subsidize their milk production, for they are reimbursed by the EC for part of their subsidy. The results have been dramatic. Subsidies from the individual countries amounted to almost 8 percent of the gross value of milk at domestic prices. CAP dairy expenditures have grown by more than 20 percent a year for a decade; transfers from consumers and taxpayers reached $6,200 per dairy farmer ($410 per cow) in 1982.

By April 1984, the burden of the EC's dairy policies had become unsupportable. Rather than reduce support prices, however, the EC imposed production quotas. These are fixed nationally and are generally distributed within each country to individual farmers. Quantities produced in excess of quotas receive the world price or less, so there is a strong incentive to restrain production. Indeed, production has fallen below quota levels because farmers have sought to avoid selling milk at merely its world price. But production remains far above consumption. Although consumption averages about 85 million tons a year, the quota is fixed at 99 million tons. Thus, the quota system penalizes consumers by keeping prices high, encourages an inefficient pattern of production, and institutionalizes the EC's current excessive output. In response to these problems the EC has decided to reduce dairy quotas by 3 percent starting in 1987–88.

The United States has had a similar experience. Support prices for milk were steadily increased during the 1970s in the face of low world market prices. Net spending on dairy support programs (valuing products given away at their cost to the government) grew from $150 million annually to $3 billion between the mid-1970s and 1983–84; transfers to producers were estimated to have reached $26,000 per farmer in 1982 ($835 per cow). The government cut the producer price of raw milk from 13.1¢ a pound in 1982–83 to 11.6¢ in mid-1985, but stocks continued to accumulate. In De-

Table 6.1 Nominal protection coefficients for producer and consumer prices of selected commodities in industrial countries, 1980–82

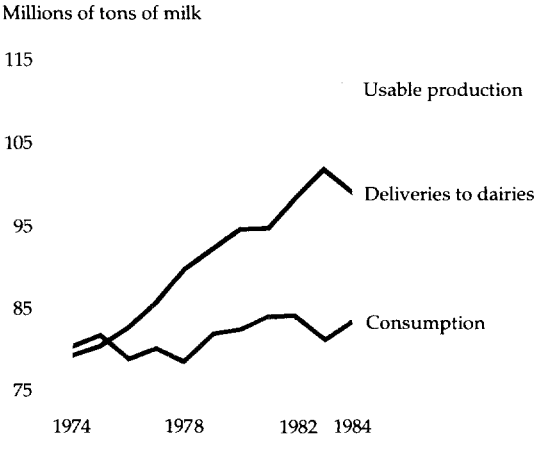
	Wheat		*Coarse grains*		*Rice*		*Beef and lamb*	
Country or region	*Producer NPC*	*Consumer NPC*	*Producer NPC*	*Consumer NPC*	*Producer NPC*	*Consumer NPC*	*Producer NPC*	*Consumer NPC*
Australia	1.04	1.08	1.00	1.00	1.15	1.75	1.00	1.00
Canada	1.15	1.12	1.00	1.00	1.00	1.00	1.00	1.00
EC[b]	1.25	1.30	1.40	1.40	1.40	1.40	1.90	1.90
Other Europe[c]	1.70	1.70	1.45	1.45	1.00	1.00	2.10	2.10
Japan	3.80	1.25	4.30	1.30	3.30	2.90	4.00	4.00
New Zealand	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
United States	1.15	1.00	1.00	1.00	1.30	1.00	1.00	1.00
Weighted average	1.19	1.20	1.11	1.16	2.49	2.42	1.47	1.51

a. Averages are weighted by the values of production and consumption at border prices.
b. Excludes Greece, Portugal, and Spain.

cember 1985, legislation was passed to allow the government to control milk production by buying and butchering up to 1 million cows, but it is unlikely that this will constitute a long-term solution to the problem.

Most surpluses end up in stockpiles, for under an agreement concluded in the GATT's Tokyo Round, butter cannot be exported at less than $1,200 a ton. Stockpiling dairy products is expensive, and quality is difficult to maintain. But patience can reap its own reward. In 1984 the EC claimed that its stored butter had so deteriorated that it had become a new, inferior product—butter oil. Since there is no international agreement on butter oil, the EC was able to sell some of its stock to the U.S.S.R. at $450 a ton—a mere 14 percent of the price paid to farmers.

Box figure 6.1 Milk production in the EC, 1974–84



Note: Data include butter, cheese, and powdered milk, converted to fluid milk equivalents.
Source: Bureau of Agricultural Economics (Australia) 1985.

sure those internal policies that are not supported by border policies; in such cases domestic prices and world prices are equal. For example, U.S. acreage controls and deficiency payments affect internal and border prices of maize equally.

Nonetheless, certain conclusions can be drawn from the table. First, dairy farmers receive generous support nearly everywhere; so do rice and sugar producers. Second, Japanese and European farmers are more highly protected than farmers in countries that rely on agricultural exports. Third, the relative rate of protection between commodities varies from country to country, which implies that internal relative prices also vary. Thus, even within countries there are distortions, as farmers react to prices that have been set by policy rather than to indicators of scarcity and opportunity.

Trade measures

Behind these complexities lies a distinction between border measures, which act on imports and exports, and domestic measures, which directly affect internal supply and demand. Take border measures first. The simplest border measure for an importer is the tariff—that is, an import tax—and for an exporter, the export subsidy. Matters are rarely that simple. Variable import levies and variable subsidies—called export restitutions—are more common.

VARIABLE IMPORT LEVIES. Variable levies are the cornerstone of the EC's common agricultural policy. They are also used by other European countries, namely, Austria, Sweden, and Switzerland. They make up the difference between the price of imports delivered at the port and an officially fixed entry price at which foreign goods can be sold. The entry price—known in the EC as the threshold

Pork and poultry		*Dairy products*		*Sugar*		*Weighted average*[a]		
Producer NPC	*Consumer NPC*	*Producer NPC*	*Consumer NPC*	*Producer NPC*	*Consumer NPC*	*Producer NPC*	*Consumer NPC*	*Country or region*
1.00	1.00	1.30	1.40	1.00	1.40	1.04	1.09	Australia
1.10	1.10	1.95	1.95	1.30	1.30	1.17	1.16	Canada
1.25	1.25	1.75	1.80	1.50	1.70	1.54	1.56	EC[b]
1.35	1.35	2.40	2.40	1.80	1.80	1.84	1.81	Other Europe[c]
1.50	1.50	2.90	2.90	3.00	2.60	2.44	2.08	Japan
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	New Zealand
1.00	1.00	2.00	2.00	1.40	1.40	1.16	1.17	United States
1.17	1.17	1.88	1.93	1.49	1.68	1.40	1.43	Weighted average

c. Austria, Finland, Norway, Sweden, Switzerland.
Source: Tyers and Anderson (background paper).

Box 6.2 Protecting sugar producers

Sugar and its very close substitutes, glucose sugar and high fructose corn syrup (HFCS), are derived mainly from three sources: sugarcane, sugar beets, and high-starch products such as maize. Sugarcane was the earliest and cheapest source of sugar; use of the other two products expanded significantly only when supplies of sugarcane were curtailed. The possibility of obtaining sugar from beets was recognized in the late eighteenth century, but it took Britain's blockade of Continental Europe during the Napoleonic wars to make the process commercially viable. More than 300 sugar beet factories were established in France between 1811 and 1813. Peace and sugar imports brought about their demise, and it was only later in the nineteenth century that European beet production revived—once again behind protective barriers. Since then, sugar beet production has enjoyed high protection.

The level of protection proved costly to industrial countries, especially when, in the 1970s, the new sweetener HFCS became available. HFCS developed in the shelter of sugar protection as the internal prices for beet and cane sugar were driven further above world market prices than were those of its own raw material, maize.

The EC and the United States dealt with the impact of HFCS production differently, but the effects on world trade in sugar and on developing countries were similar. The EC, already a major sugar exporter at the beginning of the 1970s, included glucose sugar production in its quota system for sugar beets, thus generating even more subsidized export surpluses. The EC's share of world sugar exports rose from less than 9 percent in the 1960s to more than 20 percent in the 1980s, making the EC the world's largest exporter in 1982. In contrast, the United States allowed the HFCS industry to expand behind an import quota. As a result, the share of domestic sweetener consumption accounted for by HFCS increased, with corn sweeteners surpassing sugar in consumption for the first time in 1984. The U.S. share of world raw sugar imports dropped from an average of 20 percent between 1960 and 1973 to around 10 percent in the early 1980s. Preferential deals continue to dominate international trade in sugar, the free market being of a residual nature.

The experience of the United States illustrates the practical difficulties of operating trade restrictions. Until 1983, imports of sugar mixed with as little as 6 percent of corn sweeteners were not restricted under the sugar import quotas. This, in effect, allowed consumers to buy sugar at world prices, but growing imports led local producers to complain until the "loophole" was plugged. However, with the domestic sugar price four to seven times the world price, it was worth it for firms to extract sugar from processed products such as cake mixes. In January 1985, emergency regulations imposed a quota on all imports of sweetened "edible preparations" for nine months. Unfortunately, edible preparations included chicken pie, pizza, and noodles (with a sugar content of 0.002 percent); within two months the nine-month quota had been exhausted and imports of an unintentionally wide range of goods ceased.

Neither the EC nor the United States has been able to adjust its sugar policies to the changing economic environment. Rather, they have accepted increased market distortions and growing economic costs. In addition, they have placed a great burden of adjustment on their trading partners, mainly developing countries. One study estimated that industrial countries' sugar policies cost developing countries about $7.4 billion in lost export revenues during 1983, reduced their real income by about $2.1 billion, and increased price instability in the residual world market for sugar by about 25 percent.

price—represents the minimum price of imports to domestic users. Domestic prices are fixed annually by the agriculture ministers of the member states. The cost of threshold pricing varies because world prices and exchange rates change but domestic prices remain fixed as long as imports continue and the domestic price is higher than the border price.

Variable levies can insulate farmers and consumers from world markets. But such insulation is costly. Consumers continue to buy goods whose world prices have risen sharply; producers continue to produce goods whose prices have fallen. Importers cannot, therefore, take advantage of changing world prices; nor can exporters. Worse, by isolating a part of world consumption and production from world prices, variable levies reduce the efficiency and stability of world markets. Box 6.2 spells out these points with reference to sugar policy.

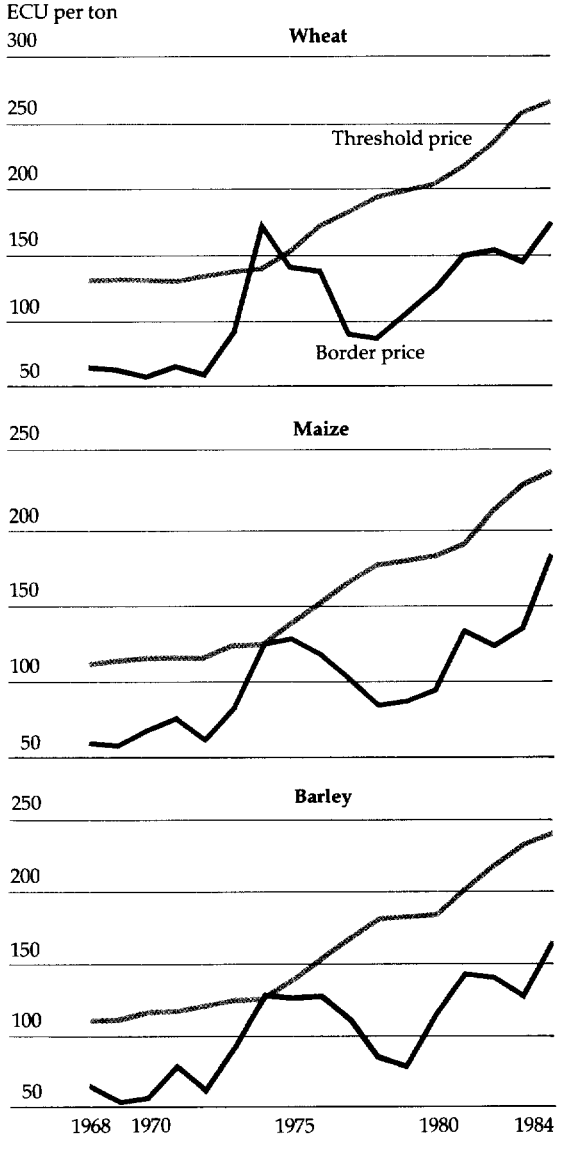
EXPORT RESTITUTIONS. Export restitutions are the exporter's equivalent of variable levies. They permit domestic prices to be independent of world prices and above them. The result is to depress and destabilize world prices. Although the effect is equivalent to that of an import levy, export restitutions are less widespread. Indeed, an export resti-

tution most commonly originates as a prop to an overextended system of import levies: having introduced levies to protect local farmers from cheap imports, governments find themselves accumulating surpluses as the high level of support leads domestic production to outstrip demand. Unable to abandon price supports for political reasons, they resort to export restitutions to dispose of their surpluses abroad. The EC provides the best-known example of this phenomenon: a large-scale grain importer in the 1960s, it became a big exporter in the 1980s, and the switch was not the result of any comparative advantage in cereal production.

Export restitutions entail the same kind of losses to the economy that import levies do, but can be even more difficult to administer—especially when, as in the EC, the restitution varies according to the destination of the exports. Moreover, they are a drain on the public purse. This often leads governments to reduce the level of price supports as products switch from imports to exports. For example, the EC's support prices increased by an average 0.3 percent annually in real terms between 1973 and 1978, but fell by 1.1 percent a year between 1979 and 1986, when surpluses and the need for restitutions grew.

Variable levies and export restitutions can be high. Sweden's levies raise domestic beef prices to about 250 percent of world prices. Figure 6.1 shows the gap between threshold and border prices in the EC for grains since 1968. In 1982–83 the cereal regime is estimated to have transferred 7.9 billion European currency units (ECUs), or $8.9 billion, from consumers—and ECU 2.3 billion from taxpayers—to producers.

Figure 6.1 Threshold and border prices for selected grains in the EC, 1968–84



Source: Bureau of Agricultural Economics (Australia) 1985, p. 177.

TARIFFS. Fixed tariffs are less common than variable levies in agricultural trade. They do not stabilize domestic prices and cannot guarantee farm incomes, even in the short term, because internal prices vary along with world prices. High tariffs tend to be limited to markets which either are too heterogeneous for variable levies or were not deemed important enough when the policies were introduced. Most industrial countries apply tariffs to fruits and vegetables; tariffs on meat products, oilseeds, and tobacco are also fairly common. Tariffs are relatively important in the protection of processed agricultural goods and tend to escalate with the degree of processing. This makes it difficult for developing countries to establish processing industries.

IMPORT QUOTAS. An import quota restricts imports of a product to a specified quantity or value (sometimes zero). Quotas are commonly imposed on dairy products, sugar, beef, vegetables, and fruits and are applied by a wide range of countries, including Canada, the EC, Japan, Switzerland, and the United States. Import quotas are sometimes dressed up as voluntary export restraint agreements between exporting and importing countries. Examples include Australia's dairy imports from New Zealand and U.S. imports of beef

from Australia. Import restrictions are sometimes associated with special trade schemes in which both the price and quantity of imports are fixed. U.S. imports of sugar from the Caribbean and the EC's imports of beef and sugar from certain developing countries are examples.

Like variable import levies, quotas isolate a country from changes in the world markets and raise domestic prices. They can be even more costly to the country that imposes them. The difference between domestic and border prices may be captured by exporters rather than collected by the government as tariff revenue. And the imports may not come from the cheapest sources, because

Box 6.3 Land restrictions and part-time farming

Agricultural policy in Japan is based on two pieces of legislation passed in the 1940s. Aiming to combine self-sufficiency in rice with stable consumer prices, the Staple Food Control Act of 1942 divorced producer and consumer prices. It said that government purchase prices "are to be determined for the purpose of securing reproduction of rice by taking into consideration the cost of production, prices and other economic conditions." Consumer prices "are to be determined for the purpose of stabilizing the consumer's budget by taking into consideration the cost of living, prices and other economic conditions."

The second piece of legislation concerned land reform. Agricultural land reforms between 1945 and 1950 transferred the ownership of approximately one-third of all farmland to former tenants, imposed maximum sizes on farms, prohibited nonfarm residents from owning farmland, prohibited resident landowners from renting out more than one hectare, and effectively outlawed the sale of land between farmers. These measures reduced the proportion of farms operated by tenants from 46 percent in 1945 to 10 percent by 1950 and 5 percent by 1965. Some renting was permitted, but rent ceilings and the difficulties of reoccupying rented land made it unattractive. Even after later liberalization, only 4 percent of Japanese farmland was leased in 1978.

The land law inhibited the creation of bigger farms. The average Japanese farm expanded from 1.01 hectares in 1950 to 1.17 hectares in 1977, whereas farms in the United States grew by 50 percent on average. At the same time, the cultivated land area in Japan fell by about 8 percent and the amount of land that was double-cropped dropped from around one-third to almost zero; also, agricultural employment declined at about the same rate as in other countries.

Because the farms are small, total factor productivity—output divided by an index of all input quantities—has not risen as rapidly in Japan as elsewhere in the world. Farm size has been critical since 1960, when technology became more sophisticated and capital-intensive. In 1960 the costs of rice cultivation were 20 percent higher on farms of 0.3 to 0.5 hectare than on those larger than 3.0 hectares; by 1975 the differential was more than 60 percent.

In 1955 Japanese agriculture appeared to be reasonably competitive—certainly compared with that of Western Europe. The farm price of rice was only 13 percent above the import price, and Japan was close to self-sufficiency. Thereafter, however, rising labor costs—driven by Japan's industrial success—coupled with the cost of increasing capital intensity on such small farms, pushed up costs on farms faster than in the rest of the economy. Given the government's aims of promoting self-sufficiency and supporting the farm labor force, more protection from imports became necessary. Behind strict import restraints, the domestic price of rice rose from one and a half times the import price in 1961, to more than double it in 1970, to four times as much in 1979. Similar, though less extreme, relative price movements occurred for such products as wheat, beef, and dairy products.

Restrictions on ownership and leasing have encouraged farmers to subcontract certain tasks, such as weeding, soil preparation, and harvesting. More often, however, the restrictions have encouraged farmers to take part-time or full-time jobs outside agriculture. Only 20 percent of Japanese farm households contain one or more full-time farm workers; 70 percent obtain more than half their income from outside activities. Living standards in these latter households are around 25 percent higher than in full-time farm households.

The 20 percent of farms that have one full-time farm worker produce about 60 percent of total agricultural production on 48 percent of the land. In rice production, however—which lends itself well to part-time work—farming is dominated by part-timers. They produce about two-thirds of total output.

In 1980, new legislation permitted larger farms and encouraged part-time farmers to lease their land. Simultaneously, attempts were made to keep support prices below the average costs of very small farms. Although the domestic price fell back to only three times the import price during the 1980s, the structure of farming has not changed significantly. The principal beneficiaries of Japanese rice policy are still part-time farmers. Full-time farmers have been prevented from exploiting their efficiency by the legacy of restrictive land legislation.

quotas on exports from different countries almost inevitably fail to reflect differences in costs.

A prominent set of import quotas or quantity restrictions can be found in Japan. Behind very tight restrictions on rice and beef imports, the Japanese government has raised domestic producer prices to around three times world prices (see Box 6.3). These prices have generated large domestic rice surpluses, some of which have been sold as animal feed or as subsidized exports. The losses in this market alone totaled about $6 billion in 1980.

It is often alleged that countries use health and quality standards to restrict imports. No one doubts the need for such regulations, but their excessive or discriminatory use can be implicitly protectionist. Comparison of import restrictions in four countries for which comprehensive figures are available indicates that the percentage of food imports subject to health standards is 95 percent in Japan and 94 percent in Norway, but only 55 percent in Switzerland and 60 percent in Australia. These percentages do not tell the full story of protection, however, since they exclude the total prohibition of entry for certain products.

Table 6.2 summarizes data on border policies for agriculture pursued by industrial countries. It shows which imports in industrial countries are subject to nontariff barriers (NTBs). The figures do not indicate how much each import is affected, nor the value of imports affected, but merely the presence (or absence) of particular kinds of restriction in each trade category. The table shows that industrial countries' imports of raw materials are largely unimpeded by nontariff barriers; so are their imports of tropical beverages. However, 70 percent of their sugar and confectionary imports and more than half of their meat and live animals and dairy imports face at least one barrier. Fruits and vegetables and beverages other than tea, coffee, and cocoa (mainly wine and fruit juice) are hardly affected by variable levies; they are restricted either quantitatively or by seasonal tariffs. Variable levies are important for sugar, dairy products, meat, and cereals.

Production quotas and input controls

Production quotas grant farmers the right to sell a specified quantity of a crop at a guaranteed price. If a farmer produces more, he must sell at lower prices. To implement the quotas, governments must monitor the output of individual farmers. So far, this approach has been found administratively feasible only for sugar, milk, peanuts, and tobacco.

Quotas are usually introduced when the budget cost of surpluses becomes intolerable. If, for political reasons, price levels cannot be reduced, quotas are the only way to stem the outflow of public funds. While production quotas have no direct budgetary costs, they have significant economic costs. They penalize consumers by raising prices, they frequently allocate production rights to inefficient farmers, and they can distort the markets for competing products. Import quotas on sugar in the United States have artificially stimulated the production of corn syrup. Similar consequences in the EC have been forestalled by domestic production quotas on corn-based substitutes.

Table 6.2 The frequency of application of various nontariff barriers in industrial countries, 1984
(percent)

Commodity	*Tariff quotas and seasonal tariffs* (1)	*Quantitative restrictions* (2)	*Minimum price policies*		*Total*[a] (5)
			All (3)	*Variable levies* (4)	
Meat and live animals	12.3	41.0	26.0	23.8	52.2
Dairy products	6.9	29.6	28.6	25.6	54.6
Fruits and vegetables	15.7	18.8	4.9	0.8	33.1
Sugar and confectionary	0.0	21.7	58.0	58.0	70.0
Cereals	1.7	10.9	21.7	21.7	29.0
Other food	0.8	16.3	13.5	13.2	27.0
Tea, coffee, cocoa	0.4	4.0	2.5	2.5	6.6
Other beverages	18.5	22.9	18.4	0.6	42.3
Raw materials	0.0	7.5	0.3	0.3	7.8
All agriculture	8.2	17.2	11.5	8.2	29.7
Manufactures	2.2	6.7	0.6	0.0	9.4

Note: Data are the number of import items subject to the nontariff barriers shown as a percentage of the total number of import items. The industrial-country markets considered are Australia, Austria, the EC, Finland, Japan, Norway, Switzerland, and the United States.
a. This column will be less than the sum of columns (1), (2), and (3) if some imports are subject to more than one barrier.

The U.S. tobacco program is the oldest system of production quotas still in effect today. According to a recent study, it cost consumers about $1 billion a year from 1980 to 1984. It did not even benefit all those who were growing tobacco. True, quota holders were better off by $800 million, but many of them had rented out their quotas. Producers without quotas were worse off by $200 million. The overall gain of $600 million to producers and quota owners, coupled with the $1 billion loss to consumers, implies a net loss to all concerned of $400 million.

Once granted, production quotas are difficult to remove because they become valuable property rights. In British Columbia, Canada, the right to sell the milk of a cow costs about eight times more than the cow itself. Such rents create substantial entry barriers to farming. They increase the amount of initial capital required, although they do not affect the long-term rate of return on investment in agriculture. Table 6.3 shows the prices that tradable quotas command and the capital outlay that they imply for family farms in Ontario, Canada.

Controls on inputs are more common than controls on output. Commonest of all are restrictions on land. The United States has the longest history of acreage controls. The first legislation, on grains and cotton, was passed in 1933; the most recent scheme, the payment-in-kind (PIK) program, was started in 1983 and is in use again in 1986. Japan has also used such measures, first to reduce rice acreage and then to reduce citrus fruit output. The government sometimes paid to uproot trees which had been planted on paddy fields that had been idled under a previous program.

In a large and open economy, voluntary acreage controls are easier to administer than production quotas. With quotas, all output has to be monitored, and surpluses may have to be destroyed. With acreage controls, only the land has to be monitored, and governments can induce farmers to join the system by paying them for each acre they do not plant or by offering them higher prices for their output if they leave some acres fallow (the current practice in the United States).

The administrative costs of commodity programs are formidable. The U.S. Agricultural Stabilization and Conservation Service maintains a staff of about 2,600 full-time employees, several thousand more part-time employees, and some 3,000 county committees, each made up of three local citizens, usually farmers. In 1985 this cost $400 million. Countless decisions must be made: What is each farmer's program acreage (the land on which payments may be made) for each crop? What is the program yield—which determines how much the farmer gets per acre from the legislated payment per bushel? What can the farmer use his idled land for, if anything? Are his storage facilities adequate? Is he complying with the programs' provisions? Not surprisingly, it is too costly to monitor every requirement, and local administrators may be tempted to give farmers the benefit of the doubt.

Acreage controls are also wasteful because they distort farmers' input costs. They encourage farmers to farm their permitted acreage more intensively and at higher cost. Ironically, in order to benefit when their program acreage is updated, farmers may plow up land that might otherwise be left as pasture, woodland, or swamp. Acreage controls and input subsidies work at cross purposes; each increases the cost of the other.

In the PIK program of 1983, U.S. farmers agreed not to grow crops on a total of 77 million acres, 37 percent of the land sowed to grains, cotton, and rice in 1982. Drought scourged the Midwest farm states in 1983, and output in these crops fell by 41 percent. Prices rose by an average of 16 percent. Farmers also gained because in payment for idling their land they received up to 80 percent of the quantity they could normally have grown. These in-kind payments came from crops that had been stored by the government. The total transfer from consumers and taxpayers was worth about $20 billion. On top of this, the PIK program cost livestock farmers and farm input industries billions of dollars because increases in feed grain prices could

Table 6.3 The market value of quotas in Ontario, Canada, 1984

Product	*Unit price*	×	*Size of family farm unit*	=	*Quota cost to acquire farm*
Eggs	$23 a hen		25,000 birds		$580,000
Milk	$3,500 a cow		40 cows		$140,000
Tobacco	$1.50 a pound		40 acres		$310,000
Turkeys	54¢ a pound		25,000 birds a year		$270,000

Source: Johnson, "Agricultural Protection" (background paper).

not be fully passed on to consumers and because farmers cut down on their use of fertilizers, seeds, and other inputs.

Intervention and target prices

In nearly every industrial country, the government offers to buy produce at a fixed price. This intervention price represents the minimum return to farmers and, unless they are constrained by quota, determines their level of production. The government finds it expensive to hold the stock it buys and usually ends up selling it at less than cost, either at home or abroad.

In the United States the federal Commodity Credit Corporation (CCC) "lends" cash to participating farmers, using grain held in approved storage facilities as collateral. Farmers may repay the loans, retrieve their crops, and sell them. Or they may turn the crops over to the CCC as repayment. The loan rate—the price at which the CCC lends—defines farmers' minimum prices. Because the United States is the dominant grain exporter and has few border measures to insulate its domestic prices from world trading prices, the CCC loan rate establishes a floor price in the world grain markets. This means that when CCC stocks are large, as they have been in the 1980s, the world market price is fixed in dollar terms by the loan rate, and this rate together with the value of the dollar determines the border prices facing other countries. Consequently, problems were created for many grain-trading countries when, in 1986, the loan rates for wheat and feed grains were cut by 25 to 30 percent at the same time that the dollar was weakening substantially. The reduction in the support price for rice was even larger.

Since the mid-1970s, the United States has also set a target price that is higher than the loan rate. Deficiency payments make up the difference between market and target prices. In and of themselves, such payments would encourage production and hence drive down domestic and world prices. But this result is forestalled because farmers must participate in acreage reduction schemes in order to receive payments. Deficiency payments for corn came to 48¢ a bushel in 1985—more than 20 percent of the market price. The percentage is higher for wheat, rice, and cotton. These payments are almost certain to rise even further in the future as new U.S. legislation cuts loan rates and hence market prices. Deficiency payments are often defended on the grounds that they help farmers who are in financial trouble. But in the United States two-thirds of the payments in 1985 were estimated by the U.S. Department of Agriculture to have gone to farmers who were wealthier than the average citizen.

Consumer subsidies

Subsidies to consumers also contribute to the cost of agricultural price supports. By making food comparatively cheap, subsidies raise demand for domestic output. Temporary or selective subsidies can help reduce government stocks of surplus commodities. European pensioners have periodically received slices of the EC's butter mountain. In the United States, the CCC donated $2.5 billion in stockpiled commodities for domestic and foreign distribution in 1985. Subsidies shield consumers from the high prices paid to producers and probably reduce the political costs of agricultural price support. In Japan, the official aim of supporting the price of rice is to ensure consumers adequate quantities of reasonably priced rice. Once the government decided on a policy of self-sufficiency in rice—because it feared the effects of external shocks—consumer subsidies became necessary. Japanese consumer food subsidies cost about $3.5 billion a year.

Other measures

Other policy instruments exist. Some countries have state monopolies on imports, exports, or domestic purchases, and their actions generate many of the effects of subsidies or border measures. State marketing boards have been important for certain commodities in Canada, Australia, and New Zealand. The range of subsidies is wide: transport (in Canada, see Box 6.4), insurance (in Canada and the United States), fertilizers (in Australia), water (in the United States), and income tax concessions (in France, Italy, the United Kingdom, and the United States). Tax breaks are estimated to have accounted for almost 20 percent of recent capital goods investment in U.S. agriculture.

The domestic gains and losses from agricultural policies

Agricultural policies in industrial countries transfer income from consumers and taxpayers to farmers and landowners. They also reduce national income in several ways. Subsidies cause farmers to use inputs inefficiently. Artificially high food prices mislead producers into using too many resources

Box 6.4 Hidden subsidies: the Crow's Nest rates

Not all export subsidies draw directly on the public purse, and those that do not can be very long-lived. In 1897 the Canadian government subsidized the building of a railroad through the Crow's Nest Pass of the Rocky Mountains. In return, the railroads agreed to freeze their freight rates for transporting wheat and coarse grains from the Prairie provinces to the ports for export.

By 1981–82, it is estimated, farmers were paying only one-sixth of the cost of freight on grain exports. The railroad—or, rather, its other customers—contributed most of the remaining five-sixths. The subsidy amounted to about $30 a ton, or about 15 percent of the price of wheat and about 25 percent of the price of barley. The subsidy has raised grain and oilseed prices in the Prairie provinces, increased rents, and discouraged the development of alternative industries such as lumber and coal (which have to pay excess transport costs) and agroprocessing and livestock (which have to pay higher grain prices). As an implicit tax on the railroads, the subsidy has also led to substantial underinvestment in rail facilities, which hinders all economic activity in the Prairie provinces. Finally, it has caused additional distortions elsewhere in the economy. To compensate eastern livestock farmers for the effects of the Crow's Nest rates on domestic feed prices, further subsidies were introduced to encourage the shipment of feed grains from western Canada for domestic use in the east.

Recently, the government has begun to reform the Crow's Nest system. It now pays the railroads $659 million a year plus a declining share of any increases in freight rates. It is estimated that by 1990 farmers will be paying about half of the freight costs themselves.

for producing food—resources which could be better used to produce something else. They also induce consumers to purchase less food than they would otherwise. While accurate estimates of these effects are difficult to obtain, economists have amassed a body of evidence that presents a strong case against such policies. This section reviews that evidence.

Net losses

Table 6.4 summarizes some estimates of the domestic real national income losses to industrial countries. The estimates differ in coverage, method, and time, but they all show that agricultural protection is expensive. Rice protection alone is estimated to have cost Japanese society $2.9 billion in 1980; in 1976 it cost about $3.9 billion—0.6 percent of Japan's GNP. The costs of the CAP to the EC were $15.4 billion in 1980, or 0.6 percent of GDP. Even traditional agricultural producers were not immune. Canada lost $400 million protecting its dairy industry between 1976 and 1979, and the United States lost almost $4 billion in total agricultural support in 1984–85.

These efficiency, or real income, losses are underestimates because they omit administrative expenses and ignore the distortions that high agricultural prices cause in the long term—such as the diversion of fixed investment and research from industry to agriculture. The underestimation can be substantial because agriculture changes so quickly. One indication of how much it can change is the way nine EC countries converted themselves from net importers of 20 million tons of wheat a year to net exporters of 10 million tons between 1965 and 1983. Another is the development of sugar substitutes in the United States; the substitutes reduced sugar imports from 5 million tons (half of U.S. consumption) in 1981, to 3 million tons in 1982, to possibly 1½ million tons in 1986.

Much larger than the net costs of agricultural support are the costs borne by consumers and taxpayers. Table 6.5 shows estimates of the components of the costs as well as the benefits that are reaped by producers. The figures are necessarily imprecise, but they give an indication of the massive volume of transfers involved. In every case, producers gain less than consumers and taxpayers lose. The ratio of domestic losses to gains is expressed as the transfer ratio—the average loss to consumers and taxpayers per dollar transferred to producers.

The high transfer ratio for Japan reflects high levels of protection. Taxpayer costs, however, are lower for Japan. The United States and the EC spend billions on payments to farmers and on export and domestic consumption subsidies, whereas Japan's import restrictions actually provide revenue through tariff collections. The U.S. policies cost less per dollar transferred because the relative price distortions are smaller. Also, since

U.S. output affects world market prices, part of the cost of the acreage controls is borne by foreign consumers.

The figures in Table 6.5 suggest that agricultural protection is an expensive way of transferring income between various sections of society. In Japan, consumers and taxpayers lost $2.58 for every $1.00 transferred to producers, not including the efficiency losses caused by taxes raised to pay farm subsidies. Furthermore, protection can transfer income from the poor to the rich. In most countries the main beneficiaries of price support are landowners and quota holders; the poor bear a disproportionate share of the cost because they spend a larger share of their income on food.

The figures in Tables 6.4 and 6.5 indicate the resource wastes that could be avoided if trade were liberalized. They show what countries would gain—after all the effects have worked through the economy—if they abolished their agricultural policies. In the short term, however, because land, capital, and labor would remain in farming, sup-

Table 6.4 The domestic efficiency loss from agricultural intervention in selected industrial countries

Country or region and source	*Coverage*	*Year*	*Efficiency loss (billions of 1980 dollars)*
Canada			
Josling 1981	Dairy products	1976–79	0.4
Barichello 1986	Wheat, barley, milk, poultry, eggs	1980	0.3
Harling 1983	Wheat, barley, oats, potatoes, beef, poultry, eggs	1976	0.1
Europe			
Bale and Lutz 1981[a]	Wheat, maize, sugar, barley, beef	1976	1.9
Buckwell and others 1982[b]	All CAP commodities	1980	15.4
Bureau of Agricultural Economics (Australia) 1985[b]	All CAP commodities	1978	9.4
Bureau of Agricultural Economics (Australia) 1985[c]	All CAP commodities	1983	6.7
Tyers and Anderson (background paper)[b]	Grains, meats, dairy products, sugar	1980–82	24.1
Japan			
Bale and Lutz 1981	Wheat, barley, sugar, beef, rice	1976	6.0
Otsuka and Hayami 1985	Rice	1980	2.9
Tyers and Anderson (background paper)	Grains, meats, dairy products, sugar	1980–82	27.4
United States			
Rosine and Helmberger 1974	All commodities	1970–71	5.5
Gardner, "Economic Consequences" (background paper)	Grains, dairy products, sugar, cotton, tobacco, peanuts	1984–85	3.9
Johnson, Womack, and others 1985	Grains, soybeans, cotton	1981–84	0.3

a. Data are for France, Germany, and the United Kingdom. b. Data are for the EC, excluding Greece, Portugal, and Spain.
c. Data are for the EC, excluding Portugal and Spain.

Table 6.5 The annual domestic costs and benefits of agricultural protection to consumers, taxpayers, and producers in the EC, Japan, and the United States
(billions of dollars unless otherwise noted)

Country and year	*Consumer costs*	+	*Taxpayer costs*	−	*Producer benefits*	=	*Total domestic costs*	*Transfer ratio*
EC (1980)[a]	34.6		11.5		30.7		15.4	1.50
Japan (1976)	7.1		−0.4		2.6		4.1	2.58
United States (1985)	5.7		10.3		11.6		4.4	1.38

a. Excludes Greece, Portugal, and Spain.
Source: For the EC: Buckwell and others 1982; for Japan: Bale and Lutz 1981; for the United States: Gardner, "Economic Consequences" (background paper).

plies would be maintained even in the face of changing policies. As a result, prices would be depressed more in the short term than in the long term.

Long-term issues

One argument in favor of supporting agricultural prices is that it stimulates agricultural technology and boosts crop yields. Indeed, it does. But higher yields reflect gains which only partly offset the cost of inputs such as fertilizers, oil, and pesticides. Investment in agriculture draws skilled manpower and sophisticated equipment away from other sectors of the economy. These resources could be used more efficiently elsewhere. Investment that generates ever more output of a product that already costs more than it is worth is not progress.

Agricultural intervention also places heavy burdens on most countries' treasuries. Indeed, soaring budget costs in the mid-1980s provide the main impetus for agricultural reform. In the EC, agricultural spending accounts for around 70 percent of the total community budget. Of the ECU 18.6 billion ($23.5 billion) spent on price supports in 1984, about ECU 1.9 billion was raised from customs duties and levies on agricultural imports; the rest was met from general taxes. As recently as 1974, agricultural spending was only ECU 4.7 billion ($5.6 billion), of which ECU 3.0 billion was raised from agricultural levies. So the increase both in spending and in the burden placed on general taxation has been great.

Spending is also significant in the United States and Japan. The U.S. government's costs were $11.9 billion in 1984 (up from about $3.0 billion in 1980 and 1981). They are likely to rise to $20 billion a year in 1986–88 under the newly enacted Food Security Act of 1985. In Japan, the total agriculture, fisheries, and forestry budget was $14.7 billion in 1984, of which $3.4 billion was devoted to food subsidies. This, however, represents a fall from 1980.

The benefits from all this spending are questionable. The main aim is to raise farmers' incomes and keep them from fluctuating. Some stability has probably been achieved, but it is doubtful that high product prices have raised farm incomes in the long term, although the rental value and price of land have been supported.

There are problems in assessing the effect of agricultural policies on farmers' incomes. In many industrial countries, figures on farmers' incomes are unreliable or unavailable. Rising prices tend to raise incomes in the short term, so their long-term effects are obscured by the constant stream of new policies. Because the policies depend in part on farmers' incomes, it is difficult to distinguish between cause and effect.

The evidence available does not inspire confidence that commodity policies can solve farmers' economic problems. Price supports and payments have been ineffective in halting the rise in farm failures that has occurred since 1981 in the United States, and unprotected commodity producers have fared no worse than protected ones. The start

Box 6.5 Old wine in new bottles

The arguments in this chapter about the relation between commodity prices and returns to land are far from new. They date back to the English economist David Ricardo, who was one of the first to analyze formally the benefits of free trade. His arguments against the early-nineteenth-century form of agricultural protection, Britain's so-called Corn Laws, are as relevant today as they ever were:

- "[The price of] corn is not high because a rent is paid, but a rent is paid because corn is high" (Ricardo [1817] 1973, p. 38).
- "The sole effect of high duties on the importation, either of manufactures or of corn, or of a bounty on their exportation, is to divert a portion of capital to an employment which it would not naturally seek. It causes a pernicious distribution of the general funds of the society—it bribes a manufacturer to commence or continue in a comparatively less profitable employment. It is the worst species of taxation, for it does not give to the foreign country all that it takes away from the home country, the balance of loss being made up by the less advantageous distribution of the general capital" (ibid., p. 210).
- "The market price of corn would, under an increased demand from the effects of [an export] bounty . . . be raised. By a continued bounty, therefore, on the exportation of corn, there would be created a tendency to a permanent rise in the price of corn, and this, as I have shown elsewhere, never fails to raise rent" (ibid., p. 209).

of the EC's cereal regime in 1967–68 cut average agricultural prices in Germany by 8 percent, but farm profits per family worker rose. So did the value added by each farm worker compared with the value added elsewhere in the economy. Figure 6.2 plots rates of protection against GDP per capita in agriculture in relation to other sectors. It shows an inverse relationship—the higher the protection, the lower the relative income. Because of differences in farm size, the extent of part-time farming, and other factors, the plotted relationship cannot demonstrate any causal connection. But it provides no support for the idea that it is better for a country's farmers to have highly protected commodity markets.

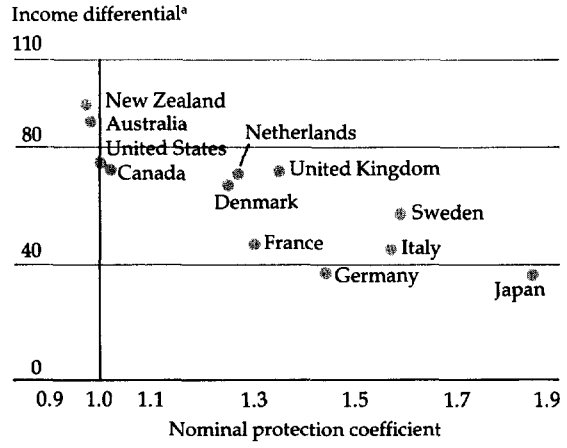
In general, there is no reason to expect higher protection to be associated with higher farm incomes—a point made effectively by David Ricardo many years ago (see Box 6.5). Box 6.6 illustrates how extra revenues from higher farm prices are lost to rising land prices and rents as farmers bid against one another to acquire the means to produce goods that can be sold at high prices. The price rises cause a windfall gain for those lucky enough to own land when the programs are introduced, but become a component of costs for those who enter farming later. In any case, agriculture accounts for only a small proportion of GDP in industrial countries, and thus, in the long run, rates of return in agriculture are largely set by other parts of the economy.

In the United States, net farm income as a proportion of farmers' total income fell from 58 percent in 1960 to 36 percent in 1982. In Japan, where small-scale farming is more important, farm households derived 75 percent of their income from nonfarm sources in 1980. Furthermore, the families of part-time farmers with permanent jobs outside farming were approximately 25 percent better off than families with one or more full-time farm workers.

Many countries say agricultural self-sufficiency is an aim—and an outcome—of their agricultural support programs. Self-sufficiency is supposed to contribute to food security, stabilize food prices, and, occasionally (and perversely), make prices reasonable. None of these arguments is sound.

Take price stability. There is no doubt that the variable levies in Europe and the fixed intervention prices in Japan do stabilize consumer and producer prices. But self-sufficiency is not necessary to achieve this. Variable levies and subsidies could achieve the same effect at lower average prices without boosting domestic production. Self-

Figure 6.2 Nominal protection coefficients and the income differential in selected industrial countries, 1980



a. GDP per head of work force in agriculture as a percentage of GDP per head of work force in the whole economy.
Source: Based on Anderson, Hayami, and Honma 1986 and OECD data.

sufficiency contributes nothing to the quest for reasonable prices, for it increases the total cost of food.

The argument that self-sufficiency contributes to food security sounds simple, but it is not. Industrial countries need never go short of food because of crop failure, since they can always afford to buy enough on world markets. The argument for economic security hinges on cost—and it seems likely that it would be cheaper in the long run to pay high scarcity prices even as often as one year in five than to pay relatively high prices every year. As shown in Chapter 1, the long-term trend of real world market prices is downward, not upward.

What about so-called strategic security—the ability to produce food in times of political turmoil? It would take a worldwide crisis to make food unobtainable from any source. After all, the U.S.S.R. managed to purchase a record quantity of imports despite the U.S. grain embargo in 1980. Such a crisis would also stop the inputs—oil, fertilizers, pesticides—on which the present high levels of output in Europe and Japan depend. The goal of strategic security is illusory.

International consequences

Industrial countries' agricultural policies may be aimed at solving domestic problems, but their effects spill over onto the rest of the world. By ex-

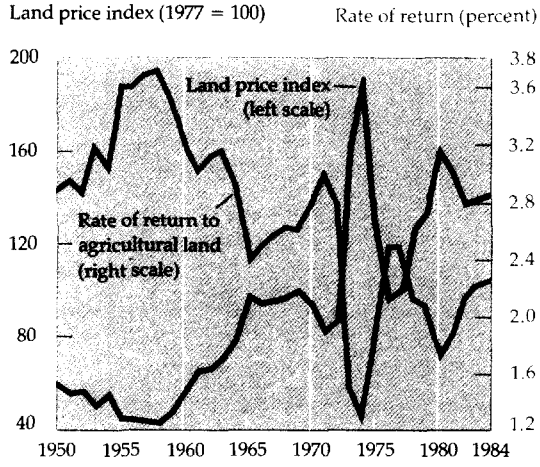
Box 6.6 Commodity prices, rent, and rates of return

When the price of an agricultural commodity rises, the immediate result is an increase in the rate of return to farmers. If they expect the price to remain high in the future, they will grow more. Ordinarily, this would tend to drive the price down. But if the price rise is the result of government policy and can be maintained by subsidies or government purchases, the price may stay high for a long time. Then, as farmers attempt to increase their output, they compete for resources with businessmen elsewhere in the economy. As long as they are prepared to pay slightly more for labor and capital, farmers can attract these resources into agriculture. Prices of labor and capital in agriculture are therefore determined by the returns earned elsewhere and remain independent of agricultural prices and policy. In the long term, this is true even of the incomes of farmers. If their profits fall low enough, farmers will leave farming more rapidly.

For land, the situation is different. The stock of cultivable land in industrial countries is more or less fixed, so excess demand resulting from high farm prices and incomes will tend to bid up land rents. This will continue until the excess demand disappears—that is, until farmers who rent land earn only average profits. For this to happen, all the extra revenue generated by higher prices must be absorbed into rental values. Of course, if rents rise, so will the price of land, for people will try to buy land until the rate of return equals that available elsewhere in the economy. In the long run neither suppliers of capital nor land buyers gain from higher agricultural prices. Only landowners gain, because they can rent or sell land at higher prices.

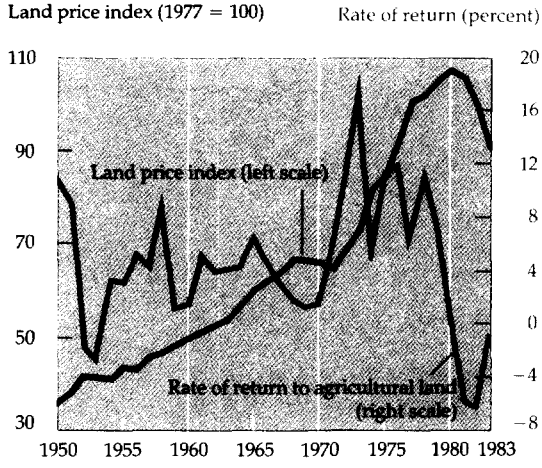
Box figure 6.6A plots the rate of return to owning land against land prices in the United Kingdom. The rate of return is measured as the annual rental value of land divided by the price of land. Sharp increases in farm incomes during the 1960s and in 1973, when Britain joined the EC, are reflected in land prices but not in the rate of return, which has been declining for most of the period since 1955.

Box figure 6.6A Real land prices and the rate of return to land in the United Kingdom, 1950–84



Source: Traill 1980.

Box figure 6.6B Real land prices and the rate of return to land in the United States, 1950–83



Source: Phipps 1985.

Box figure 6.6B shows similar data for the United States, except here the returns include appreciation in the price of land as well as current income generated. A study of these data indicated that payments to farmers and acreage diversions were effective in raising the rental returns to land. Each $1 billion permanent rise in government payments generated a $0.96 increase in returns per acre and a $15.21 rise in the price of an acre of land. There was no effect on the rate of return to investment in farming. U.S. policies were more unstable than those of the United Kingdom, and commodity prices varied more. Large short-term price fluctuations occurred, especially during the commodity price boom of the 1970s and the price collapse of the 1980s. But, overall, the rate of return in agriculture tended to follow the general rate of return in the economy and was not affected by agricultural policies.

panding output and depressing domestic demand, their policies reduce world prices and distort the relative prices of agricultural and manufactured goods. By granting special trading privileges to remedy some of the harm, industrial countries can make matters worse. And by destabilizing international markets, their farm policies can amplify rather than dampen commodity price fluctuations. This section quantifies these effects using the results of recent studies that look at what would happen to trade if the policies were liberalized.

Supply and price effects

How much agricultural policies in industrial countries depress world prices depends on four things: the level of protection, the extent to which domestic surpluses lead to reduced imports or subsidized exports, the share of world output and consumption accounted for by the industrial countries, and the responsiveness of supply and demand to price changes in the world markets.

Agricultural prices and costs are the key to the profitability of investment in agriculture. In industrial countries, resources are diverted from other sectors to agriculture. In developing countries, which face low world prices for agricultural products but nonetheless tax domestic production, resources are diverted from agriculture to industry. As a result, agricultural production is favored in industrial countries, even though in some of them the costs of production are higher than in many developing countries. This makes developing countries export less and import more, even though they could become—if they are not already—efficient producers by making investments to acquire the necessary technology. The longer agricultural protection is maintained in industrial countries, the more damaging it will be to the world economy.

The impact of agricultural protection differs from one developing country to another. It depends on whether the country is a net importer or exporter of each product. Exporters of commodities that are in surplus in the industrial countries are most vulnerable. Thailand, which is heavily dependent on exports of rice, has been severely threatened by the recent cut in the U.S. export price of rice. To reduce its surpluses, the United States slashed the price almost in half—from $8.00 a hundredweight in 1985 to about $4.20 as of mid-April 1986. In contrast, net food importers benefit from the low world prices caused by current policies, and at first sight it may appear that they would lose from liberalization. But this need not be so if they liberalize their domestic policies and allow domestic production to substitute for imports. Moreover, some developing countries would be able to increase their exports or become exporters for the first time.

The rate of protection varies among agricultural products. So protection not only depresses the overall level of world prices, but also distorts relative prices among agricultural products. Prices for the most highly protected products—dairy products, beef, and sugar—are depressed more than prices of other agricultural products. These distorted prices make the use of resources in world agriculture even less efficient. If Japan were to reduce its protection of rice of the varieties in which other Asian countries have a comparative advantage, they could produce more. Until recently, farmers in the Netherlands produced vegetables in greenhouses because energy costs were subsidized. This discouraged Mediterranean countries from exploiting their natural advantages in these products.

Differing rates of protection hit developing countries especially hard when the rate of protection is higher for processed agricultural products than for unprocessed ones. Tariffs in industrial countries are higher for wheat flour, pasta, cheese, and poultry than they are for wheat, milk, or feed grains (see Box 6.7). As a result, industrial countries export larger quantities, and import smaller quantities, of processed goods than of the related raw materials. The EC accounts for 11.4 percent of world wheat exports but 48.9 percent of wheat flour exports.

Subsidies and trade preferences

Some industrial countries have to give subsidies to sell crops on world markets. Developing countries' competitiveness, therefore, depends less on their own efficiency than on political decisions in industrial countries. And their ability to compete may be undermined at any time by increased export subsidies on industrial countries' exports. Even when industrial countries appear to provide developing ones with market opportunities, the gains may not last. High grain prices in the EC created new markets for feed grain substitutes such as cassava, corn gluten feed, and citrus pellets. But China, Indonesia, and Thailand, which produce cassava, had to sign "voluntary" export restraint agreements.

When a high-cost importing country becomes an exporter, potential gains from trade are wasted.

The losses are often made worse by the special trade preferences that industrial countries grant to developing ones in the hope of mitigating these distortions. In some cases, industrial countries which produce an exportable surplus of a crop have to import it under the trade preference scheme. The EC imports dairy products from New Zealand and beef from some African, Caribbean,

Box 6.7 Protection and agroprocessing

Most goods are not purchased in their raw form but go through several stages of processing. International trade can occur at any stage, so the location of particular activities is an important issue.

In some cases, transport costs and technology determine location. The dilution and bottling of concentrated soft drinks take place near the final point of sale to economize on transport costs. For the same reason, cassava is converted into pellets in its country of origin before export. In many cases, however, the best place to locate a processing industry depends on a wide range of production costs. For labor-intensive industries in particular, developing countries should be well represented among processing countries. Yet this is much less the case than might be expected.

An important reason is the pattern of industrial countries' protection. Industrial countries have escalating tariffs for most goods—that is, tariffs are higher on more highly processed forms of a good. For many agricultural goods, the higher tariffs are buttressed by a wide array of nontariff barriers. As goods become more highly processed—and embody more labor and capital services—developing countries face increasing barriers to sales in the world's major markets. Box table 6.7 illustrates tariff and nontariff barriers on a range of products imported by industrial countries.

Even apparently mild escalation can severely disadvantage developing countries that try to establish a processing industry. Suppose that 70 percent of the cost of processed leather is accounted for by the rawhides and that all countries can purchase hides at the same price on world markets. A developing-country producer making leather worth $1.00 on the world market earns $0.30, out of which he must pay for labor and capital and retain profits. Now consider an industrial-country producer protected by a tariff barrier of 4 percent. The same leather worth $1.00 on world markets sells for $1.04 domestically. So he earns $0.34, or 13.3 percent more than the producer in the developing country. That is, the developing-country producer has to be 13.3 percent more efficient than the domestic producer if he is to sell in the industrial country. Economists refer to this 13.3 percent—the extent to which value added behind the tariff wall exceeds value added at world prices—as the effective rate of protection.

The degrees of escalation in the table often exceed 4 percent, so rates of effective protection can be very high. In an extreme case, that of Sweden in 1969–70, effective rates of protection have been as high as 1,480 percent (soybean oil), 1,050 percent (coconut oil), 165 percent (corn milling), and 102 percent (flour).

By blocking this first and most natural step toward industrialization, escalating protection on agroprocessing severely disrupts the process of development. Developing countries often respond by subsidizing local processing industries. Almost inevitably, this encourages inefficiency and compounds the direct harm arising from industrial countries' tariffs.

Box table 6.7 Tariffs and nontariff barriers in industrial countries

Product and stage of production	*Average tariff rates[a] (percent)*	*Percentage of imports subject to NTBs[b]*
Fish		
Stage 1: fresh	3.5	35
Stage 2: prepared	5.5	31
Vegetables		
Stage 1: fresh or dried	8.9	39
Stage 2: prepared	12.4	48
Fruit		
Stage 1: fresh	4.8	20
Stage 2: prepared	14.4	54
Coffee		
Stage 1: green, roasted	6.8	11
Stage 2: processed	9.4	17
Cocoa		
Stage 1: beans	2.6	0
Stage 2: processed	4.3	0
Stage 3: chocolate	11.8	14
Oils		
Stage 1: seeds	2.7	33
Stage 2: fixed vegetable oils	8.1	56
Tobacco		
Stage 1: unmanufactured	55.8	11
Stage 2: manufactured	81.8	22
Rubber		
Stage 1: natural	2.3	0
Stage 2: processed	2.9	6
Stage 3: rubber articles	6.7	14
Leather		
Stage 1: rawhide and skin	0.0	0
Stage 2: processed	4.2	13
Stage 3: leather articles and footwear	9.6	26

a. Data are for Australia, Austria, Canada, the EC (excluding Greece, Portugal, and Spain), Finland, Japan, New Zealand, Norway, Sweden, and Switzerland.
b. Data are for Australia, Austria, Canada, the EC (excluding Greece, Portugal, and Spain), Finland, Israel, Japan, New Zealand, Norway, Sweden, Switzerland, and the United States.
Source: Yeats 1981 and UNCTAD data.

and Pacific countries. These trade flows raise income in the exporting countries which are part of the preference scheme, but importers and potential exporters outside the scheme suffer greater losses. Increases in production costs and transport and other marketing costs account for the net worldwide loss.

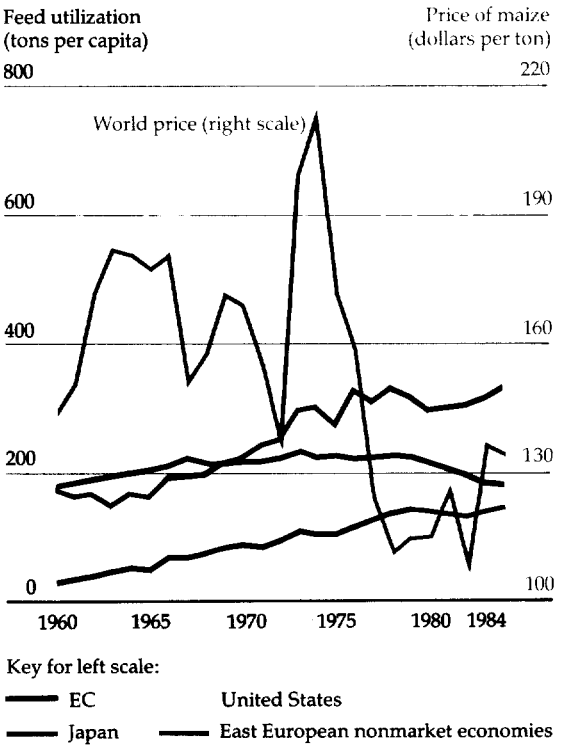
Destabilization of world markets

Most industrial countries hold domestic consumer prices relatively constant when world market prices change. A shortfall in world output will not affect demand in a country which insulates its domestic markets. But someone's consumption must be reduced. And if some countries refuse to cut their consumption, others must reduce theirs disproportionately. To ration the world output, world prices have to rise by more. If meat consumption and demand for feed grains were allowed to change with world market prices, cereal prices would fluctuate less—thus reducing the risk of food shortages in developing countries. Figure 6.3 shows that among major industrial countries only the United States reduced per capita feed consumption significantly when prices soared in 1974–75. Consumption in the EC, in other industrial countries, and in the East European nonmarket economies hardly changed.

The price changes caused by sudden supply or demand shocks can be absorbed by commodity stockpiles. Chapter 7 looks at attempts to coordinate stockpiling policies internationally. But national stockpiles are no less influential. In theory, world prices could be stabilized even if most countries insulated their markets, as long as countries or private individuals that operated on the free market held big enough stocks. But the more countries insulate their economies, the greater the size of the stockpiles needed. One study of fourteen regions found that stocks had to be eight times larger if the regions completely insulated their economies than if they allowed free trade. The cost of the extra stocks indicates one source of gain from liberalization. For crops that can be grown under a wide variety of conditions at similar costs, important gains from trade arise from temporary trade flows as each country's yield varies from year to year. Policies that insulate domestic markets sacrifice these gains.

Decisions to build up or release stocks are often made not by private traders but by governments. As in developing countries (see Chapter 5), governments in industrial countries determine the size

Figure 6.3 Per capita feed utilization and maize prices in selected industrial regions, 1960–84



Source: USDA 1985d.

of public stockpiles according to how much money is available from the budget or in response to other political pressures rather than by the size of stockpile needed for stabilization purposes. In the mid-1970s some countries built up stocks when they should have been releasing them, and this made the world food crisis worse. In June 1973, after world wheat prices had almost doubled in twelve months, wheat stocks were estimated to have risen by 2.0 million tons in the U.S.S.R. and by 0.2 million tons in Japan. By the following June, when prices had increased by an additional 30 percent, stocks in the EC and the U.S.S.R. had increased by an additional 0.3 and 14.0 million tons, respectively. Even wheat exporters increased their stocks: Canada by 0.2 million tons and Australia by 1.4 million tons between 1972–73 and 1973–74.

Counting the costs of protection

Because of the distortions in every trading country, the whole world would be better off if industrial countries were to stop protecting their farmers

Table 6.6 Changes in export revenue, import costs, and efficiency gains for selected commodities of developing countries caused by a 50 percent decrease in OECD tariff rates, 1975–77
(millions of 1980 dollars)

Commodity	Absolute increase		
	All developing countries[a]	*Low-income countries*	*Middle- and high-income countries*
Change in export revenue			
Sugar	2,108	394	1,714
Beverages and tobacco	686	191	495
Meats	655	33	620
Coffee	540	123	417
Vegetable oils	400	60	339
Cocoa	287	21	265
Temperate-zone fruits and vegetables	197	60	137
Oilseeds and oil nuts	109	19	90
Other commodities	883	96	788
Total increase for all exports	5,866	998	4,867
Change in import costs			
Cereals	−876	−530	−345
Other commodities	−497	−152	−345
Total increase for all imports	−1,373	−683	−690
Memo item: efficiency gains	922	−4	926

Note: As explained in Chapter 4, efficiency gains are estimates of the increase in the net sum of producer and consumer gains and losses, adjusted for tax revenue changes; they are not measures of the difference between the increases in export revenues and import costs. Results of further work on a later period reported by Zietz and Valdes (1985) for sugar and beef indicate somewhat larger gains in export revenue than shown here.
a. Includes developing countries with populations of more than 4 million in mid-1985.
Source: Valdes and Zietz 1980, pp. 31, 47.

and liberalize agricultural trade. But by how much? Recent studies have made some progress in quantifying the gains from liberalization.

The effects of trade and policy liberalization can be observed when trade or domestic policies are liberalized. Unfortunately, liberalization experiments are rare. Estimates of multilateral or global liberalization can be made only with the aid of simulation models.

Table 6.6 shows the results of a study by Valdes and Zietz. They asked what would have happened to developing countries if the OECD countries had cut their tariffs on ninety-nine commodities by 50 percent. The study is based on figures for 1975–77. According to Valdes and Zietz, developing countries' income would have increased by $922 million in 1977 and their export revenues by almost $6 billion. Total export revenue would have risen by 11.0 percent; exports of low-income countries would have risen by 8.5 percent. Because protection in the OECD countries has increased since 1977, the benefits of liberalization would be substantially greater in 1985.

Developing countries' gains would have arisen mainly from increases in the prices of tropical exports. The price of roasted coffee would have been 10.8 percent higher, that of coffee extracts 6.4 percent higher, cocoa paste cake 11 percent, and cocoa butter oil 9 percent. Losses would have occurred from higher prices of imported temperate-zone crops, especially cereals. But increases in export revenue would have more than compensated for such losses. Valdes and Zietz estimated that prices of most tropical products would have gone up more than the price of wheat, the most important agricultural import of developing countries. These estimates ignore certain nontariff barriers to trade. They also omit other important long-term effects. Liberalizing agricultural policies of industrial countries would encourage outward-oriented policies in developing countries, stimulate investment and research in agriculture, and increase the export potential of tropical products by more than the figures in Table 6.6 suggest. It is also likely that, because of cost advantages, some developing countries would become exporters of commodities that they import under current policies of the industrial countries. The estimates, therefore, probably represent the minimum benefits of liberalization.

Because policies interact, it is difficult to judge what would happen across the world as a result of liberalization by groups of countries. European and Japanese policies tend to reduce world prices

of wheat and rice; the acreage control policies of the United States have tended to increase them. It is possible that the policies could offset one another so that industrial countries would lose while the trade of developing countries remained relatively unaffected. But if the policies of industrial countries reinforced one another (as in sugar and dairy products), the consequences for developing countries would be more dramatic.

Interactions between commodities are also important. Industrial countries do not, on the whole, intervene in markets for vegetable oils (such as palm oil or coconut oil). But these may still be depressed by industrial countries' policies in other markets. The EC's feed grain policies increase demand for feed grain substitutes, such as soybean meal. This helps oilseed exporters such as Argentina, Brazil, and the United States. But because meal and soybean oil are joint products, these policies also affect the oil markets. Similarly, U.S. grain price supports and acreage controls encourage production of soybeans, which is not controlled. Thus, as a by-product of industrial countries' policies, soybean production is encouraged, which depresses the world price of vegetable oils, which harms export earnings of developing countries from palm oil and coconut oil.

Estimates of liberalization can reflect the complexities of world markets by focusing on the connections between commodity markets. That is what a study by Tyers and Anderson does (see Box 6.8). They simulated the effects of unilateral trade liberalization by individual countries or groups of countries as well as of simultaneous liberalization by both industrial and developing countries. Although Tyers and Anderson cover only the main temperate-zone commodities—and thus omit the most important sources of gains to developing countries—they nevertheless throw light on important aspects of trade and policy liberalization. Qualitatively similar results were also obtained in a study of free trade in agriculture carried out at the International Institute for Applied Systems Analysis.

Table 6.7 shows what Tyers and Anderson estimate would happen to world prices and trade under several scenarios: unilateral liberalization by the EC, Japan, and the United States; multilateral liberalization by all industrial countries and by all developing countries; and global liberalization. All the simulations indicate that the volume of world trade in the group of commodities studied would rise, although cross-price effects would entail small reductions for a few individual commodities. Unilateral liberalization by the EC would reduce world trade in sugar because both its subsidized exports and its preferential imports would end.

Most of the projections indicate that world prices would rise. There are two exceptions: U.S. liberalization, which would reduce world prices slightly because ending acreage controls would increase output of grains and rice; and developing-country liberalization of rice and some livestock products, which would reduce world prices by ending the taxation of domestic producers that currently holds down production.

Developing countries face higher import prices when industrial countries liberalize. As a result,

Table 6.7 International price and trade effects of liberalization of selected commodity markets, 1985

Country or country group in which liberalization takes place	*Wheat*	*Coarse grains*	*Rice*	*Beef and lamb*	*Pork and poultry*	*Dairy products*	*Sugar*
	Percentage change in international price level following liberalization						
EC	1	3	1	10	2	12	3
Japan	0	0	4	4	1	3	1
United States	1	−3	0	0	−1	5	1
OECD	2	1	5	16	2	27	5
Developing countries	7	3	−12	0	−4	36	3
All market economies	9	4	−8	16	−2	67	8
	Percentage change in world trade volume following liberalization						
EC	0	4	0	107	3	34	−5
Japan	0	3	30	57	−8	28	1
United States	0	14	−2	14	7	50	3
OECD	−1	19	32	195	18	95	2
Developing countries	7	12	75	68	260	330	60
All market economies	6	30	97	235	295	190	60

Note: Data are based on the removal of the rates of protection in effect in 1980–82. Data for the EC exclude Greece, Portugal, and Spain.
Source: Tyers and Anderson (background paper).

Box 6.8 Simulation of liberalized agricultural policies

A study by Tyers and Anderson constructs a model for simulating the effects of lowering trade barriers. It represents the world agricultural economy as a system of supply and demand equations for seven commodity groups in thirty countries or groups of countries. The commodities are wheat, coarse grains, rice, beef and lamb, pork and poultry, dairy products, and sugar. The effects of tariff and nontariff barriers are represented by nominal protection coefficients for each commodity, measured over the period 1980–82 (see Table 6.1).

To solve the model, a computer finds a set of international prices at which world supply and demand for each commodity balance and a set of domestic prices at which each country's own markets clear. The effects of liberalization can be worked out by solving the model twice: first by assuming current agricultural policies and then by assuming that the trade barriers and domestic interventions have been removed. The differences in prices represent the effects of liberalization. Once the prices are known, trade flows and transfers of income can be calculated for each country and commodity.

The Tyers and Anderson model can allow for random shocks to represent such factors as weather and disease. Under both assumptions—actual trade policy and liberalization—the model is solved 100 times using a specified series of shocks. These experiments suggest how different policy regimes cope with an uncertain world.

Results of this model are reported in Tables 6.7 and 6.8 in the text. Their relevance to the assessment of the long-term effects of liberalization in 1986 depends on a number of factors:

- The accuracy of the estimates of protection and the responses of supply and demand to changes in prices. While these can never be known with certainty, the estimates used here are based on the most recent data available and the most thorough analysis possible.
- Changes in protection since the model's 1980–82 base.
- The differences between behavior in the long run—when investment and research effort can be redirected and technology changed—and the medium-term estimates of behavior in the model.
- The importance of the fact that the model's coverage is limited, since it ignores tropical agriculture and all nonagricultural activities and income.
- The accuracy of the model's assumptions about how countries whose liberalization is not being considered would react to their neighbors' liberalization.

This list suggests that the model's results will be very imprecise. It does not, however, undermine the basic messages of the text. Indeed, the quoted figures will almost certainly be underestimates of the benefits of trade liberalization to developing countries for the following reasons:

- Current protection coefficients in industrial countries exceed those of 1980–82.
- In the long run, higher prices will stimulate investment and research in developing countries' agriculture.
- Unshackling agriculture will stimulate savings, growth, and efficiency throughout agriculturally dependent economies.
- If developing countries' export goods were liberalized as well as their (temperate-zone) import goods, trade expansion would occur.
- If developing countries exploit the opportunities that industrial-country liberalization would grant them, by deregulating their own agriculture, significant supply expansion would be feasible.

Overall, therefore, while the computer model is no substitute for economic analysis of observed policy experiments, its estimates of the benefits of trade liberalization indicate the strong advantages of such a policy.

they import less and export more. Because imports exceed exports, the simulated higher prices yield a net loss (estimated at $11.8 billion in Table 6.8) to consumers and producers. The implication that developing countries lose is misleading for three reasons. First, the study looks at temperate-zone crops, of which developing countries are the main importers. If tropical products were to be included, we would expect to see a substantially different story, as Valdes and Zietz did. Second, under free trade some developing countries might, in the long run, become exporters of these products. Third, even Tyers and Anderson's study shows that developing countries could gain $18.3 billion if they liberalized their own agricultural policies along with the industrial countries.

In the Tyers and Anderson study, liberalization by developing countries means the removal of distortions in border prices by sixteen individual and four regional groups of developing countries and no overvaluations of the exchange rates. The results (see Table 6.7) are that the world price of rice would fall 12 percent, while prices of grain, sugar, and dairy products would rise. The grain and dairy prices would rise because the main developing countries in the study were importers of these products and they maintained internal prices above world prices. Ending this protection would

Table 6.8 Efficiency gains caused by liberalization of selected commodities, by country group, 1985
(billions of 1980 dollars)

Country group	Industrial-country liberalization	Developing-country liberalization	Industrial- and developing-country liberalization
Developing countries	−11.8	28.2	18.3
Industrial market economies	48.5	−10.2	45.9
East European nonmarket economies	−11.1	−13.1	−23.1
Worldwide	25.6	4.9	41.1

Note: Data are based on the removal of the rates of protection in effect in 1980–82.
Source: Tyers and Anderson (background paper).

increase imports and hence prices. Liberalizing the grain policies of developing countries would have a bigger impact on prices than liberalization by the OECD countries because the OECD countries' grain policies tended to offset one another in the period studied.

The projections show that the main beneficiaries of unilateral liberalization are the liberalizers themselves (see Table 6.8). Industrial countries would gain $48.5 billion if they liberalized unilaterally; developing countries would gain $28.2 billion if they did the same. But each imposes losses on the other. If both groups liberalized, neither would gain quite as much individually, but the world would be even better off.

So why do countries not tear down their agricultural policies? The reason, of course, is that the interest groups whose support the policies aim to capture would lose. With OECD liberalization, the overall gain to the industrial countries would be $48.5 billion. But this figure comprises a net gain of $104.1 billion to OECD consumers and taxpayers and a $55.6 billion loss to producers.

It is interesting to note that the OECD countries spent $27 billion annually during 1980–84 on official development assistance. With global liberalization, the industrial and developing countries would together gain about $64 billion annually—more than double the level of official development assistance from OECD countries.

Losses to farmers would tend to be smaller if countries liberalized together rather than on their own. The reason is that the declines in producer prices would be less. Consider dairy products, one of the most protected products in industrial countries. Unilateral liberalization of the U.S. dairy policy would push up world prices by 5 percent (see Table 6.7). This would imply a cut in U.S. producer prices of as much as 46 percent. But if all industrial countries were to liberalize simultaneously, world dairy prices would rise 27 percent, and the U.S. producer price would have to fall only 24 percent. Indeed, if developing countries liberalized as well, the world price would rise above the former protected price.

The biggest gains from current policies accrue mainly to the East European nonmarket economies. They would be worse off by $11 billion if industrial countries liberalized, by $13 billion if developing countries liberalized, and by $23 billion with global liberalization. They would not reduce their imports as much as the developing countries, and they would have less scope for exporting those goods whose prices would rise.

Would prices become more volatile if agricultural policies and trade were liberalized? Two recent

Table 6.9 Effects of liberalization on price instability, 1985

Commodity	Coefficient of variation[a]			
	Without liberalization	With industrial-country liberalization	With developing-country liberalization	With global market liberalization
Wheat	0.45	0.30	0.23	0.10
Coarse grains	0.19	0.17	0.14	0.08
Rice	0.31	0.25	0.14	0.08
Beef and lamb	0.06	0.04	0.05	0.03
Pork and poultry	0.09	0.07	0.06	0.04
Dairy products	0.16	0.07	0.07	0.04
Sugar	0.20	0.17	0.07	0.04

a. The expected deviation from the long-term average price in any particular year as a percentage of the average price.
Source: Tyers and Anderson (background paper).

studies indicate that liberalization would make prices more stable. According to one estimate, by Schiff, the variability of world wheat prices could be reduced by 48 percent if all countries were to end their protective wheat policies. A second study found that liberalization by industrial countries would reduce the price variability of all the major temperate-zone commodities. The variability of wheat prices would fall by 33 percent and that of sugar by 15 percent (see Table 6.9). Liberalization by developing countries might stabilize prices even more, because these countries insulate their domestic markets to a greater extent than do some industrial ones; they also have a larger share of world consumption. This second study needs to be interpreted with more caution than usual: among other things, it assumes that internal prices in China and India would move in line with world prices. This seems unlikely, so consumption would not adjust fully to scarcity or abundance in world markets. Nonetheless, the findings of the two studies, even if they exaggerate the impact of developing countries, confirm that liberalized trade is more effective at price stabilization than even the most elaborate international commodity-stockpiling schemes. It is to those efforts that we turn in Chapter 7.